REDACTED VERSION

PRELIMINARY ASSESSMENT
of the
WILCOX OIL COMPANY

located in
BRISTOW, CREEK COUNTY, OKLAHOMA

TATE OF OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

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I. Introduction

The State of Oklahoma Department of Environmental Quality (DEQ) is tasked by the U.S. Environmental Protection Agency (EPA), as authorized by CERCLA and as amended by SARA, under the Multi-Site Cooperative Agreement (CA# V-00645-01) to conduct a Preliminary Assessment (PA) of the Wilcox Oil Company site, (CERCLIS ID # not yet assigned). The primary purpose of this PA is to assess the immediate or potential threat of wastes at the site that may impact public and environmental health and to collect information sufficient to support a decision regarding the need for further action under CERCLA/SARA. The scope of this investigation includes the review of available information from DEQ and other State agencies' files, a comprehensive target survey, and a site reconnaissance.

II. Site Description, Operational History, and Waste Characteristics

Site Description

The original site of the Wilcox Oil Company refinery is located in the NE/4 NW/4, NW/4 of Section 29-T16N-R9E (IM) Creek County, Oklahoma, along the east side of the St. Louis and San Francisco railroad right of way and is situated about 0.75 miles northeast of the Bristow City Hall (References 1; 2; Figures 1, 2, 3). The railroad extends northeast-southwest though the NW/4 NW/4 of section 29. Another feature of the area is Sand Creek which flows to the southeast across the NW/4 of Section 29. Coordinates of the site are 35° 50' 31.39" north latitude and 96° 23' 02.05" west longitude (Reference 3).

Operations at the oil refinery site began in the 1920's and the property was sold by Wilcox Oil Company on November 1st, 1963 (References 4; 5E; 6J; 6K). It is assumed that the company operated the refinery for all of this 35 to 40 year time period. Most of the equipment and storage tanks which remained on site in 1963 were auctioned and have been salvaged for scrap iron by private land owners (Reference 5E). After conducting the PRP search and the site reconnaissance, it was found that the Wilcox Oil Company actually owned more land than was originally considered to be the site, as indicated by the Sanborn Fire Insurance Map for Bristow (References 2; 6J; 6K; 6M; 7). It was determined that the size of the site should be expanded to include approximately 75 acres north of Sand Creek in the N/2 NW/4 and 40 acres in the NW/4 NE/4 of Section 29.

A tank farm with 50,000 barrel storage tanks and surface impoundments existed on the east 80 acres of the expanded site (NE/4 NW/4 & NW/4 NE/4 of Section 29) (References 2; 5E). Most of the tank farm area is currently owned by Mr. (b) (6) of Bristow, Oklahoma; home address unknown (Reference 5E). It is rural/undeveloped

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land just outside the city limits of Bristow Oklahoma, and there are no structures or storage tanks currently on this part of the site (Reference 2). On the north the land is separated from the east-west section line county road by a barbed wire fence which has an unlocked gate. The gate is located at the north quarter corner of Section 29 where a lease road enters the property, trending south along a topographic high. Another entrance to the (b) property is located along the west side where a lease road extends southeast from a private drive which trends south from the north section line road. An area of about 2.5 acres in the northwest corner of the tank farm area is fenced. This is believed to be a gas pipeline compressor station (Reference 5S). A pipeline easement extends to the southeast from this location (Reference 2). It is marked with flagging and identifiable as a cleared path about twenty five feet wide. A south trending creek is located along the eastern portion of the (b) property (Reference 2). The eastern part of the property drains to the south and southeast while surface drainage in the west is to the southwest and south (Reference 2; Figure 1). The eastern 1/4 of the property is heavily wooded (Reference 2). While a tree line is present along the southern fenced property boundary and trees are randomly scattered elsewhere, most of the remaining areas of the property are covered with grasses and brush (Reference 5). The land to the south is cleared of trees and is probably used for agricultural purposes, either farming or for grazing cattle (Reference 2).

The original refinery site, which is located inside the fenced area just east of the railroad right of way, is currently owned by (b) (6) and covers approximately 13 acres (References 1; 6A; 6L; 7). The (b) (6) property, which is completely fenced on all sides with a locked gate entrance on the north side, is located within a rural/underdeveloped setting just northeast of Bristow (Reference 2). The east-west section line road marks the north boundary of the property. The west side borders the railroad right of way. On the east side is a private drive extending south from the section line road. About 400 feet south of the section line road the fence angles southwest from the private drive then turns south after crossing a small creek and continues to Sand Creek. The southern border of the property is marked by the fence's position along the north bank of Sand Creek. The total area is about 18 acres, which is larger than what is described on their deed (13 acres, more or less) due to the fact that the fence extends all the way to Sand Creek (References 2; 5E).

Four storage tanks (12,500 gallons each) and an abundant number of pipe pieces and scrap iron are present on the (b) (6) property (Reference 2). There are several brick structures remaining on the west side near the railroad right of way. One of the old facility structures located on the north side next to the section line road is being used as a residence. Concrete tank, tower and facility foundations are present at numerous places. A small south trending creek is located along the east side of the (b) property. Surface drainage is to the east and south (Reference 2; Figure 1). Trees and dense vegetation are present along the banks of the creeks and on the west side of the property. The remnants of several tanks, which had been salvaged for scrap iron, are

present (References 2, 5E).

The property bordering the railroad right of way on the west is owned by the Bristow First Assembly of God church (Reference 6B). The southern boundary of the church property is Sand Creek. The western and northern boundaries are believed to be the section lines. There are no fences. A gravel drive enters the property from the northeast corner to a gravel parking lot north of the church building itself Reference 2). The building west of the church is a residence (Reference 5R). South of the church is an unoccupied mobile home which is to be used as a residence (Reference 5R). Two storage sheds are present near the mobile home. The ground is covered with mowed grass except for the parking lot and for trees located along the bank of Sand Creek. The church property drains to the west and south (Reference 2; Figure 1).

There are no schools or day-care centers near the site (References 2; 5R). There are three residences considered to be on site (References 2; 5E; 5Q; 5R). A residential area of Bristow is located just south of the (b) (6) property across Sand Creek (Reference 2). Four residences are located just north of the east-west section line road which marks the northern extent of the refinery site (Reference 2). Activities at the site involve domestic activities associated with the residences; salvaging of scrap iron from the remaining refinery equipment on the (b) (6) property; activities associated with the church; hunting on the (b) property; and occasional dirt work on all the properties (References 2; 5Q; 5R; 5S).

Operational History

The Wilcox Oil Company operated a crude oil refinery from the 1920's to early 1960's (References 4; 6). It was operated as a pilot project from about 1920 to 1928 at 1,000 barrels of oil per day by Riley Petroleum Company (Reference 4). The Sanborn Fire Insurance Map shows the various components of the facility (Reference 7). A modern skimming and cracking plant was constructed in 1929 which had an operating capacity of 4,000 barrels of crude oil per day (BOPD) (Reference 4). The main components of the new system consisted of a skimming plant, cracking unit, and redistillation battery with a vapor recovery system and continuous treating equipment (Reference 4). The crude oil was brought directly from the field, which eliminated storage and handling facilities but resulted in crude with high bottom sediment and water (b. s. & w.) (Reference 4). It is assumed that Wilcox Oil Company expanded operations at some later date since they acquired the former Lorraine Refinery facility west of the railroad and the tank farm area to the east (References 4; 6). Wilcox Oil Company acquired the original site (NE/4 NW/4 NW/4 of Section 29) on October 11, 1928, from (b) (6) (Reference 6J). The company sold the original site plus the expanded areas totaling about 110 acres, more or less, to (b) (6) on November 1, 1963 (Reference 6K). Wilcox Oil Company no longer operates in Oklahoma (Reference 5O). It is believed that this company merged with Tenneco Oil Company in 1967 (References 5O; 6). Tenneco operates in Oklahoma and is "in good standing" with the Secretary of State (Reference

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5O). [redacted] acquired the original refinery site from [redacted] on March 27, 1973 (References 6A; 6L).

DEQ received positive responses to its inquiries concerning access to the site from the current owners who, according to Oklahoma County Assessor's Office, are Messrs. [redacted] and [redacted], and the Bristow First Assembly of God church (References 6; 8). An on site reconnaissance was conducted by DEQ on December 16, 1994 (Reference 2). There are no existing complaints regarding the site in the Creek County Health Department files or records from other state institutions including the Corporation Commission, the Water Resources Board, and the Department of Environmental Quality (References 5J; 5K; 5L; 5M; 5N).

Waste Characteristics

The raw crude oil contained high percentages of bottom sediment and water (b. s. & w.), that was separated and represents the initial component of the waste stream at the site. The suspected waste stream components are: b. s. & w. (i.e., tank residues & brine); acid and caustic sludges; lead (sodium plumbite, Na_2PbO_2); coke; elemental sulfur; and possibly solvents (References 2; 4). Waste volumes are estimated to be large, i.e., at 1 % b. s. & w., the 4,000 BOPD refinery capacity would result in a waste stream of 40 barrels per day of waste if operated at capacity. The coke production was reported to be 7 to 8 tons per month which was transported off site by railroad and sold (Reference 4). The sodium plumbite was used as a Doctor solution additive for gasoline odors (Reference 4). Other potential contaminants such as the products (naphtha, gasoline, kerosine, fuel oil, and furnace oil) and raw crude oil are excluded under CERCLA (References 4; 9).

The soil survey classification for the site is oil-waste land which indicates that the area was impacted in 1950 by oil and salt water wastes from oil wells (Reference 10). This classification corresponds to miscellaneous land types which are gullied and eroded and are almost bare of vegetation. Comparison of aerial photos taken in 1941 with one flown in 1991 shows that there is quite a bit more vegetation currently (References 3B; 3E). Several surface impoundments containing oily sludge totaling about 4 acres in area are visible on both photos in the NE/4 NW/4 of Section 29 (References 3; 3B; 3E; Photo 1).

About 6.5 acres of asphalt-like material (presumably tank bottoms) is present within the storage tank retention berms located in the 80 acre tank farm area (References 3; 3F). The original refinery site (the [redacted] property) contains some refinery equipment in various states of disrepair and several brick structures (References 3; 1; 7). An area barren of vegetation about 2 acres in size (200 by 400 feet) is present in the south central portion of the [redacted] property (References 3; 3F; Photo 2). Coke and asphalt-like material is scattered over the ground surface in two areas about 1 acre (200 by 200 feet) each in size (References 3; 3F; Photo 3). What appears to be tank bottom sediment and

oily sludge was observed in one remnant tank bottom (Reference 3; Photo 4). This material is presumed to be present in the remaining four tanks on this site and in the bermed areas, totaling about 1 acre in size (Reference 3; 3F). The church's property has several areas, totaling about 5,000 square feet in size that have barren to sparse vegetation (Reference 3). Apparently, some oily waste was discovered on site about 2 feet below ground level when the church installed lateral lines (Reference 5U). Due to the evidence presented above, it will be assumed in this investigation that approximately 15.5 acres of the on site surface has been contaminated with hazardous substances.

III. Pathway and Environmental Hazard Assessment

Groundwater

The Barnsdall Formation outcrops at the Wilcox Oil Company refinery site and potentially receives ground water recharge from downward infiltration of precipitation falling on the ground surface (Reference 11). The Barnsdall Formation is a bedrock aquifer but is not considered to be a Principal Ground Water Resource by the Oklahoma State Department of Health (Reference 11). The site is in close proximity to an alluvial aquifer located less than one half mile to the south (Reference 11).

The alluvial deposits consist of wedge shaped layers of sand, silt, clay, and gravel. These deposits are found along Sand and Little Deep Fork Creeks and range from 0 to 100 feet in thickness (Reference 11). The Barnsdall Formation is approximately 200 feet thick at the site and consists of massive to thin beds of coarse to fine grain sandstone, irregularly interbedded with sandy to silty shale (Reference 11).

There is no indication that the site is located in an area of karst terrain (Reference 11; Figure 1). There are no faults mapped at the site (Reference 11). The soil survey has mapped the site as oil-waste land (Reference 10), indicating contamination at the ground surface. The Stephensville and Darnell fine sandy loam series (sloping) are the soils most likely associated with the site prior to being impacted by oil-field activities (Reference 10). These soils are well drained and are present from shallow to moderate depths (Reference 10). Sandstone outcrops are fairly common (Reference 10). Runoff is slow to moderate and internal drainage is moderate to rapid (Reference 10). The average annual precipitation is 37.19 inches (Reference 10) and the recharge to ground water is estimated to be about 10 per cent of the precipitation (Reference 11); thus, it is 3.7 inches per year.

The upper part of the Barnsdall Formation and the alluvial aquifer are unconfined, with a shallow water table, and are very susceptible to ground water contamination by potential wastes or contaminated soils at the site (Reference 11). Depth to the shallowest water bearing formation is less than 25 feet (Reference 11). However, a depth of sixty feet was reported for the first water saturated sandstone in a domestic water well

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located in the SW/4 SW/4 SW/4 of Section 20-T16N-R9E which is less than a quarter mile north of the site (Reference 11). Recharge to the shallow part of the Barnsdall Formation at the site and discharge of ground water to the alluvial aquifer to the south are probable contamination mechanisms occurring at the site (Reference 11). Since shale beds occur within the Barnsdall Formation, recharge to the deeper part of the aquifer is probably restricted (Reference 11). However, pumpage from this zone could cause leakage of ground water from the strata above (Reference 11). Thus, the deep part of the Barnsdall Formation is also susceptible to ground water contamination by potential wastes or contaminated soils at the site. Two abandoned oil exploration wells located less than a quarter mile to the southeast of the site may represent potential routes for ground water contamination of the deeper parts of the Barnsdall aquifer (Reference 11). Two water wells, one of which is contaminated with petroleum, were drilled to depths around 200 feet on the (b) (6) property (References 5E; 5H). They have been abandoned and plugged (References 5H; 5Q). The integrity of the plugging is suspect (Reference 5H); therefore, these wells may act as conduits for contamination to reach the deeper parts of the aquifer. There may be an unplugged refinery well located south of the church since an open six inch casing has been observed there, and two wells are indicated on the Sanborn Fire Insurance map (References 3; 5R; 7).

The site lies just northeast of Bristow, Oklahoma. Generally, the majority of the population in the area of interest is served by public water supplies from the City of Bristow, but some residences have private water wells within the four mile study radius of the site (References 12; 13; Figure 4). The City of Bristow obtains its water supply solely from wells in the Barnsdall Formation and the Vamoosa-Ada aquifer (References 2; 5A; 13). The nearest water well, which is a domestic well 110 feet deep, is located on site, south of the church (References 2; 5R; 5U; Figure 2). However, this well, which was perforated at 40 feet in a shallow water zone, has been abandoned as a drinking water source because of contamination from petroleum (References 5R; 5U). It has not been plugged, however, and could be put into operation (References 5; 8U). The Sanborn Fire Insurance Map shows two refinery water wells on either side of the railroad (Reference 7). Two deep wells have been drilled on the (b) (6) property but were plugged and abandoned because one became contaminated with petroleum waste and the other one had collapsed casing (Reference 5E; 5H). The residences on site are presently connected to city water via a 2 inch line (Reference 5E; 5H; 5R). The nearest active drinking water well is within one quarter mile north of the site (References 11; 13; Figure 2; 4), and serves an estimated population of 2.68 (Reference 13). It is 230 feet deep and produces water from sandstones in the lower part of the Barnsdall Formation (Reference 11). It is assumed that the vast majority of residences in the study area utilize municipal water; however, since most domestic wells are located outside the city, these wells are assumed to be sources of drinking water (References 11; 13; Figure 4). The total population served by private wells is described in the table below. The numbers were arrived at by multiplying the number of wells by the estimated average number of persons (2.68) within each household in Creek County (Reference 14).

Private Wells

Distance from Site (mi)	# of Wells	Est. Population Served by Private Wells
On-site	1	2.68
0 - 1/4	1	2.68
1/4 - 1/2	0	0
1/2 - 1	4	10.72
1 - 2	25	67.00
2 - 3	20	53.6
3 - 4	29	77.72
Total	**80**	**214.4**

There are eight active public water wells distributed across two study radius zones that make up the City of Bristow Municipal Water System (References 5A; 13). Bristow obtains its water supply solely from wells that are within the study area (Reference 5F). Two municipal wells were located about one quarter mile south and southwest of the site (References 11; 13). They were approximately 200 feet deep and produced from the Barnsdall Formation; but they have been abandoned (References 5A; 13). However, Well #7, the one located less than 1/4 mile southwest of the site was not plugged but has a welded steel cap and is capable of producing. The nearest active municipal well is located almost one mile southwest of the site (References 5A; 13). It also produces from deep sandstones of the Barnsdall Formation (Reference 5A; 13). There are no surface water intakes in the system which serves 4,300 people of Bristow and 116 people of Slick, Oklahoma (References 13; 15). There are four water storage towers within the distribution system (Reference 13). This is a blended system in which two large capacity wells (200 gpm) and one small capacity well (50 - 90 gpm) are produced together during 24 hour periods (Reference 13). The specific wells are changed periodically. Under this scheme, one well provides more than forty per cent of the daily water supply but not more than forty per cent of the total annual production (Reference 13). The population served by each well is apportioned according to the estimated annual production capacities of the individual wells (Reference 13). Well #14 is located in the 1/2 to one mile radius zone and the other municipal wells are located in the one to two mile zone. Thus, the apportioned population served by Well #14 is located in the 1/2 to one mile radius zone, while the rest of the population is placed in the one to two mile zone. A public well in the one to two mile radius zone serves the 50 residents of the Evergreen

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Trailer Park (Reference 13). The 50 residents of the Fogle Mobile Home Park formerly used a well, which was located in the one to two mile radius zone, but they are currently using city water (Reference 13). The status of this well is unknown. The 116 residents of the Slick Rural Water Association also obtain their water supply from Bristow (Reference 13). Considering the 4,416 people served by the 8 wells of the Bristow Municipal Water System and the 50 people of the Evergreen Trailer Park served by one well, the total population served by public wells (4,466 people) is described in the table below (Reference 13). The one municipal well which is abandoned but not plugged is also included in the table.

Public Wells

Distance from Site (mi)	# of Wells	Est. Population Served by Public Wells
On-site	0	0
0 - 1/4	1	0
1/4 - 1/2	0	0
1/2 - 1	1	165
1 - 2	8	4301
2 - 3	0	0
3 - 4	0	0
Total	**10**	**4466**

There are no Well Head Protection Areas within a four mile radius of the Site (Reference 5I). As a result of historical practices at the site, a release of hazardous substances from the Wilcox Oil Company refinery site to the groundwater is suspected. In fact, ground water contaminated by petroleum has been observed in a well on site (References 3; 5R; 5U). The private wells located outside the city limits of Bristow are assumed to be drinking water supply wells. Those wells close to the site which produce from the shallow ground water are at considerable risk of contamination, as in the case of the well on the church's property. However, wells that produce from the deeper zones in the Barnsdall Formation are at less risk of contamination because of the presence of shale beds between the contaminated zone above and the water producing zone below (Reference 11). The nearest of the domestic wells that utilize shallow ground water for drinking purposes are located more than 1/2 mile away in an up-gradient direction, and the wells within 1/2 mile produce from the lower part of the aquifer. Therefore, the

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residences served by these wells are considered secondary targets. The population served by public wells are also considered secondary targets due to the distance of the wells from the site. Since the church's well on site is not currently being used for drinking water and since the well located within 1/4 mile north of the site produces from the deeper parts of the Barnsdall Formation, these wells are not considered to be primary targets.

Surface Water

The topography in the vicinity of site is relatively flat being situated on the noses of several south trending highs (Reference 2; Figure 1). There are two south trending tributaries of Sand Creek on site (Reference 5; Figure 1). Sand Creek, which marks the southern boundary of the western part of the site is a small perennial tributary of the Little Deep Fork Creek and flows southeasterly across the NW/4 of Section 29 (Figures 1). Sand Creek enters the Little Deep Fork about 3.5 miles downstream from the PPE (Figure 3). The probable point of entry (PPE) into Sand Creek is on site and occurs in the SE/4 NW/4 NW/4 of Section 29-T16N-R9E (IM) in Creek County, (Figures 1; 2; 3). The 15 mile target distance ends in the Little Deep Fork Creek just south of Slick, within Section 20-T15N-R10E (IM) of the same county (Reference 16; Figure 3). A mean annual flow rate of 806 cfs was recorded at gaging station #2435, which is located on the Deep Fork River in the NW/4 SW/4 of Section 20-T14N-R12E of Okmulgee County, down stream from the confluence with the Little Deep Fork Creek (Reference 17). This was the nearest available information on flow rate. Assuming that less than half the flow at the gaging station is attributed to the Little Deep Fork, then the maximum flow for the Little Deep Fork at the confluence would be about 400 cfs. Using the same reasoning, the maximum flow of Sand Creek at the confluence with the Little Deep Fork would be approximately 200 cfs. However, there are two tributaries that enter the Little Deep Fork after the Sand Creek confluence (Skull and Chicken Creeks) and before the 15 mile target distance (Reference 16; Figure 3). Two additional creeks flow into the Little Deep Fork after the 15 mile end point. Assuming that all five tributaries have similar flow characteristics, then the maximum flow of Sand Creek at the confluence with the Little Deep Fork would be 50 cfs. However, the creek, which is shown as a perennial stream on the topographic map (Reference 16; Figure 1), may not flow at times during the late summer months (Reference 5P).

The normal annual precipitation in the region of the site is about 37.19 inches per year (Reference 10). Portions of the site are located within the 100 year flood plain which is located along Sand Creek and the south trending tributary on the east side of the [redacted] (b) property (Reference 18). There are no drinking water intakes located within the 15 mile (6) target distance (Reference 15).

Sand Creek is considered by the State of Oklahoma to be in the "habitat limited aquatic community" subcategory of the fish and wildlife propagation beneficial use and within the "secondary body contact" category of the recreational beneficial use (Reference 19). The

Little Deep Fork Creek is placed in the "warm water aquatic community" subcategory of the fish and wildlife propagation beneficial use and within the "primary body contact subcategory for recreational beneficial use (Reference 19).

Habitats of the endangered and threatened species listed below are known to occur in Creek County and may also be associated with the 15 mile target distance (Reference 20). Although the location of the site is near an urbanized area (Figures 1; 3), it is possible that these species would be found in the vicinity of the site (Reference 20). However, since no sightings have been observed or reported, all species listed below are considered secondary targets (References 2; 23).

Species	Federal Status
Bald Eagle	Endangered
Interior least tern	Endangered
Peregrine falcon	Endangered
Piping plover	Threatened
Cerulean warbler	Category 2 Candidate
Loggerhead shrike	Category 2 Candidate
Prairie mole cricket	Category 2 Candidate
Arkansas River speckled chub	Category 2 Candidate
Texas horned lizard	Category 2 Candidate
Western Snowy plover	Category 2 Candidate
Fissa sedge (Carex fissa)	Category 2 Candidate

There are about 30 miles of wetland frontage associated with the 15 mile target distance (Reference 21). The nearby Sand Creek and Little Deep Fork Creek have a potential for contamination from the site. In fact, a seep was identified in Sand Creek just west of the church property (Reference 2; 5R). Also, the oily sludge flowing out of the surface impoundments in the NE/4 NW/4 of Section 29, which have had their berms recently cut by bull dozer, will likely reach Sand Creek by surface drainage (Reference 2).

Soil Exposure

The site is an abandoned crude oil refinery located near residential areas (Reference 2; Figure 1; 3). The presence of soil contaminated by hazardous substances is assumed to be about 15.5 acres because of evidence found during the site reconnaissance (Reference 2). There are three residences located on site (Reference 2). The (b) (6) property, encompassing about 18 acres, is completely enclosed with a fence, and has the only controlled access on the site (Reference 2). There are about eight people living on site and an additional 11 people living within 200 feet of the site (Reference 2). These

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people are considered as primary targets. The site is inactive so there are no workers employed at the facility (Reference 2). There are no schools or day-care centers within 200 feet (Reference 2). The estimated total population within 1 mile of the site is 2,393. This number is based on a house count taken during the site reconnaissance, the average number of persons (2.68) per household, and the Geographical Exposure Modeling System (GEMS) data (References 2; 14; 22). Several types of activities occur at the site including: occasional earth work; salvaging scrap iron; domestic activities associated with the residences on site; activities associated with the church; and some hunting (References 5; 8S). The Oklahoma Natural Heritage Inventory has no records of terrestrial sightings of rare species within 5 miles of the site (Reference 23).

Air

An air release is suspected since there were unusual odors observed during the site visit (Reference 2). The prevailing wind direction is from the north during the months of December through February and from the south the rest of the year (Reference 10). There is an estimated population of 8 persons who live in residences on site (Reference 2). Habitats of the endangered and threatened species listed under the surface water pathway are considered secondary targets (Reference 23). The estimated population and wetland acreage within the four mile radius of the site is described in the table below (Reference 24).

Distance from Site (mi)	Est. Population	Est. Wetland Acreage
On-site	8	2*
0 - 1/4	54	4.5
1/4 - 1/2	495	7
1/2 - 1	1,836	9
1 - 2	2691	65
2 - 3	1,017	145
3 - 4	517	112
Total	6,616	342.3

* - estimated.

There are an estimated 2 acres of wetlands present on site when the expanded site area is considered (Reference 2). Vegetation suggesting the presence of wetlands (cattails) was observed during the site reconnaissance in one surface impoundment and there are wetlands associated with Sand Creek (Reference 2; 23).

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IV. Summary and Conclusion

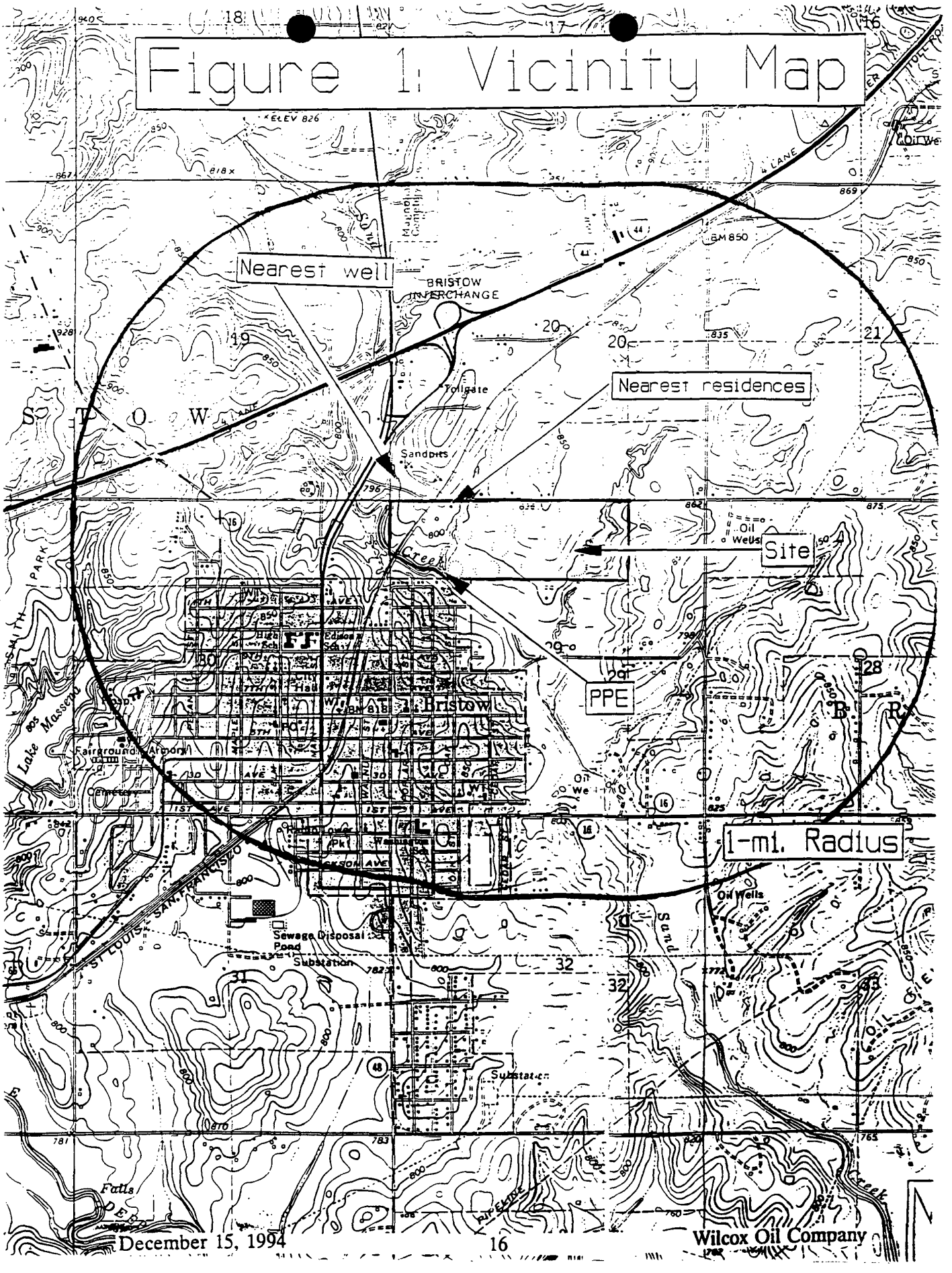
The Wilcox Oil Company operated a refinery outside of the city of Bristow in Creek County, Oklahoma, for an estimated period of 35 to 40 years. As a result of this practice, ground water at the site has been adversely affected by potentially hazardous substances associated with the site. However, the private wells within the study area are located either in areas served by municipal water systems; located at relatively safe distances and up-gradient from the site; or produce from the deeper part of the Barnsdall Formation below shale beds. Therefore, the residences served by these wells are considered secondary targets. The population served by public wells are also considered secondary targets due to the distance between the wells and the site.

Sand Creek receives suspected contaminated runoff from the site so the associated wetlands would be primary targets. The habitats of threatened or endangered species and the warm water aquatic community "fishery" of the Little Deep Fork Creek are considered secondary targets. An air release is suspected due to the odors detected during the site reconnaissance. Contaminated soil is assumed because of the barren areas and stressed vegetation observed during the site reconnaissance. The residents on site are considered primary targets under both these pathways. Also, residents within one quarter mile are considered primary targets under the air pathway. Considering the fact that there are primary targets associated with the air, surface water, and soil pathways; and because subsurface contamination of ground water and soils at the site have been observed, a Site Inspection is recommended in order to better characterize the site and to determine whether threats to human health and the environment exist.

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V. Figures

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Figure 1: Vicinity Map
Nearest well
Nearest residences
Site
PPE
1-mi. Radius
BRISTOW INTERCHANGE
Bristow
Tollgate
Sandpits
Oil Wells
Sewage Disposal Pond
Substation
Fairground
Cemetery
Lake Mass
Creek
Falls
Sand
PIPELINE
ST LOUIS - SAN FRANCISCO
18
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16
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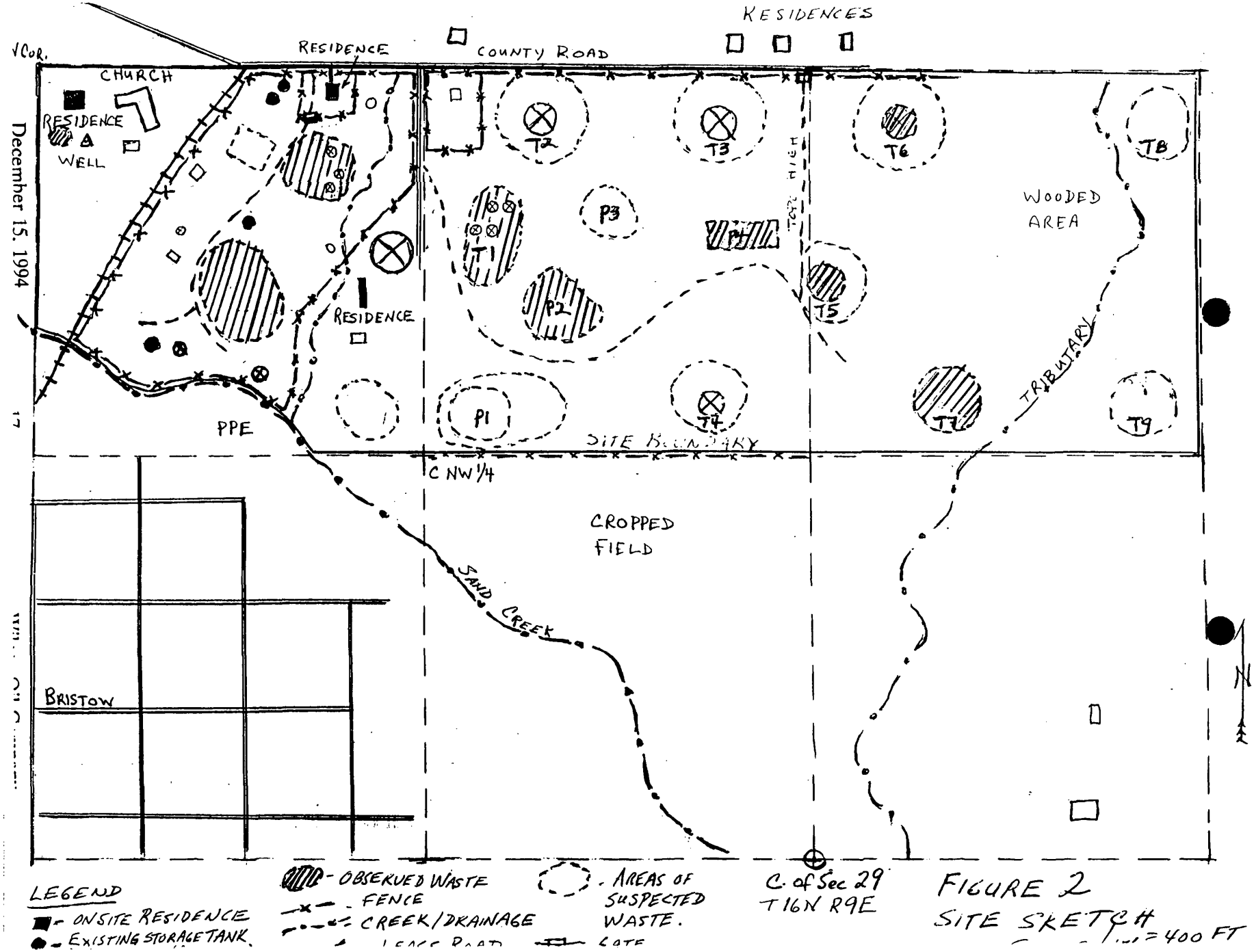


FIGURE 2
SITE SKETCH

December 15, 1994

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Figure 3: Surface Water Migration Route

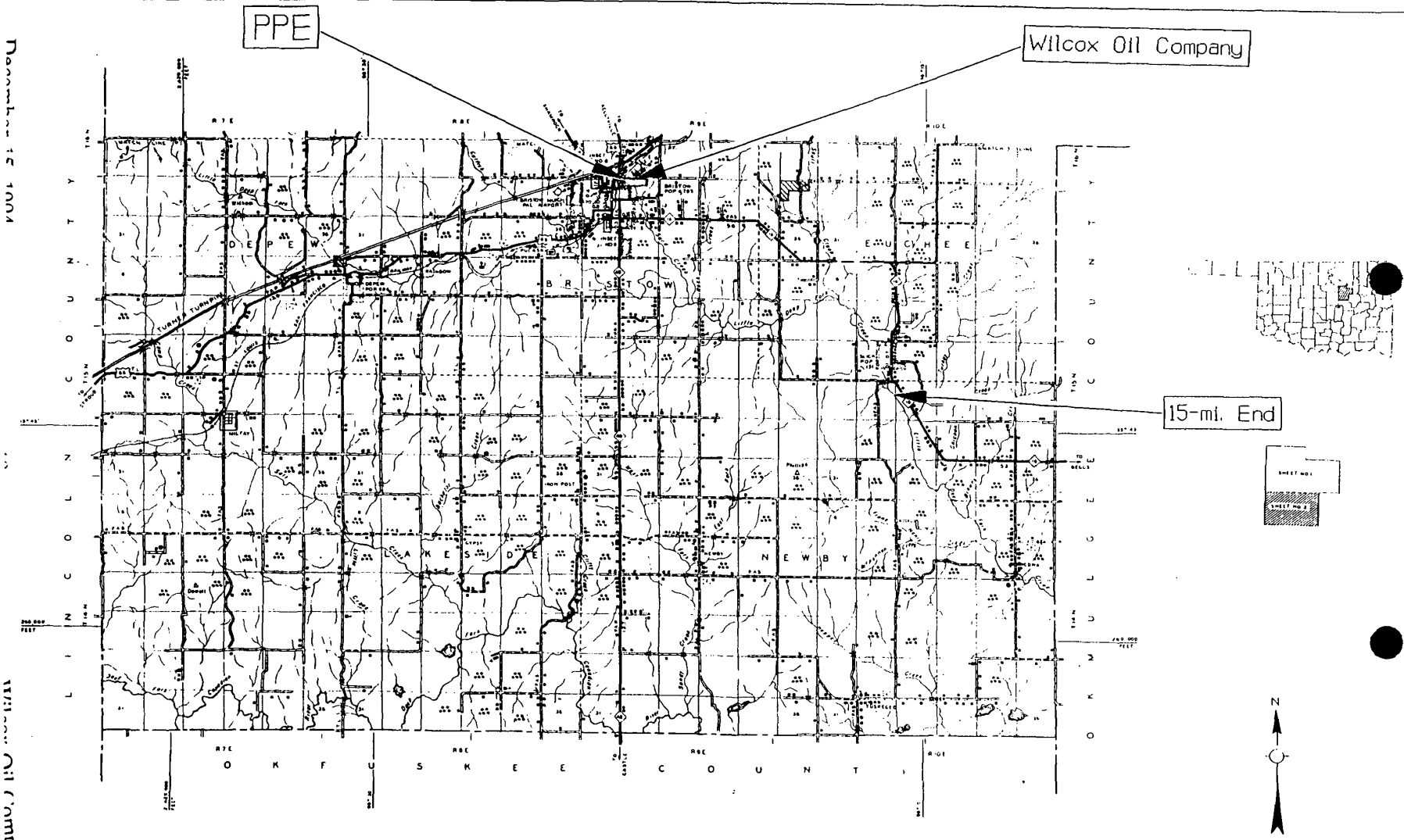
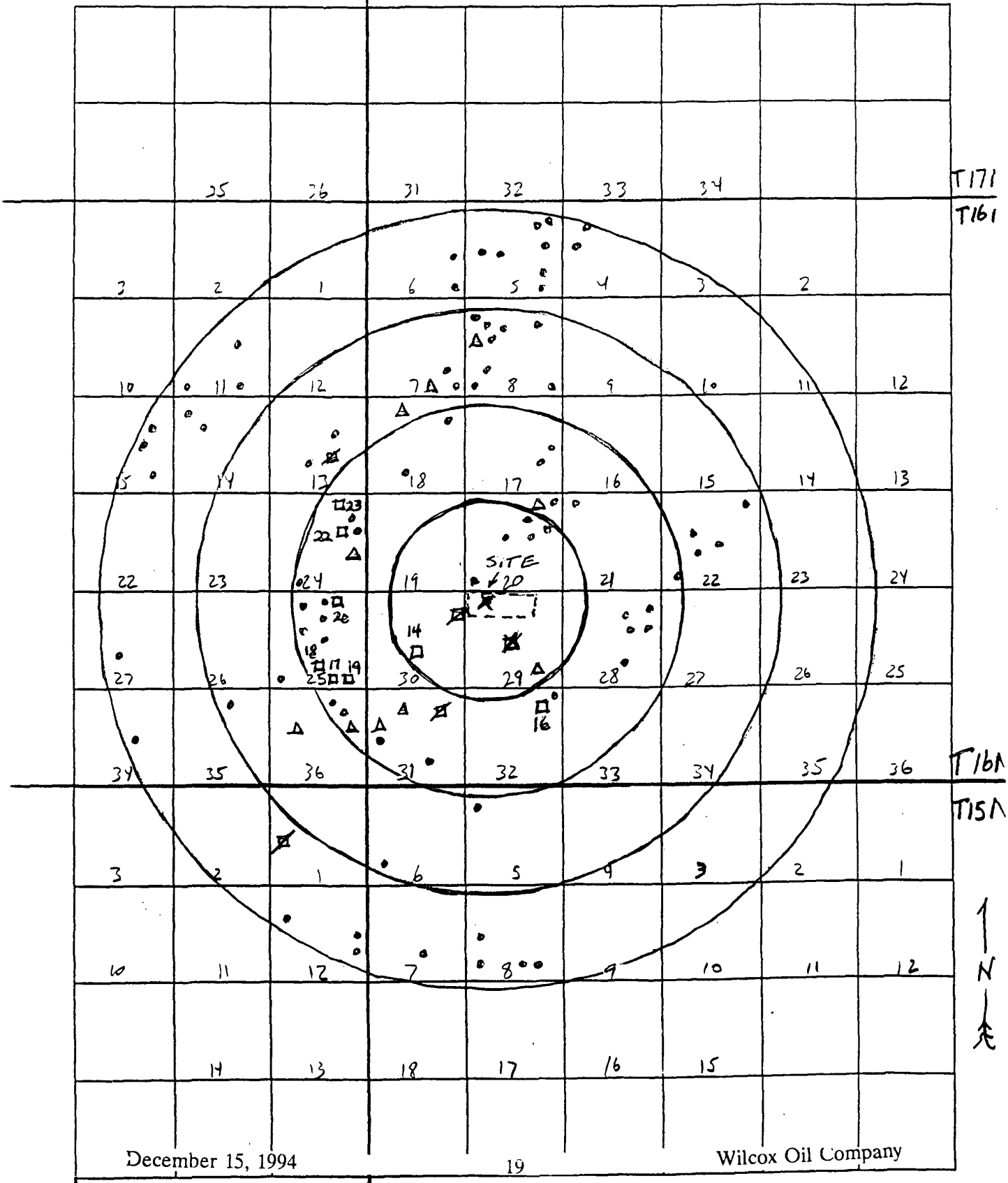


FIGURE 4



000025

VI. Photodocumentation

000026

K.K.

Photographer: Karen Khalafian
Date: December 16, 1994

DAC

Witness: David Cates
Direction: North



Comments: Photograph #1 (matches slide #21). This photo shows the oily sludge in the surface impoundment on [redacted] (b) (6) (in the NE/4 NW/4 of Section 29).

K.K.

Photographer: Karen Khalafian
Date: December 16, 1994

DAC

Witness: David Cates
Direction: Southeast



Comments: Photograph #2 (matches slide #8). This photo shows the area of contaminated soil in the south central portion of the (b) (6) property (NW/4 NW/4 of Section 29).

000028

K.K.

Photographer: Karen Khalafian
Date: December 16, 1994

DAC

Witness: David Cates
Direction: East



Comments: Photograph #3 (matches slide #12). This photo shows the coke and asphalt-like material covering the ground on the (b) (6) property (NW/4 NW/4 of Section 29).

000029

K.K.

Photographer: Karen Khalafian
Date: December 16, 1994

DAC

Witness: David Cates
Direction: East



Comments: Photograph #4 (matches slide #6). This photo shows the oily sludge in the bottom of a partially salvaged tank located on the [redacted] (b) (6) (NE/4 NW/4 NW/4 of Section 29).

000030

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VIII. References

000033

Reference 1

POTENTIAL HAZARDOUS WASTE SITE IDENTIFICATION

REGION	SITE NUMBER
VI	

NOTE: The initial identification of a potential site or incident should not be interpreted as a finding of illegal activity or confirmation that an actual health or environmental threat exists. All identified sites will be assessed under the EPA's Hazardous Waste Site Enforcement and Response System to determine if a hazardous waste problem actually exists.

A. SITE NAME	B. STREET (or other identifier)		
Wilcox Oil Co.	North of Bristow		
C. CITY	**D. STATE**	**E. ZIP CODE**	**F. COUNTY NAME**
Bristow	OK		Creek

G. OWNER/OPERATOR (if known)

1. NAME	2. TELEPHONE NUMBER
unknown	

H. TYPE OF OWNERSHIP (if known)

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☐ 5. PRIVATE ☒ 6. UNKNOWN

I. SITE DESCRIPTION

The site is located in a mostly rural area and is bordered by a residential area to the east and the south, an active railroad track to the west, and a county road to the north. The site appears as a fenced, inactive oil-related facility containing tanks and oil-related equipment in various states of disrepair. There are some barren spots on the site, and several waste piles were visible.

J. HOW IDENTIFIED (i.e., citizen's complaints, OSHA citations, etc.)	K. DATE IDENTIFIED (mo., day, & yr.)
State Program	6-7-94

L. SUMMARY OF POTENTIAL OR KNOWN PROBLEM

Wilcox Oil Co. operated an oil-related facility at this site, and refinery related wastes may be on site. Currently, the contents of the on-site containers are unknown. Integrity of these containers is uncertain. As a result, a potential for release of hazardous substances may exists on the site.

M. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE (mo., day, & yr.)
Karen Khalafian, Environmental Specialist	(405)271-7137	6/7/94

EPA Form 2070-8 (5-80)

Reference 2

MEMORANDUM

December 18. 1994.

To: Wilcox Oil Company Preliminary Assessment (PA) file.

From: David Cates, Environmental Specialist, DEQ, Superfund (Site Assessment Unit).

Re: Site Reconnaissance.

The PA site reconnaissance of the abandoned refinery operated by Wilcox Oil Company was conducted on Friday December 16, 1994, between 11:00 and 2:30. The Oklahoma Department of Environmental Quality (DEQ) personnel were David Cates and Karen Khalafian. At the beginning of the site reconnaissance the weather was cloudy/overcast with temperatures around 50° F and the wind was blowing from the north and northwest at about 5 to 10 mph. In the afternoon it cleared off and warmed up to around 60° F. The ground was still wet from a rain shower which occurred the previous night. Run off water in the creeks was high and flowing rapidly.

The site reconnaissance was conducted in three phases. The first phase involved visiting the original refinery site located inside the fenced property just east of the railroad right of way. (b) (6) co-owner of this property, was present and opened the locked gate. The next phase involved visiting the church located just west of the railroad. The (b) (6) (b) (6), and his wife, (b) (6) were present and conveyed that the church did not have a day care center. The third phase involved visiting the abandoned storage tank farm located in the NE/4 NW/4 and NW/4 NE/4 of Section 29, east of the (b) (6) property. The current owner of this property, (b) (6), was present.

The (b) (6) property is completely fenced on all sides with an entrance and locked gate on the north side. An east-west section line road marks the north boundary of the property. The west side borders the St. Louis and San Francisco Railroad right of way. On the east side is a private drive extending south from the section line road. About 400 feet south of the section line road the fence angles southwest from the private drive then turns south after crossing the small creek and extends to Sand Creek. The southern border of the property is marked by the fence's position along the north bank of Sand Creek. The total area is about 18 acres which is larger than what is described on their deed (13 acres, more or less) due to the fact that the fence extends all the way to Sand Creek.

Upon entering the (b) (6) property four storage tanks and an abundant number of pipe pieces and scrap iron were observed. There are several brick structures remaining on the west side near the railroad right of way. One of the old facility structures located on the north side, next to the section line road, is being used as a residence by (b) (6) younger brother and wife. Concrete tank, tower, and facility foundations were observed at numerous places. A small south trending creek, which had flowing water at the time of the site reconnaissance, is located along the east side of the property. Surface drainage is to the east and south. Trees and dense vegetation are present along banks of the creeks and on

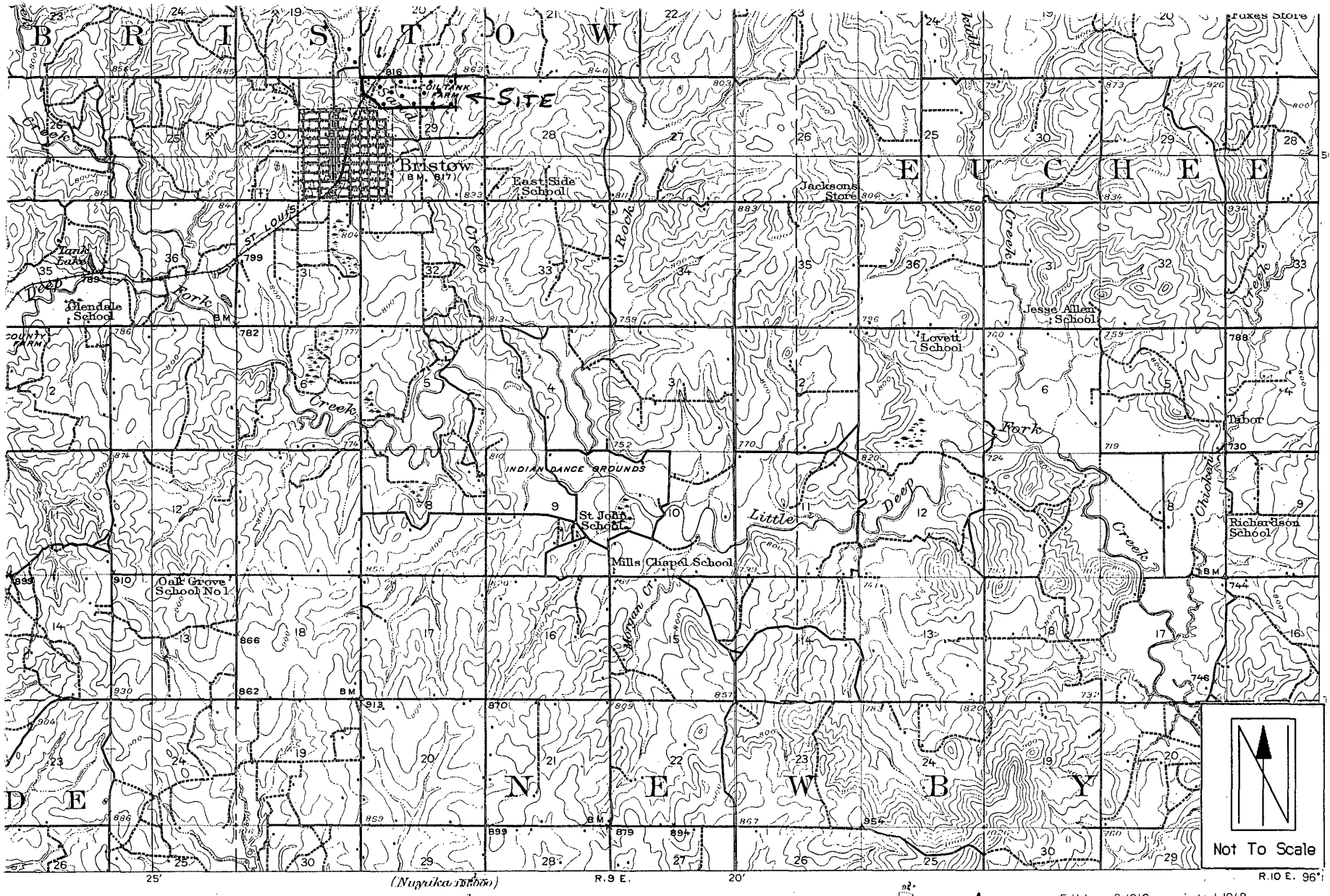
the west side of the property. The remnants of several tanks which had been salvaged for scrap iron were observed. Sludge was present in the bottom of one of these salvaged tanks which was located just south of the residence. It is believed that tank bottom sludge is present in the remaining tanks, as well as, in several bermed areas. Coke, asphalt-like waste and what appears to be elemental sulfur covers the ground in many areas, especially in two areas about 200 feet by 200 feet each located in the central and northeast parts of the property (which is about two acres total). A barren area about 200 feet by 400 feet (about 2 acres) in size is located in the south central portion of the property. This area, which is believed to be soil contaminated by acid or caustic waste, lacks vegetation. A slight acrid odor (possibly SO2) was detected down wind of the area and some small white colored rocks believed to be precipitated carbonates were present on the ground around the perimeter.

The property of the Bristow First Assembly of God church lies just west of the railroad right of way which forms the eastern property boundary. The southern boundary is Sand Creek. The western and northern boundaries are believed to be the section lines. There are no fences. A gravel drive enters the property from the northeast corner to a gravel parking lot north of the church building itself. The building west of the church is the home of (b) (6) (b) (6) South of the church is a mobile home which will be used as a residence for the new pastor. Two storage sheds are also near the mobile home. The ground is covered with mown grass except for the parking lot and for trees located along the bank of Sand Creek. Several areas of barren to sparse vegetation totaling about 5,000 square feet (100' by 50'), or about 0.1 acres, were observed just southwest of the church. (b) (6) indicated that grass would not grow on these areas. He pointed out the contaminated water well which is housed in the small shed just southwest of the church building. He also indicated a place just west of the church where he had seen a seep on top of a sandstone outcrop in the bottom of Sand Creek. The seep was not observed due to high water, but rust colored staining was noted. Sand Creek flows to the south at this location. The church property drains to the west and south. He pointed out an open 6 inch iron pipe descending vertically from ground level. It is located in the middle of the grassy area south of the church. This could be casing of a well or riser pipe for an underground storage tank (UST) or possibly part of a piping network. No odors were detected when a iron plate covering the top of the pipe was lifted off.

The (b) property was visited around 1:00 pm. Entrance was gained along the west side where a lease road extends southeast from the private drive bounding the east side of the (b) property. An area of about 2.5 acres in the northwest corner of the property is fenced off. (b) (6) indicated that he thought this was a gas pipeline compressor station. A pipeline easement extends to the southeast from here. It is marked with flagging and identifiable as a cleared path about twenty five wide. The north boundary is fenced and the east-west section line road extends about 3/4 of the length of the property to the east. A gate without a lock is located near the north quarter corner where another lease road enters the property following a southerly route along a topographic high. A south trending creek is located along the eastern portion of the property, and water was flowing at the time of the site visit. The eastern part of the property drains to the south and southeast while surface drainage in the west is to the southwest and south. The eastern 1/4 of the property

is heavily wooded. While trees are present along the southern fenced property boundary and randomly scattered elsewhere, most of the remaining areas of the property are covered with grasses and brush. The land to the south is cleared of trees and probably farmed or used for grazing cattle. No structures or tanks were observed on the property. Asphalt-like waste believed to be tank bottom sediment from the 50,000 barrel storage tanks once present was observed in four of the bermed areas (T1, T5, T6 & T7) shown on the site sketch map (PA - Figure 2). It is believed that the remaining bermed areas contain this asphaltic material as well (T2, T3, T4). Two areas on the east side of the north-south creek appear as tank batteries on the 1948 15 minute topographic map (Attachment A). These areas (T8 & T9 of the site sketch) are inside the wooded area and are probably eroded flat. The T8 area was investigated but was not found during the site reconnaissance. The total area of waste is calculated to be 282,743 square feet or 6.49 acres ($3.14 \times 100^2 \times 9$). Aerial photos taken in 1941 (Attachment B) show that five 50,000 barrel tanks were present in T2, T3, T4, T5, & T6 locations and two 5,000 barrel tanks were present at the T1 location. The pit in the west central part of the property (P2) contains sludge as does the pit (P4) in the central part of the property. Both pits were devoid of plant life. A section of the berm on the southwest side of the west central pit had been cut by a bulldozer allowing the sludge to drain out over the ground surface towards the southwest to Sand Creek. The pit is about 45,000 square feet in area. An acrid (possibly SO2) petroleum odor was detected on the down wind (south) side of the pit. The central pit which had been leveled by a bulldozer covers about 28,000 square feet. (b) (6) indicated that he was responsible for these modifications to the land for the purposes of cleaning up the place for sale. The southwest pit (P1) which covers an area of about 96,000 square feet contains a pond with cattails. (b) (6) indicated that sludge was present in this pit as well, but it was not observed. All three pits were identified on the 1941, 1950, 1969, and 1991 aerial photos (Attachments B; C; D; E); thus, the surface impoundments have held waste for more than 30 years. The north central pit (P3) was not observed but is suspected of containing waste. It is about 31,415 square feet in area which was determined from aerial photos. No animal life was observed except a field mouse. (b) (6) said that many hunters use the land for hunting and shooting since it has no controlled access.

There are no schools or daycare centers located within 200 feet of the site. The number of residences within 1/4 mile and between 1/4 and 1/2 mile were determined by a windshield survey. Three residences are considered to be on site; 20 residences are within 1/4 mile; and 185 are between 1/4 and 1/2 mile. A residential area of Bristow is located just south of the (b) (6) property across Sand Creek. Four residences are located just north of the east-west section line road which marks the northern extent of the refinery site.


SITE
Bristow
(B.M. 817)
East Side School
Jacksons Store
Foxes Store
Glendale School
Jesse Allen School
Lovett School
Tabor
Richardson School
St John School
Mills Chapel School
Oak Grove School No 1
INDIAN DANCE GROUNDS
Deep Fork
Little Deep Creek
Rock Creek
St Louis
Morgan Cr
Chicken
Not To Scale
R.9 E.
R.10 E.
(Nuyaka 15000)
Scale 1/62500
4 Miles
7000 Yards
18000 Feet
5 Kilometers
Contour interval 25 feet
APPROXIMATE MEAN DECLINATION, 1915
TRUE NORTH
MAGNETIC NORTH
A
Edition of 1916, reprinted 1948.
Polyconic projection. North American datum
BRISTOW, OKLA.
N3545-W9615/15

000040


8-10-71
CUC-4B-3
SITE
"B"

1949

CREEK COUNTY, OKLAHOMA

R. 9 E.



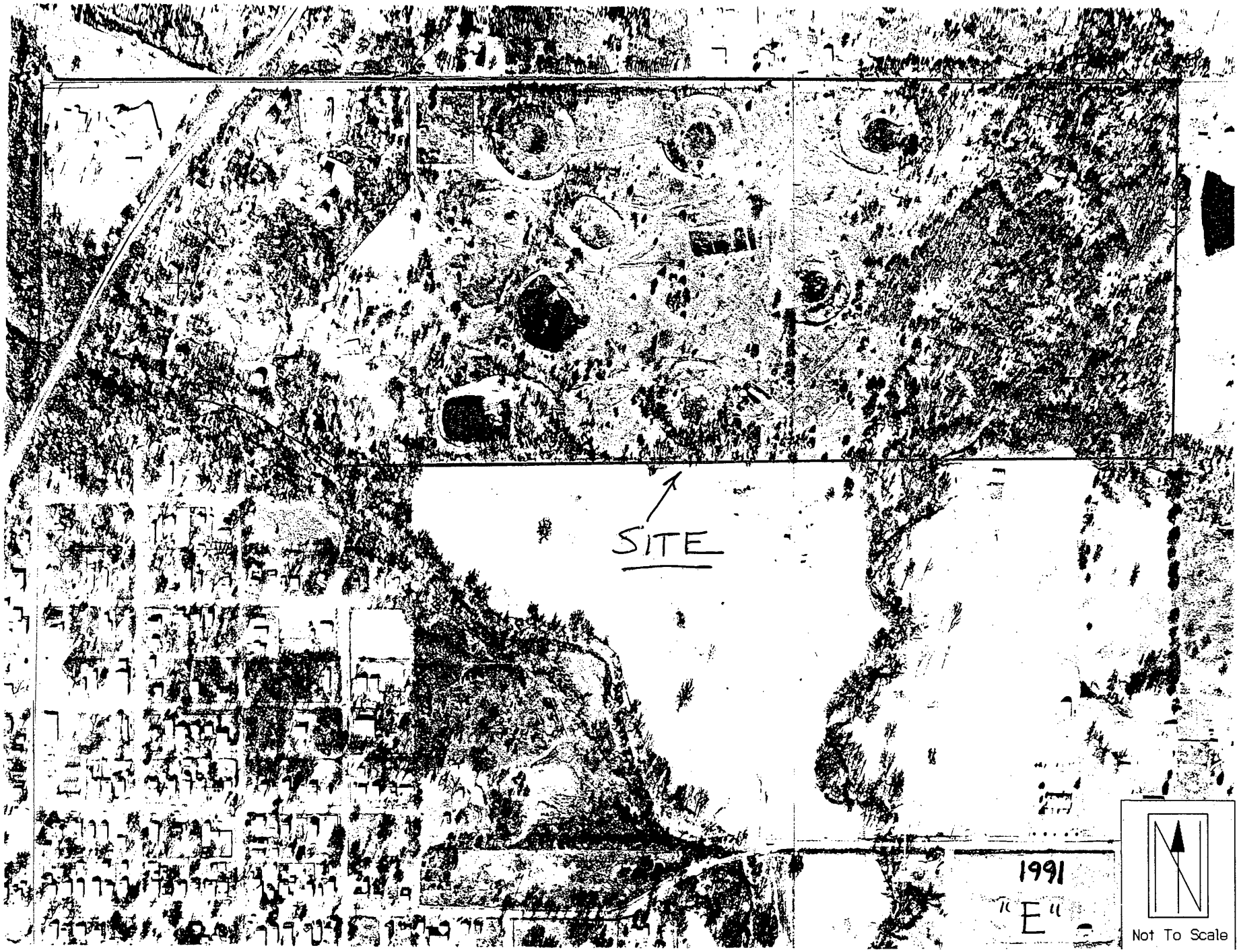
"C"

000042



D

Not To Scale


SITE
1991
"E"
Not To Scale

Reference 3

APPENDIX E

STANDARD OPERATING PROCEDURE
TO DETERMINE SITE
LATITUDE AND LONGITUDE COORDINATES

HAZARDOUS SITE EVALUATION DIVISION
SITE ASSESSMENT BRANCH
U.S ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C.

September 1991

000046

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #2
LI USING ENGINEER'S SCALE (1/60)

SITE NAME: Wilcox Oil Co. CERCLIS #:

AKA: SSID:

ADDRESS: North of Bristow

CITY: Bristow STATE: Ok ZIP CODE:

SITE REFERENCE POINT: center of site

USGS QUAD MAP NAME: Bristow TOWNSHIP: 16 (N)/S RANGE: 9 (E)/W

SCALE: (1:24,000) MAP DATE: 1973 SECTION: 29 NE 1/4 NW 1/4 NW 1/4

MAP DATUM: (1927) 1983 (CIRCLE ONE) MERIDIAN: Indian

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy):

LONGITUDE: 96 ° 22 · 30 " LATITUDE: 35 ° 45 · 00 "

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: 96 ° 22 · 30 " LATITUDE: 35 ° 50 · 00 "

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM LATITUDE GRID LINE TO SITE REF POINT: 95

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 31 . 39 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 0 · 31 . 39 "

D) ADD TO STARTING LATITUDE: 35 ° 50 · 00 . 00 " + 0 · 31 . 39 =

SITE LATITUDE: 35 ° 50 · 31 . 39 "

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM RIGHT LONGITUDE LINE TO SITE REF POINT: 97

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 32 . 05 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 0 · 32 . 05 "

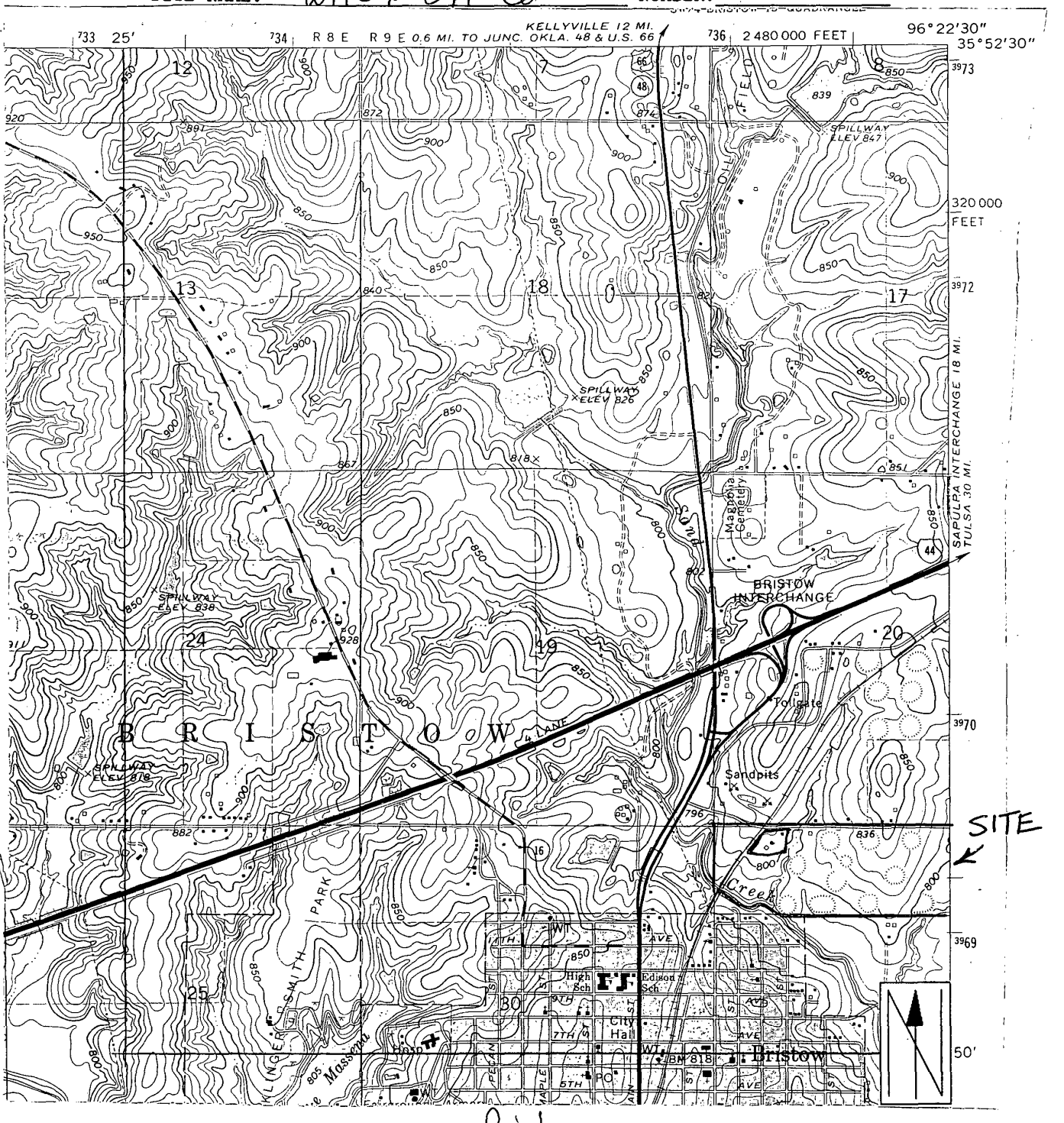
D) ADD TO STARTING LONGITUDE: 96 ° 22 · 30 . 00 " + 0 · 32 . 05 =

SITE LONGITUDE: 96 ° 23 · 02 . 05 "

INVESTIGATOR: Charles Cornell DATE: 6-16-94

000047

SITE NAME: Wilcox Oil Co NUMBER:



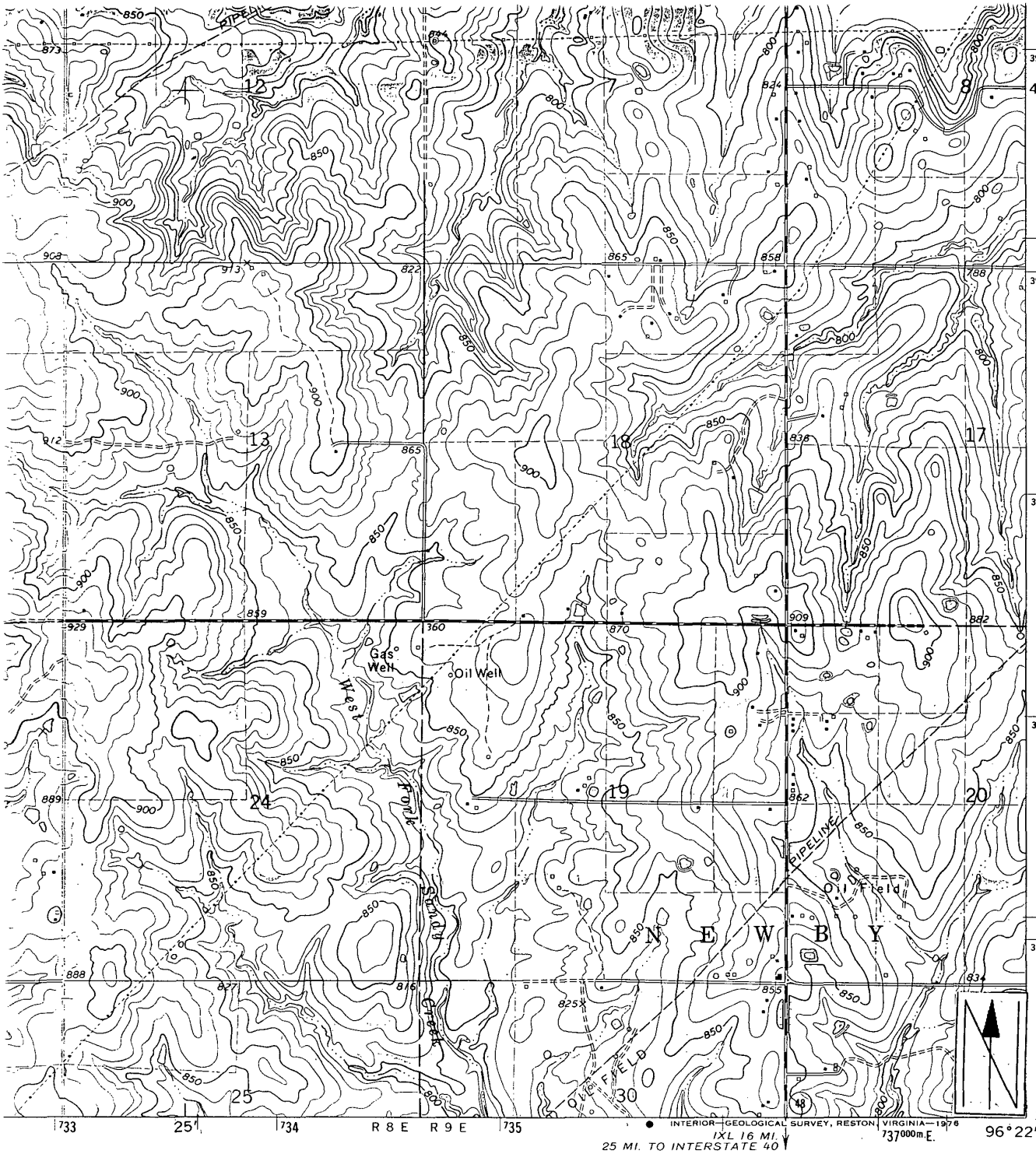
TOPOGRAPHIC MAP QUADRANGLE NAME: Bristow SCALE: 1:24,000

COORDINATES OF LOWER RIGHT-HAND CORNER OF 2.5-MINUTE GRID:

LATITUDE: 35 ° 50 ' 00 " LONGITUDE: 96 ° 22 ' 30 "

★U.S. GOVERNMENT PRINTING OFFICE: 1991-548-187/40505

E-11



1 MILE

7000 FEET

KILOMETRE

ROAD CLASSIFICATION

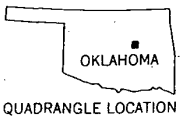
Primary highway, hard surface

Secondary highway, hard surface

Light-duty road, hard or improved surface

Unimproved road

Interstate Route U. S. Route State Route



QUADRANGLE LOCATION

(NEWBY) 6755 III NE

BRISTOW, OKLA.

SW/4 BRISTOW 15' QUADRANGLE

N3545—W9622.5/7.5

1973

AMS 6755 IV SW—SERIES V883

VIRGINIA 22092
73069
EQUEST

000049

Reference 4

A Gulf Publishing Company Publication

THE REFINER

and Natural Gasoline Manufacturer

Member Audit Bureau of Circulations

VOL. 9, No. 9 — SEPTEMBER, 1930

GRADY TRIPLETT, *Editor* — GEORGE REID, *Associate Editor*

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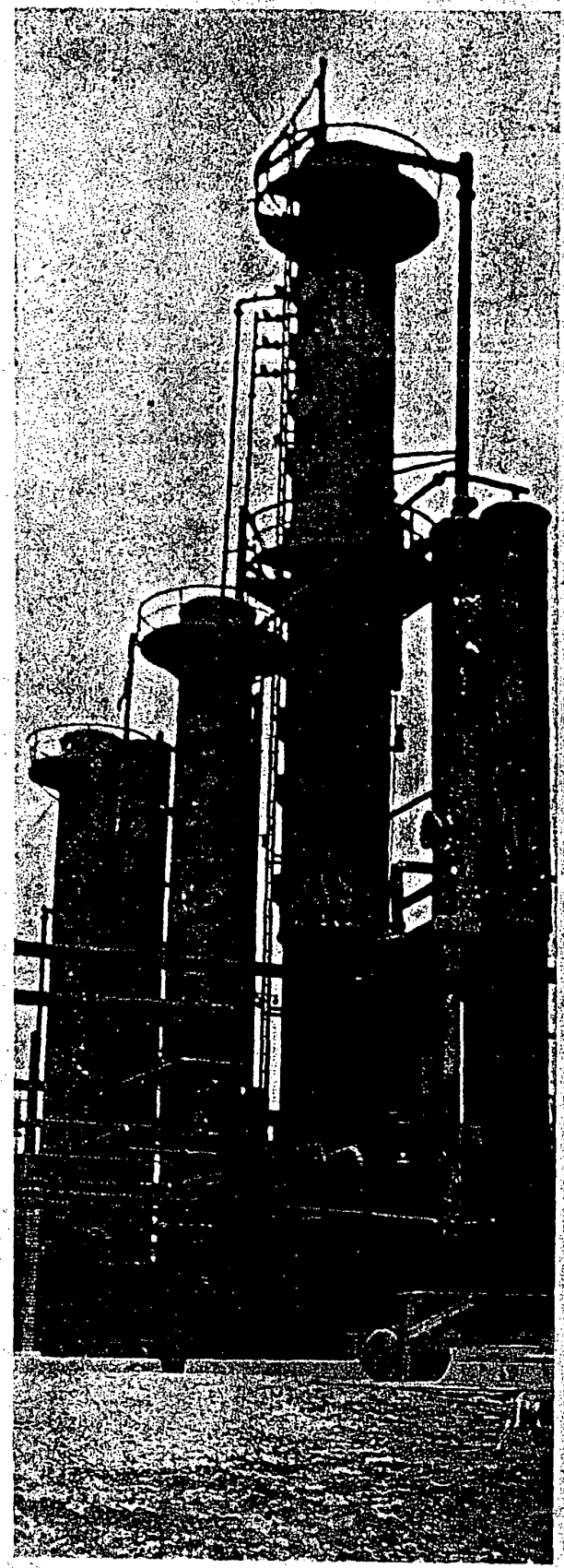
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000051

Wilcox Ha... Installation ... Plant



WILCOX OIL & GAS COMPANY has ... operating its new refinery at Bristow, ... a little more than a year, during which ... certain additions and changes have been made ... secure products not originally required and to ... erally improve efficiency. The refinery is on ... same site as the original 1000-barrel Wilcox ... mental plant erected 10 years ago, which was ... ated under lease by Riley Petroleum Company ... 1928, and which was completely dismantled to ... erection of the new 4000-barrel modern skimming ... cracking plant. Decision to erect and operate a ... finery follows entry of the company into wholesale ... and retail marketing and subsequent expansion ... these facilities in territory within a radius of ... miles of the refinery. Like most modern installations of the type this plant consists of skimming plant, cracking unit, and redistillation battery, ... vapor recovery system and continuous treating equipment.

The greater portion of the 4000-barrel crude ... quirements of the refinery is produced locally by the company, and as soon as it is practical the crude is brought direct to the plant from the field, thus eliminating expensive storage and handling facilities. However, this practice is conducive to relatively high percentages of b. s. & w. in the crude, which must be settled out before actual processing at high temperature. This is accomplished by means of ... heating the fresh crude in a series of Cloverleaf ...

Fractionating equipment in connection with crude topping unit and pressure distillate re-run stills.

000052

Ha Modern tio n Bristow lan

By GEORGE REID
Associate Editor

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d in the uppermost section of the skimming unit fractionating ating column where the oil is preheated to 200° F.

m this point the crude passes into one end of ght by 24 foot horizontal settling drum (for- having seen years of service as a shell still) e the settling time is sufficient to let the foreign materials drop out of the oil. Clean crude is drawn continuously from the front and top of the drum, and s. w. is continuously removed from the front bottom of the settler.

e crude is then further preheated through coun- through a series of exchangers, absorbing from the residum leaving the base of the sepa- column. The temperature is raised to about F. before it enters the pipe still. This Winkler- distillation unit consists of 124 tubes 3½ I. D. and 22 feet long, arranged in two con- banks and one roof bank. As the oil leaves tubes it has been heated to about 520° F. and temperature it enters the bottom of the large fractionating ating column.

e column was designed by the same engineering and is six feet in diameter by 75 feet high, tains 17 bubble decks and two blank decks, which is approximately half way up the height tower from which point a kerosene side stream oil is removed; the other blank deck being just the top three bubble trays where a side stream oline is removed. Former design called for



By means of this conveyor coke dropping from the reaction chamber is loaded directly into cars for shipment.

000053

removal of a kerosene side stream into a flashing or stripper tower, and withdrawal of residuum through a similar flash tower, flashing both with superheated steam, and returning flashed vapors to the original column. Under the present practice the upper auxiliary tower or side stream produces a stream of 437 e. p. naphtha, and a 375 e. p. gasoline stream is taken off over head. Gas oil may be removed from the lower withdrawal equipment, and fuel oil is taken from the bottom. Condensed 375 e. p. gasoline is taken from a large water separator device and returned over the top of the column as a means of temperature control. This control is also aided by passing the incoming crude through the coils in the top of the tower. Residue is pumped from the tower by liquid level control into raw oil tanks for the Dubbs unit.

This change in design and in the number and type of products fractionated through the large bubble column is an example of the flexibility of modern rectifying equipment. With slight mechanical changes the operation of the tower may at any time be converted back to the original system or to meet some other requirements. The two grades of gasoline produced in this operation are given sodium plumbite treatment in a continuous treating system to meet Doctor and corrosion specifications.

CRACKING OPERATION

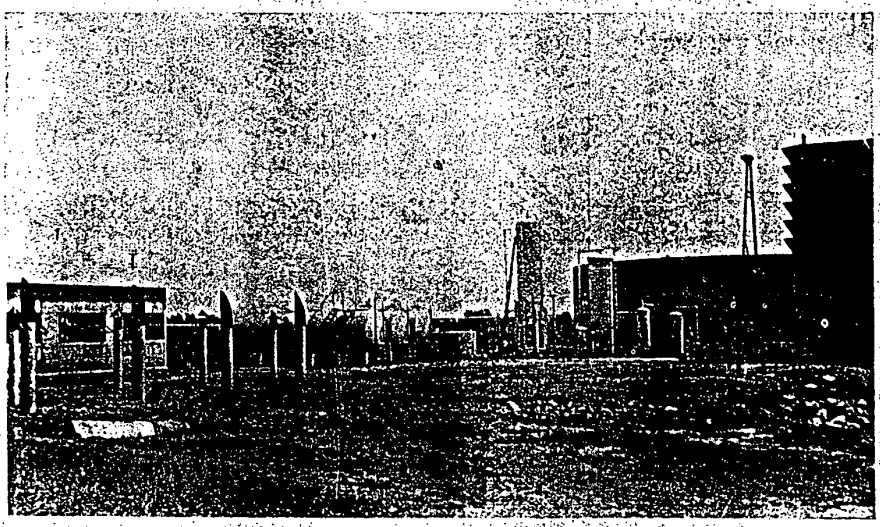
The Dubbs cracking unit is equipped with a 10 by 40 foot reaction chamber and late type modified Alcorn radiant heat furnace. Several changes in design were effected in this furnace and its operation. Special alloy beams have been installed to support the radiant shield getting the weight off of the tubes, the arch was removed, the number of tubes was reduced to 64 and the flow of oil was reversed. These changes and other details were worked out by Dubbs, Alcorn and Wilcox engineers, due to the new design of the furnace. The unit is operated in three day cycle running non-residuum. At present the production of topped crude is in excess of the capacity of the single Dubbs unit, and the company is considering the installation of additional cracking equipment.

Through the use of equipment designed for direct loading of coke into cars the coke production is handled but once at this plant. A spur track was built close to the reaction chamber from the nearby railroad. A conveyor with a hopper large enough to fit under the reaction chamber, is employed to dump the coke directly into the cars. As the 4300-foot cable is pulled from the chamber by means of a steam hoist, the electrically operated conveyor removes the falling coke, free of nuts, bolts, dirt and other foreign matter, spilling it into the cars. It is estimated that this conveyor has reduced the cost of handling coke about one dollar per ton, and as seven to eight hundred tons are handled monthly and sold on contract to a large industrial concern, there is real economy effected in this method of handling the product.

Pressure distillate from the cracking operation is taken to the treating department and treated with four pounds of 66° Be. acid per barrel and neutralized with 17° Be. caustic in a continuous system. The distillate is then taken to rerun stills. This system consists of two 12 by 30 foot shell stills equipped with bubble towers. Incoming 50 gravity pressure distillate is charged through Cloverleaf sections placed in the tops of the two bubble towers. After this preheating it enters the shell stills. Through the addition of a new stripper tower in connection with the second bubble tower, the rerun system is producing a fraction of stripped furnace oil of about 34 gravity. The bottoms are marketed as 28/30 gravity fuel oil. Overhead stream from the fractionating equipment is a premium grade 400 end point anti-knock motor fuel and marketed as such. A side stream of 425 end point gasoline is removed which is blended with the straight run gasoline.

Cracked gasoline from the rerun operation is given Doctor treatment in a continuous system. The straight run gasolines are given similar treatment. Two complete continuous

(Continued on page 122)



Compression gasoline recovery plant and gas washing equipment

000054

Reference 5

MEMORANDUM

December 28, 1994.

To: Wilcox Oil Company Preliminary Assessment (PA) file.

From: David Cates.

Re: Records of Communication.

The following messages are summaries of conversations with various people related to the Preliminary Assessment (PA) report for the Wilcox Oil Company CERCLIS site. The entries are arranged in chronological order.

A. **11/28/94 & 12/01/94:** Spoke with Danny Trout of the Bristow Public Works Department at (918) 367-5588 concerning the Bristow public water supply system. He conveyed the following information. The City of Bristow municipal water supply system has eight active wells which are connected via a distribution network to four water storage towers. The towers and wells are interconnected forming a blended system with line taps occurring before and after the towers. The system serves 4,300 people in Bristow and 116 people in Slick, Oklahoma. Water supply to the system is obtained from wells only. The water is chlorinated at the well head. Three of Bristow's eleven wells reported to be active on the public water supply database (#'s 3, 7 & 21) are no longer part of the system. Well #7 which is incorrectly located on the data base has been plugged and abandoned as a result of deactivating an underground water storage system to which it was connected. The correct location of this well was in the NE/4 SE/4 NE/4 of Section 30-T16N-R9E instead of R8E, which puts it about one quarter mile southwest of the Wilcox Oil Company refinery site. Well #3 is apparently plugged and abandoned, also. Well #21 was given to Mid-America Cafe who presumably are using it for water supply. Well #18 is incorrectly located on the public water supply data base also. It should be in the SW/4 SW/4 SE/4 of Section 25-T16N-R8E instead of in the SW/4 SW/4 SW/4 of the section. A hand dug well which has the dimensions of 30 feet in diameter by 200 feet deep was reported to be located in the NW/4 NE/4 NE/4 of Section 31-T16N-R9E. This municipal water supply well has the capability of producing but is currently shut down. An industrial well owned by McAdams Pipeline Company about 200 feet deep that supplies drinking water to workers was reported in the SE/4 SE/4 of Section 19-T16N-R9E. The company is not on city water. The well is not shown on any of the public information because apparently it was drilled in the 1950's prior to record keeping. Well #15 which was located in the SW/4 NE/4 SE/4 of Section 30-T16N-R9E, about one half mile southwest of the site, was supposedly abandoned because of diesel contamination following a train derailment. No other wells have been reported to be abandoned because of contamination. Three of Bristow's water supply wells are high capacity wells (#'s 20, 22, & 23), producing 200 gpm each. The other five wells (#'s 14, 16, 17, 18, 19) are small capacity wells which produce at rates from 50 gpm to 90 gpm. There are no annual production records.

The daily production for these wells when active is: 72,000 gallons each for #'s 14 & 16; 100,000 gallons for #17; 129,000 gallons each for #'s 18 & 19; and 288,000 gallons for #'s 20, 22 & 23. Not all of the wells are produced at once. Instead, two large capacity wells and one small capacity well are pumped together on a daily basis. Under this scheme either of the large capacity wells produces more than 40 percent of the daily water production. The specific wells in this production scheme are changed periodically. The average daily production is 400,000 gallons; the storage capacity is 1,500,000 gallons; and the total production capacity is 1,152,000 gallons. Records indicate there are two mobile home parks which have their own public water supply wells. Fogle mobile home park is currently on city water and their well is reported to be inactive. It is unknown whether or not this well has been plugged and abandoned. The church and the (b) (6) residence on site are supplied with city water via a 2 inch line installed by the (b) (6) The records show that a water supply well 120 feet deep serves 50 people of the Evergreen trailer park.

B. **12/02/94:** Had telephone conversation with Doug McCurley with Meyer Engineering at (405) 755-5325 concerning annual production from individual wells for the city of Bristow. He could not provide any pertinent information to resolve whether or not any of the wells provided more tan 40 percent of the annual water production. He mentioned that Bristow provided water to the Slick Rural Water Authority (RWA).

C. **12/05/94:** Had telephone conversation with Cissie Gaskins of the Slick Rural Water District at (918) 367-5558. She confirmed that Bristow supplies water to the Slick rural water Association (RWA) which serves 116 residences.

D. **12/06/04:** Had telephone conversation with Becky Simmons of the Creek County Tax Assessors office at (918) 224-4508 concerning ownership of the property in the (b) (6) . She informed me that (b) (6) (b) (6) Bristow, OK, 74010) owned 13 acres with this legal description.

E. **12/07/94:** Had telephone conversation with (b) (6) , co-owner of the original site of the Wilcox Oil Company refinery, at ((b) (6) in response to our letter and access agreement. He wanted his attorney, Mike Jones, to draft another agreement which specifies a time limit for access and he wants us to sign personal injury liability waivers. He informed me that (b) (6) is the owner of about 100 acres east of his land which was the site of storage tanks and sludge pits of the tank farm of the old refinery and his son (b) could provide (b) (6) telephone number. He informed me that he had three wells on his property. Two were water wells and one was an oil well. The two water wells were drilled to about 200 feet and were abandoned because of oil contamination from upper strata in one case and because the casing collapsed after cementing in the other well. Only one of the wells has been plugged and abandoned. The oil well was contaminated down to 40 feet; it was cleaned out them plugged. The water well had gasoline and diesel from 40-60 feet. Most of the area is now supporting trees and other vegetation. For a long time trees would not grow in the yard of the house on site where his youngest son lives. There

is still an area about 100 feet by 150 feet that is barren of vegetation and contains soft knee soil. He said he would get a copy of the aerial photos from the Soil Conservation Department for me. I could pick them up from (b) his son and co-owner, at (b) (6) in Bristow. (b) his youngest son, lives on site with his wife. He bought the fenced area which has about 18 acres which is more than the deed specifies (13 acres). He has an abstract. There were three refineries in Bristow. One operated until the 1930's; one operated until the 1950's; and the Wilcox Oil Company refinery operated until the early 1960's. The land, buildings, equipment and tanks were auctioned off in 1966 or 1987; with requirements for the tanks, equipment, buildings, etc., to be removed in 90 days. Three 50,000 barrel tanks were still standing in the 1970's on the property to the east where cattle have been lost in the bermed areas and one person was injured during salvaging of the tanks. The (b) (6) are salvaging scrap steel from the tanks and pipe inside the fenced area. There are two 5,000 barrel tanks remaining and 6 or 7 have been salvaged.

F. **12/08/94:** Had telephone conversation with Mike Jones, the attorney (b) (6) and (b) (6). I informed him that we were working as contractors for the EPA; told him about the PA site reconnaissance procedure; talked about the next step beyond the PA, the SI; discussed liability issues of current land owner; and let him know about the petroleum exclusion clause. He said he would try to put together an agreement for us to sign that restricts access to the site in terms of a time limit and relinquishes the (b) (6) from any personal injury liability resulting from an accident. He said he was very busy and would try to get to it in a week or so. I let him know that this was too long and asked him to fax it tomorrow. After one week we still had not received a fax. Barbara Rausch composed an agreement and we faxed it to Mr. Jones' office. It was reviewed by (b) (6) and met with his approval.

G. **12/09/94:** Had telephone conversation with a person at the Creek County Tax Assessors office concerning the ownership of the land in the (b) (6) and the (b) (6) was informed that (b) (6) owned 78.25 acres at this legal description.

H. **12/09/94:** Met with (b) (6) (b) (6) Bristow. Picked up an aerial photo his father had acquired and got a telephone number for (b) (6) Told me about two water wells they drilled on the property to around 200 feet in depth. One produced gasoline after pumping for a day from open hole below the surface casing which was set at about 40 feet. It was plugged back by adding successive volumes of sand then cement until the cement filled inside the surface casing. The casing in the other well collapsed during cementing. They tried to drill it out without success. The oil well that was mentioned by (b) (6) did not exist. He confirmed what his father had told me by recounted the history of the property. He added that INCOG had been conducting a study of Sand Creek a few years ago.

I. **12/12/94:** Had conversation with Mike Houts with the Oklahoma DEQ at (405) 271-7899 concerning Well Head Protection Areas (WHPA) around Bristow. He said there were not any around Bristow at this time.

J. **12/12/94:** Had telephone conversation with [redacted] (b) (6) concerning any complaints that may have been reported on the Wilcox refinery site. He said according to his knowledge there were none.

K. **12/12/94:** Had telephone conversation with Lynn Moss of the Environmental complaints and local services (ECLS) of the OKDEQ at (405) 271-4468 concerning any complaints that may have been reported on the Wilcox refinery site. She has the records for the Department of Pollution Control (DPC) which was a part of the Oklahoma Department of Public Health (OSDH). She said no complaints have been reported. She indicated that the records of complaints go back to 1977 for the DPC; 1980 for the Water Board; and 1984 for the Health Department.

L. **12/12/94:** Had telephone conversation with Robert Huber with the Creek County Health Department at (918) 224-0249 and (918) 367-5588 concerning any complaints that may have been reported on the Wilcox refinery site. He was not aware of any complaints on a Wilcox Oil Company, but said he would check his files under the legal description I provided to him and get back in touch with me later.

M. **12/12/94:** Had telephone conversation with Roland Belveal with the local office of the Corporation Commission in Bristow at (918) 367-3396 concerning any complaints that may have been reported on the Wilcox refinery site. He had nothing to report.

N. **12/12/94:** Had telephone conversation with Margret Graham with OKDEQ and formerly with the OWRB at (405) 271-1400 concerning any old OWRB files on the Wilcox refinery site. She reported that no files exist on this refinery and that the earliest OWRB records would be 1969.

O. **12/13/94:** Had telephone conversation with Beth Garner of the Oklahoma Secretary of State's office at (405) 521-3911 concerning Wilcox Oil Company. She indicated that there is not a company by that name "in good standing" with the State at this time, However, a record search turned up an Oklahoma corporation called Wilcox Oil Company which operated "in good standing" from 11/17/75 to 2/28/77 when it was suspended by the Oklahoma Tax Commission. A Delaware corporation called Wilcox Oil Company operated "in good standing" from 8/28/44 through 7/24/64 when it withdrew. On the same day (7/24/64), a Delaware corporation called Wilcox Oil Company filed with the State Department to begin operations in Oklahoma. This company was involved in a merger in 9/24/65 of which the surviving company was Tenneco Oil Company, a Delaware corporation. Tenneco is operating "in good standing" in Oklahoma at this time.

P. **12/14/94:** Had a telephone conversation with Richard Smith of INCOG at (918) 584-7526 concerning a stream survey of Sand Creek. He said that INCOG conducted

a study on the Little Deep Fork 1987 and 1988 upstream and down stream of Bristow and Depew related to impacts on the creek environment waste water effluents from the two towns. He reported that no samples or measurements of stream flow were taken on Sand Creek since it was not flowing at the time of the study (summer of 1987).

Q. **12/16/94:** Met with [redacted] at about 11:30 p.m. and entered his property [redacted] for a site reconnaissance. He said they were in the long term process of salvaging the old storage tanks for scrap iron and pipes for fence posts. He said he plans to use the two tanks at the northwest corner of the property for storage; plans to clean out the old structures to make them useable; and plans to bury the old concrete foundations and tanks/tower pads. He said that there were only two water wells drilled on the property and that both had been plugged and abandoned.

R. **12/16/94:** Met with [redacted] at the Bristow First Assembly of God Church [redacted] They live in the home just west of the church. He showed us some areas of contaminated soil where grass would not grow. He pointed out an area where he observed oil? seeping into Sand Creek just southwest of the church. The seep was not visible this day because of high water from run off of rain received the previous night. He showed us a contaminated water well in a pump house located just southwest of the church and an open cased well or riser located in the middle of the field south of the church. He said that the mobile home also located just south of the church would be the residence of the new pastor. He informed us that [redacted], a church member, [redacted] could provide some information about the construction of the contaminated water well. He said that the church is not using the well anymore and that they and the church are on city water which is provided by a 2 inch line installed by th[redacted] He commented that the line breaks frequently where it crosses Sand Creek.

S. **12/16/94:** Met with [redacted] n his property [redacted] of [redacted] at about 1:00 p.m. and viewed some of the tank farm remnants (asphalt-like tank bottom sediments and oily sludge inside the remaining retention berms for the 50,000 barrel storage tanks). Recent evidence of earth work was observed where several berms had been cut and some had been leveled off. He said that he was trying to clean up the land surface in order to sell several subdivided tracts. He said that people enter the property frequently for hunting.

T. **12/19/94:** Had telephone conversation with Noel Osborne of the Oklahoma Water Resources Board (OWRB) at (405) 231-2577 concerning date when water well drillers were first required to report drilling and completions of water wells and bore holes. She indicated that they were first required to report in 1982. Prior to that date scant information on water well locations will be available.

U. **12/20/94:** Had a telephone conversation with [redacted] concerning the water well of the Bristow First Assembly of God Church. He is a

member of the church and has worked on the well. The well was drilled in 1989 or 1990 to a total depth of about 110 feet. During drilling, a water zone at 40 feet and an oil zone from 20 to 40 feet were encountered. The well was cased and perforated from 40 to 110 feet. It was equipped with a activated carbon filter system for treatment of the petroleum produced with the water. Rain-soft Water Treatment Systems installed the system. The church used the well for about one year then converted back to city water because the petroleum overloaded the treatment system and produced taste and odor problems. He reported that the filter was backflushed every one to two months which would recover about 1 to 2 gallons of crude oil, but the water still had bad taste and odor. He also reported that while digging the ditches for lateral lines, oil was encountered at about 2 feet below ground level.

Reference 6

MEMORANDUM

December 12, 1994.

To: Wilcox Oil Company Site Preliminary Assessment (PA).

From: David Cates, Environmental Specialist, Superfund (Site Assessment Unit).

Re: Potentially Responsible Party (PRP) Search.

A PRP search was conducted on December 9, 1994, concerning an abandoned oil refinery near Bristow, Oklahoma, in Creek County. The refinery appears to be owned and operated by Wilcox Oil Company from the mid 1920's to early 1960's. The original refinery site covers approximately 13 acres in the [redacted] and is located about 0.75 miles northeast of the Bristow City Hall. Records from the tax assessor's office indicate that [redacted] are the current owners of the site. The current owners of the site and surrounding properties are presented in the following table.

PROPERTY OWNERS	ADDRESS	PROPERTY LOCATION	AC	AT
[redacted]	[redacted]	[redacted]	13	A
First Assembly of God Church	Rt 3, Box 1 Bristow, OK 74010		7	B
[redacted]	[redacted]		78.85	C
[redacted]	[redacted]		11.25	D
[redacted]	[redacted]		3.60	E
[redacted]	[redacted]		67.68	F
Falcon Oil Properties	Box 988 Bristow, OK 74010		3.25	G
[redacted]	[redacted]		5.70	H
Bristow First Assembly of God Church	Route 9, Box 1 Bristow, OK 74010		1.75	I

A detailed title search was also conducted concerning the site ownership back to October 11th, 1928, when H.F. Wilcox Oil Company acquired a general warranty deed to the site covering approximately 10 acres located in the NE/4 NW/4 NW/4 of Section 29 from A. (b) (6) (Attachment J). Wilcox Oil Company, a Delaware Corporation, transferred title to (b) (6) on November 1st, 1963, thus establishing a 35 year period of operations (Attachment K). The property went through several different owners after (b) (6) until being transferred to (b) (6) the current co-owner, by (b) (6) (b) (6) n March 27th, 1973 (Attachment L). The details of these ownership transfers are shown in the following table.

GRANTOR	GRANTEE	DOC	DATE	BK	PG
(b) (6)	(b) (6)	WD	1/22/79	69	1348
		WD	3/27/73	17	595
		WD	4/21/67	1025	197
		Cor WD	3/6/67	1022	484
		WD	3/6/67	1021	403
Bolin OIl Company	C. W. Stradley	Inden-ture	7/15/66	1007	612
Tenneco Oil Company	D. H. Bolin	Deed	6/14/66	1006	482
(b) (6)		GWD	12/16/65	994	19
		QCD	11/1/63	943	434
(b) (6)		GWD	1/4/29	371	227

According to the Oklahoma Secretary of State's office, there are currently no companies in Oklahoma operating "in good standing" named Wilcox Oil Company. Their records showed that an Oklahoma corporation called Wilcox Oil Company, operated in Oklahoma from 11/17/75 to 2/28/77 at which time it was suspended by the Oklahoma Tax Commission. A Delaware corporation named Wilcox Oil Company operated "in good standing" in Oklahoma from 8/28/44 until it withdrew on 7/24/64. On the same day (7/24/64) a Delaware corporation named Wilcox Oil Company filed with the State Department and operated "in good standing" until 9/24/65 when it merged with another company. The surviving company was Tenneco Oil Company, a Delaware corporation, which is currently operating "in good standing" in Oklahoma.

The ownership map (Attachment M) shows that H. F Wilcox Oil Company owned more than the approximately 10 acres of land considered to be the original refinery site which was described previously as being in the NE/4 NW/4 NW/4 of Section 29. The map indicates

an additional 20 acres of land both west and east of the St. Louis and San Francisco Railway plus approximately 80 acres underlying the NE/4 NW/4 and the NW/4 NE/4 of Section 29 was owned by H. F. Wilcox Oil Company. The Quit Claim Deed dated November 1st, 1963, between Wilcox Oil Company, the grantor, and [redacted] grantee, records the transfer of 110 acres, more or less, of land in four tracts in section 29 (Attachment K). This confirms the ownership of additional lands by Wilcox Oil Company as shown on the ownership map cited previously. The scope of the PRP search may be expanded to include the lands surrounding the original site. However, only partial research has been done on these tracts, namely the Quit Claim Deed (Attachment K) mentioned above and the tax assessors records of currents owners in the Table above.

Records at the Creek County tax assessor's office indicate [redacted] owns the 78.85 acres located in the NW/4 NE/4 and NE/4 NW/4 of Section 29. However, this land is currently owned by [redacted] whose address % [redacted], Bristow, OK, 74010. Since this ownership did not show up on the county tax assessors records transfer of title must have taken place fairly recently. As mentioned above, titles in the county clerk's office were not researched for this property.

The St. Louis and San Francisco Railroad should also be considered as current land owners. However, it is only assumed that they own the land within the right of way.

Contact Persons:

Betty Rentz, County Clerk, Creek County Courthouse, Sapulpa, Oklahoma: (918) 227-6304.

Creek County Tax Assessor's Office, Sapulpa, OK: (918) 224-4508 (Becky Simmons & Doreen Miller).

[redacted], partial site co-owner, ([redacted] (home).

[redacted], partial site co-owner, % [redacted] Bristow, OK [redacted] home).

Mike Jones, attorney for [redacted]

[redacted], Pastor of Bristow First Assembly of God Church & wife: [redacted]

[redacted], partial owner of site, % [redacted]

to guard against loss of desirable fractions. Both the raw gasoline and reflux feeds is regulated by Foxboro controllers, the usual orifice arrangement being maintained.

The re-boiler and column temperatures are maintained within one-half of one degree of the desired temperature, the success of the stabilization depending largely upon this small deviation from the ideal temperature. The pressure on the stabilizing column is maintained within one-half pound of the desired pressure.

The regulator is on the water condensate from the re-boiler. Boiler pressure is maintained on the re-boiler, while the desired temperature is maintained by a half-inch regulator installed on the water condensate leaving the re-boiler. When the valve is closed, water covers the tube section, and when the valve is opened, water leaves the tower, allowing steam to cover the tube section and thereby increasing the temperature.

Liberal use of concrete for supporting such equipment as the heat exchangers and condensers add strength to the installation and reduces the fire hazard. Elimination of buckling from steel platforms is also accomplished, in addition to a more attractive appearance. The ladder leading up the main column is enclosed by a barrel of heavy wire netting—an added safety factor for workmen.

Five large DeLaval centrifugal pumps are used for circulating water and moving the gasoline, two being for the former and three for the latter. All pumps are in a pit below the surface of the ground. The pump house is equipped with blowers to prevent accumulation of dangerous fumes.

The unit was designed and built by C. F. Braun and Company; actual arrangement of the equipment being largely in the hands of company engineers. Besides handling an almost unprecedented gallonage, the unit is one of the most attractive installations yet completed.

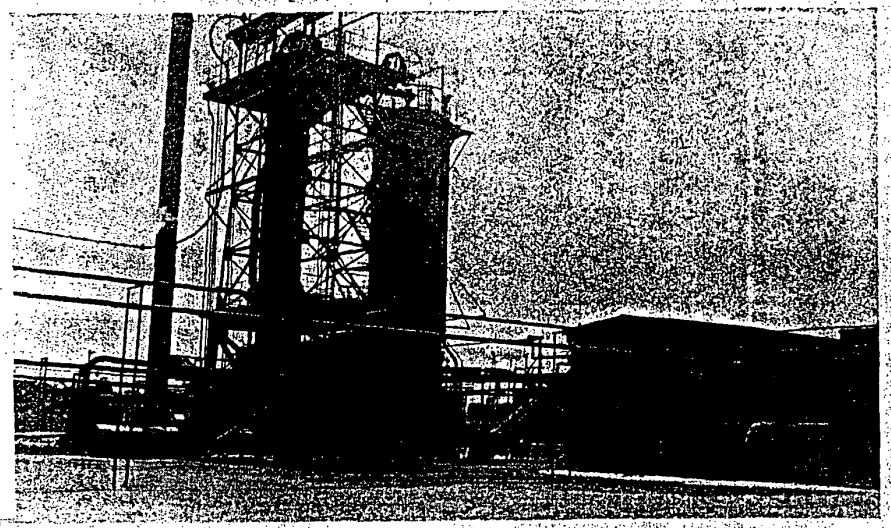
Wilcox Has Modern Installation in Bristow Plant

(*Continued from page 74*)

treating systems are provided for handling the light products, and agitators of the batch type were erected for kerosene treatment.

A recent addition at this plant is a compression type gasoline recovery installation for which gases and vapors are gathered from the skimming plant receiving house, the redistillation plant receiving house, light product storage and crude tanks. Yields from these vapors run from two to six gallons per 1000 cubic feet. The plant production ranges from 4000 to 5000 gallons per day. Gases from the Dubbs unit operation are to be processed through an absorption type recovery unit planned for early installation. Vapors from the pressure distillate reru operation are first scrubbed through alkaline solution before they are compressed.

The compression plant consists of four 80-horsepower Bessemer machines operating at 40 pounds on the low stage side and 175 pounds on the high stage side.



Cracking equipment at Wilcox Oil & Gas Company's Bristow, Oklahoma, refinery

Early in the construction of the new refinery P. L. Tinkler joined the organization as construction engineer. He supervised the installation and design of facilities, and upon completion of the plant was made superintendent of its operation, and has directed the modifications and additions to the plant as discussed in this writing. We are indebted to Mr. Tinkler for his helpfulness and his permission to present the details of plant operations.

000066

Print Key Output Page 1

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:52:28

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 042776 Book: 003

(b) (6)

ARTHUR E
BRISTOW OK 740100000

Property Description

(b) (6)

(number)(sfx) (dir) (street name) (type)

Property Address: WE8469

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Status	Exemption Reg	Exemption Dbl
Tx	1300		A2	1155	9629	A2	1260	10500	I		
Un								Perm. Exempt:			

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd Value 03/10/89 By	Last Chgd Value 03/10/89 By
02R		0019					KARLA	KARLA

FF
R

Prop# 16 0929 00 0008 100 - 000 00
READY TO UPDATE MASTER RECORD
Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

"A"

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:52:02

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 012554 Book: 008
FIRST ASSEM OF GOD CHURCH (BRISTOW)
NON-TAXABLE

Property Description

#1 29-16-9 PT NW NW LYING N & W OF #2 R/W SF & SL RY CO LESS TR SOLD
#3 TO CONT REF CO #4
#5 BK 89 PG 569 #6 (69 SCHULT VIN 87516 HERE)

(number)(sfx) (dir) (street name) (type)
Property Address: FI8493

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Status	Exemption Reg	Exemption Dbl
Tx	700								N		
Un									Perm. Exempt:		

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd Value	Last Chgd By
02R		0019					03/06/91 DEBBIE	

FF
R

Prop# 16 0929 00 0017 100 - 000 00
READY TO UPDATE MASTER RECORD
Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

B

Print Key Output Page 1

5733SS1 V2R3M0 931217 S1041736 12/09/94 10:51:00

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 027446 Book: 008

[redacted] (b) (6)

BRISTOW OK 740100000

Property Description

[redacted] (b) (6)

(number)(sfx) (dir) (street name) (type)

Property Address: TI8463

	Acres	Lots	Land Value Cd	Assessed	Market	Improvement Value Cd	Assessed	Market	Status	Exemption Reg	Exemption Dbl
Tx	7885		A1	740	6171				U		
Un									Perm. Exempt:		

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd 07/19/94 By	Value Last Chgd 03/29/91 By
02R		0019					DOREEN	EARLINE3

FF
E

Prop# 16 929 5 100 000 00

PROPERTY NUMBERS DO NOT MATCH; TRY AGAIN

Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

"C"

Print Key Output Page 1

5738SS1 VZR3MO 931217 S1041796 12/09/94 10:53:46

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 036754 (b) (6) Book: 008

(b) (6) TX 75088

Property Description

(b) (6)

(number)(sfx) (dir) (street name) (type)
Property Address:

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Status	Exemption Reg	Exemption Dbl
Tx	1125		A2	630	5250				U		
Un								Perm. Exempt:			

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd 04/28/92 By	Value Last Chgd 04/28/92 By
02R		0019					ROBIN	ROBIN

FF
R

Prop# 16 0929 00 0062 106 - 000 00
READY TO UPDATE MASTER RECORD
Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

"D"

Print Key Output Page 1

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:53:1E

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 062017 Book: 008

[redacted] (b) (6)

BRISTOW OK 74010

Property Description

[redacted] (b) (6)

(number)(sfx) (dir) (street name) (type)

Property Address: 008513

	Acres	Lots	Land Value Cd	Assessed	Market	Improvement Value Cd	Assessed	Market	Status	Exemption Reg	Dbl
Tx	360		A2	655	5471		1200	10000	H	1000	
Un								Perm. Exempt:			

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Num	Last Chgd Value	Last Chgd By
02R		0019					02/07/94 NANCY	02/07/94 NANCY

FF
E

Prop# 16 0929 00 0027 100 - 000 00
READY TO UPDATE MASTER RECORD
Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

"E"

Print Key Output Page 1

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:56:02

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 013535 Book: 008

(b) (6)

TULSA OK 74112

Property Description

(b) (6)

#5 #6

(number)(sfx) (dir) (street name) (type)

Property Address: MO8049

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Sta tus	Exemption Reg	Exemption Dbl
Tx	6768		A1	590	4900				U		
Un											

Perm. Exempt:

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd 02/26/92 By	Value Last Chgd 04/10/90 By
02R		0019					ROBIN	SUSAN

FF
R

Prop# 16 0920 00 0029 100 - 000 00

READY TO UPDATE MASTER RECORD

Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

" F "

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:55:41

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 060313 Book: 008
FALCON OIL PROPERTIES
BOX 988
BRISTOW OK 74010

Property Description

#1 20-16-9 BEG SW COR OF SW TH S89 #2 D36'2"E 660' TH N0D4'14"W 242.85
#3 TO POB TH CONTINUING N0D4'14"W #4 235.64' TH N0D0'49"W554.87' TH
#5 N89D36'02"W 526.14' TH N25D32'16 #6 "E 184.1' TH N47D56'57"E 436.30

(number)(sfx) (dir) (street name) (type)
Property Address:

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Status	Exemption Reg	Exemption Dbl
Tx	325		A2	194	1620				U		
Un									Perm. Exempt:		

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd 04/13/94 By	Value Last Chg 04/13/94 By
02R		0019	LS				DOREEN	DOREEN

FF
R

Prop# 16 0920 00 0024 117 - 000 00
READY TO UPDATE MASTER RECORD
Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

"G"

Print Key Output Page 1

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:56:20

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: [redacted] Book: 008

[redacted] TULSA OK 741064619

Property Description

#1 [redacted]
#3
#5

Property Address: NU8051

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Status	Exemption Reg	Exemption Dbl
Tx	570		A2	790	6563	A2	325	2710	I		
Un								Perm. Exempt:			

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd 09/13/93 By	Value Last Chgd 03/01/89 By
02R		0019					DEBBIE	MARY

FF
R

Prop# 16 0920 00 0030 100 - 000 00

READY TO UPDATE MASTER RECORD

Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

H

Print Key Output Page 1
5738SS1 V2R3M0 931217 S1041796 12/09/94 10:56:40

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 062163 Book: 008
BRISTOW FIRST ASSEMBLY OF GOD
ROUTE 3 BOX 1
BRISTOW OK 74010

Property Description

#1 20-16-9 TR BEG SW COR TH S89D35 #2 '48"E660'TH N74D12'47"W174.83'TH
#3 N66D48'11"W299.01'TH N70D09'35"W #4 230.85'TH S00D3'31"E239.04'TO PO
#5 B 1.75AC M/L BK 314 PG 1491 #6

(number)(sfx) (dir) (street name) (type)
Property Address:

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Status	Exemption Reg	Exemption Dbl
Tx	175								N		
Un											

Perm. Exempt:

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd 11/23/93 By	Value Last Chgd 11/23/93 By
02R		0019	LS				DOREEN	DOREEN

FF
R

Prop# 16 0920 00 0024 109 - 000 00
READY TO UPDATE MASTER RECORD
Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

39825

GENERAL WARRANTY DEED NO. 371

News Dispatch Printing & Audit Co., Shawnee, Okla.

THIS INDENTURE, Made this 11th day of October A. D. 19 28 between

A. A. Rollestone, by his attorney in face, Edwin H. Rollestone, of Bristow,

of Creek County, in the State of Oklahoma, of the first part, and

H. F. Wilcox, Oil & Gas Company of the second part.

WITNESSETH, That ~~said party of the first part~~, in consideration of the sum of

One Dollars ($1.00) and other good and valuable considerations ~~DOLLARS~~,

said party of the first part,

the receipt whereof is hereby acknowledged/do es by these presents, Grant, Bargain, Sell and Convey unto said part y of the second part,

and ~~his~~ its heirs and assigns, all of the following described Real Estate, situated in the County of Creek, State of Oklahoma, to-wit:

Beginning at a point at the east intersection of the St.Louis and San Francisco Railroad Right of way with the north line of section twenty-nine (29), township sixteen (16), North, Range Nine (9) East, thence east along the north line of said section line 462 feet, thence in a southerly direction at right angles with said section line 365 feet, thence in a westerly direction parallel with said section line 260 feet, thence in a southerly direction at right angles with said section line 362 feet, thence in a westerly direction parallel with said section line 707 feet to the east line of the St.Louis and San Francisco Railroad right of way, thence in a northeasterly direction along the east line of the St. Louis and San Francisco Railroad Right of way 891 feet to the place of beginning and containing ten (10) acres, more or less.

TO HAVE AND TO HOLD THE SAME, Together with all and singular the tenements, hereditaments and appurtenances thereto belonging or in anywise appertaining forever.

And said A. A. Rollestone by his attorney in fact Edwin H. Rollestone, his

and ~~his~~ heirs, executors or administrators, do es hereby covenant, promise and agree to and with said part y

of the second part ~~his~~ at the delivery of these presents he is lawfully seized in his own right of an absolute and indefeasible estate of inheritance in fee simple, of and in all and singular the above granted and described premises, with the appurtenances; that the same are free, clear and discharged and unincumbered of and from all former and other grants, titles, charges, estates, judgments, taxes, assessments and incumbrances of whatsoever nature and kind: Except

and that he will warrant and forever defend the same unto said part y of the second part, its heirs and assigns, against said part y of the first part, his heirs and assigns, and all and every person or persons whomsoever, lawfully claiming or to claim the same.

IN WITNESS WHEREOF, The said part y of the first part ha s hereunto set his hand, the day and year first above written.

WITNESSES:

Alvin L. Chapman — A. A. Rollestone

Horace B. Clay — By Edwin H. Rollestone

His attorney in fact.

STATE OF OKLAHOMA, County of Tulsa, ss.

Before me, Kate Dickson, a Notary Public in and for said County and State on this 12th day of October, A. D. 1928, personally appeared Edwin H. Rollestone

to me known to be the identical person ~~s~~ and as attorney in fact of A. A. Rollestone, who executed the within and foregoing instrument and acknowledged to me that ~~he~~ executed the same as ~~his~~ and as the free and voluntary act and deed of A. A. Rollestone free and voluntary act and deed for the uses and purposes therein set forth.

Witness my hand and ~~official~~ notarial seal the day and year above written. set forth.

My commission expires January 8, 1931 (Notary SEAL) D Kate Dickson Notary Public.

Tulsa Co.

STATE OF OKLAHOMA, County of Creek, ss.

This instrument was filed in my office for record on Oct. 25 1928, at 8 o'clock A. M.,

and duly recorded in Book 371 on page 128

Erma Morris County Clerk.

(SEAL) By Frances Delman Deputy.

"J"

000076

434

434

Form 17—Barnhart Printing & Stationery Co., Tulsa, Okla.

63 7389

Quit-Claim Deed

(CORPORATION FORM)

STATE OF OKLAHOMA
COUNTY OF CREEK
NOV 4 1963
LEO BAUER, County Clerk

THIS INDENTURE, Made this 1st day of November, 1963 between Wilcox Oil Company

a corporation, organized under the laws of the State of Delaware

of the County of Tulsa State of Oklahoma, party of the first part, and Wendell H. Sandlin

party of the second part.

WITNESSETH: That said party of the first part, in consideration of the sum of

Ten and No/100 Dollars ($10.00) and O.V.O. DOLLARS

to them duly paid, receipt of which is hereby acknowledged, do hereby quit-claim, grant, bargain, sell and convey unto the said party of the second part, and to his heirs and assigns forever, all their right, title, interest and estate, both at law and in equity, of, in and to the following described real estate, situate in the County of Creek and State of Oklahoma, to-wit:

110.08 acres of land, more or less, more particularly described by Tracts as follows:

FIRST TRACT: The Northwest Quarter of the Northeast Quarter (NW/4 NE/4) Section 29-16N-9E, containing 40 acres, more or less.

SECOND TRACT: The Northeast Quarter of the Northwest Quarter (NE/4 NW/4) Section 29-16N-9E, less and except a tract of land containing 1.14 acres more particularly described by metes and bounds as follows: Commencing at the Northwest corner of NE/4 NW/4, thence East 25 feet, thence South, a distance of 33 feet to the point of beginning; thence East 200 feet; thence South 250 feet; thence West 200 feet; thence North 250 feet to the point of beginning, containing 38.86 acres more or less,

THIRD TRACT: A Tract of land containing 24.22 acres, more or less, situate in the Northwest Quarter of the Northwest Quarter (NW/4 NW/4) Section 29-16N-9E, more particularly described by metes and bounds as follows: Commencing at the Northeast Corner of the NW/4 NW/4 Section 29, thence West 516 feet to the East line of the St. Louis & San Francisco Railroad right of way, thence Southwesterly along said East line of said Right of Way to the point of intersection of said East line of said St. Louis & San Francisco Railway right of way with the center line of Sand Creek; thence meandering southeasterly with the center of said Sand Creek to the South line of the NW/4 NW/4 of said Section 29-16N-9E; thence East along the South line of the NW/4 NW/4 of said Section 29 to the Southeast corner of the NW/4 NW/4 of said Section 29; thence North along the East line of NW/4 NW/4 said Section 29 a distance of 1320 feet to the point of beginning, subject to Railroad Right of Way Easements and deeds of record.

FOURTH TRACT: That part of the Northwest Quarter of the Northwest Quarter (NW/4 NW/4) Section 29-16N-9E, lying North and West of the St. Louis & San Francisco Railway Right of Way, subject to Railroad Right of Way Easements and deeds of record, containing Seven (7) acres, more or less.

"K"



Together with all and singular the hereditaments and appurtenances thereunto belonging. To have and to hold the above granted premises unto the said party of the second part his heirs and assigns forever.

IN WITNESS WHEREOF, The said party of the first part has hereunto set its hand and caused its Corporate Seal to be affixed the day and year first above written.

CORPORATION SEAL

WILCOX OIL COMPANY
Name of Corporation.

ATTEST:
By Clara Alsworth
Asst. Secretary.

By A. L. Chapman
President.

STATE OF OKLAHOMA,
County of Tulsa } SS.

CORPORATION ACKNOWLEDGMENT.

Before me, the undersigned, a Notary Public, in and for said County and State, on this 1st day of November, 19 63, personally appeared A. L. Chapman

to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its President and acknowledged to me that he executed the same as his free and voluntary act and deed and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

Given under my hand and seal the day and year last above written.

My commission expires Dec. 29, 1966

Thelma Hodge
Notary Public.

K"

9.90

'73 153

STATE OF C ...MA
COUNTY O. ...K
THIS INSTRUMENT WAS ... IN
MY OFFICE FOR RECORD ON
APR 16 1973
2:10 o'clock P M. and duly recorded in
Book 12 Page 525
LEO BRUCE County Clerk
By Hoyle Deputy

WARRANTY DEED

(Statutory Form—Individual)

KNOW ALL MEN BY THESE PRESENTS:

THAT J. M. BANKSTON and KINIS BANKSTON, husband and wife, whose post office address is Route 2, Box 319A, Okemah, Ok. 74859 ..... , part ies of the first part, in consideration of the sum of NINE THOUSAND AND no/100 ---------- dollars, and other valuable considerations, in hand paid, the receipt of which is hereby acknowledged, do hereby grant, bargain, sell and convey unto JACK WHITE, whose address is Rt. 1, Box 51, Bristow, Ok. ..... , part y of the second part, the following described real property and premises situate in CREEK County, State of Oklahoma, to-wit: The so-called surface and surface rights in and to a tract of land in the Northwest Quarter of the Northwest Quarter (Nw/4 NW/4) of Section 29, Township 16 North, Range 9 East, described as beginning at the Northeast corner of said Northwest Quarter of the Northwest Quarter thence South 387.3 feet; thence S 41°45'W a distance of 571 feet; thence West a distance of 695 feet, more or less, to the Easterly right of way of the railroad; thence Northeasterly along said right of way a distance of 1000 feet, more or less, to the North line of said Section 29; thence East 511.6 feet to the point of beginning, containing 13.0 acres, more or less;

Excluding herefrom all oil, gas and other minerals heretofore RESERVED or EXCEPTED by former grants of this property; together with the improvements thereon and personal property thereon and thereunder; together with all the improvements thereon and the appurtenances thereunto belonging, and warrant the title to the same. EXCEPT as against railroad right of way easements of record and other existing easements of record.

together with all the improvements thereon and the appurtenances thereunto belonging, and warrant the title to the same.

TO HAVE AND TO HOLD said described premises unto the said party of the second part, his heirs and assigns forever, free, clear and discharged of and from all former grants, charges, taxes, judgments, mortgages and other liens and incumbrances of whatsoever nature.

Signed and delivered this 27th day of March, 19 73.

Kinis Bankston
Kinis Bankston

J M Bankston
J. M. Bankston

INDIVIDUAL ACKNOWLEDGMENT

STATE OF Oklahoma, County of Okfuskee, SS.

Before me, a Notary Public in and for said County and State, on this 27th day of March, 19 73, personally appeared J. M. BANKSTON AND KINIS BANKSTON, husband and wife,

to me known to be the identical person s who executed the within and foregoing instrument, and acknowledged to me that they executed the same as their free and voluntary act and deed for the uses and purposes therein set forth.

Given under my hand and seal the day and year last above written.

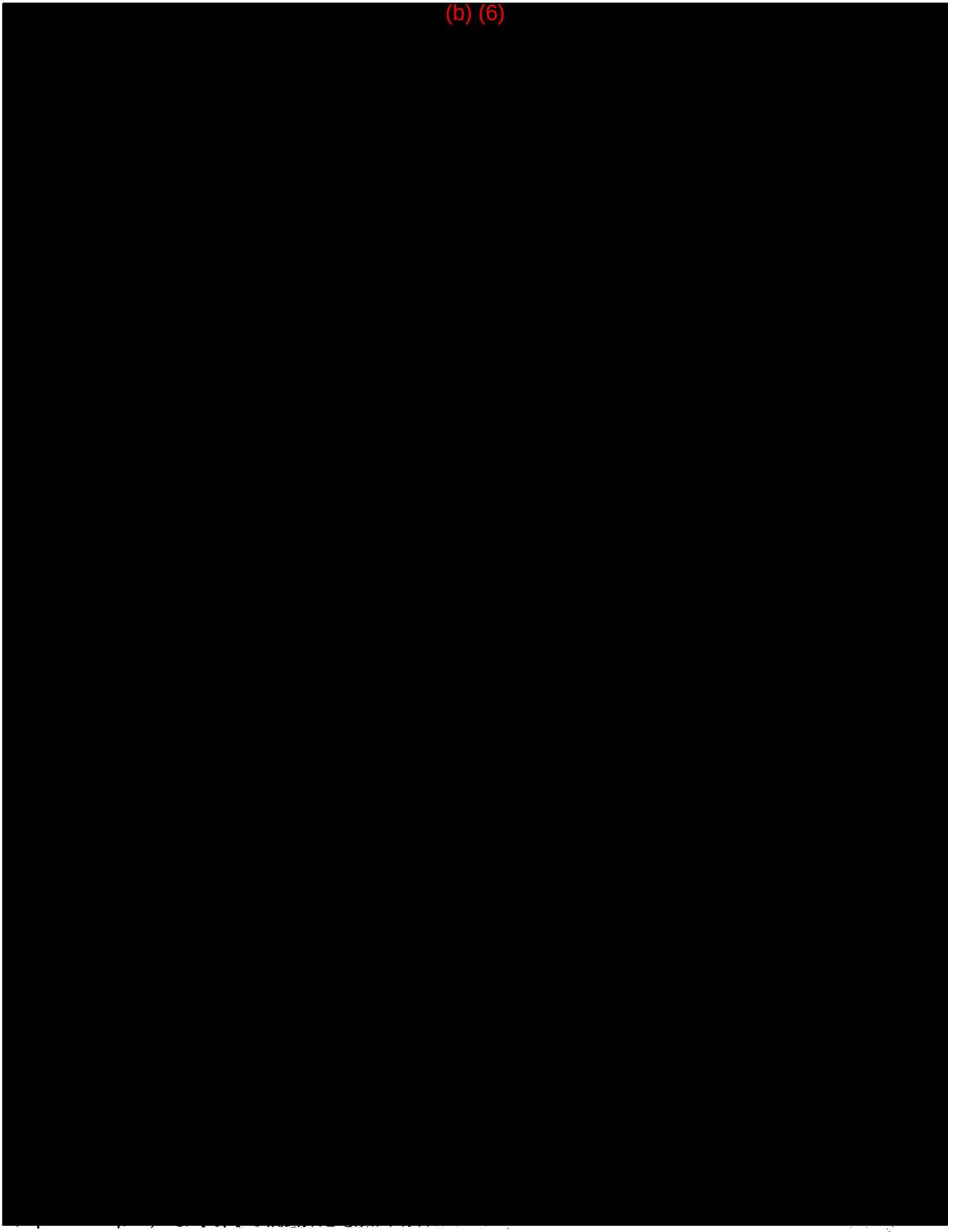
My commission expires July 20, 1976

Shany Posey
Notary Public

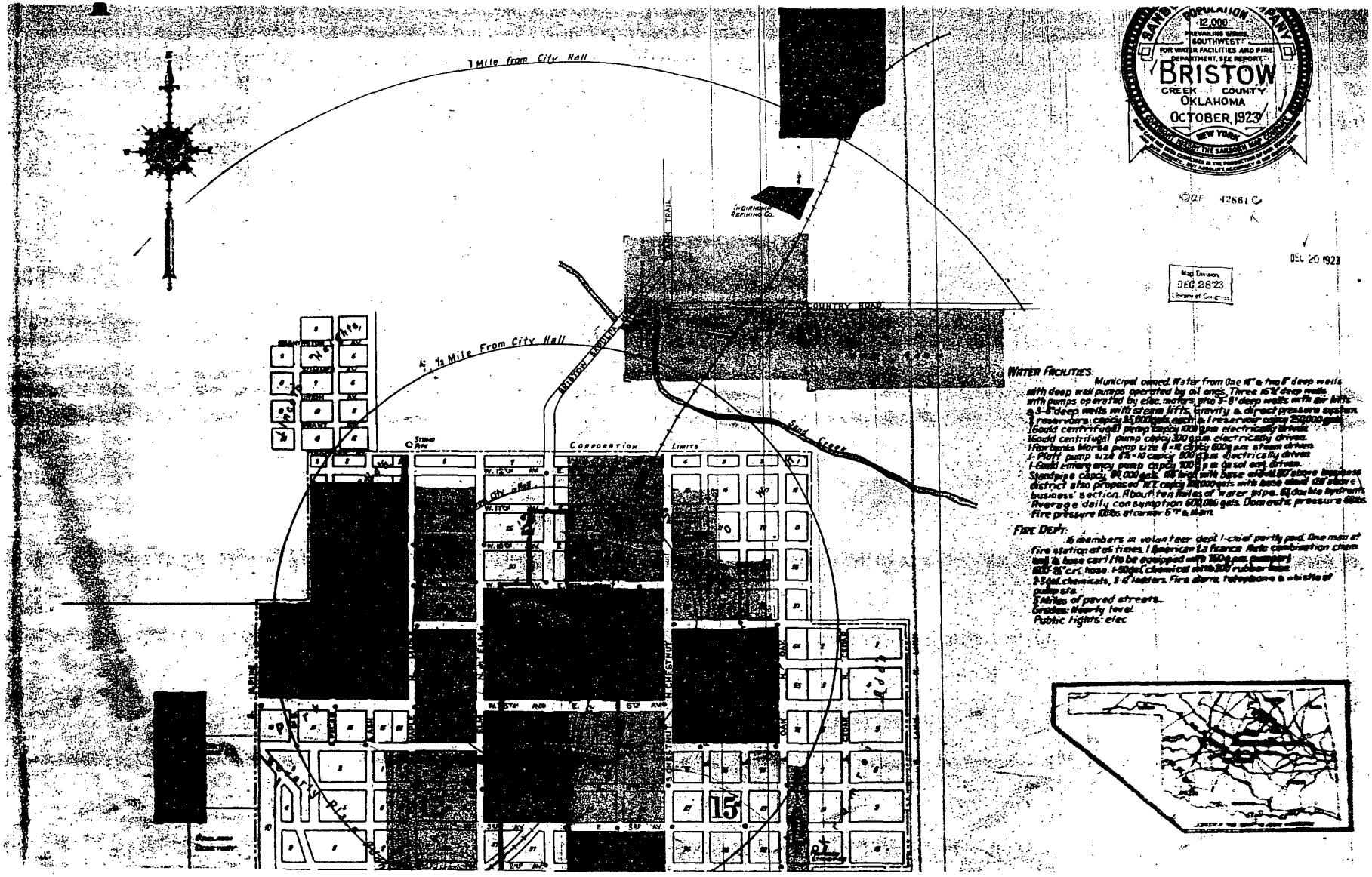
NOTE—This form supplied by TITLE GUARANTY DEPARTMENT of AMERICAN-FIRST TITLE & TRUST CO., Oklahoma City, for the convenience of ATTORNEYS. No legal instrument or form should ever be prepared by anyone other than an Attorney.

595 G44

000079


(b) (6)

Reference 7



SANBORN POPULATION COUNTY
12,000
PREVAILING WINDS SOUTHWEST
FOR WATER FACILITIES AND FIRE DEPARTMENT, SEE REPORT
BRISTOW
CREEK COUNTY
OKLAHOMA
OCTOBER, 1923
NEW YORK

OCF 42661 C

DEC 20 1923

Map Division
DEC 28 23
Library of Congress

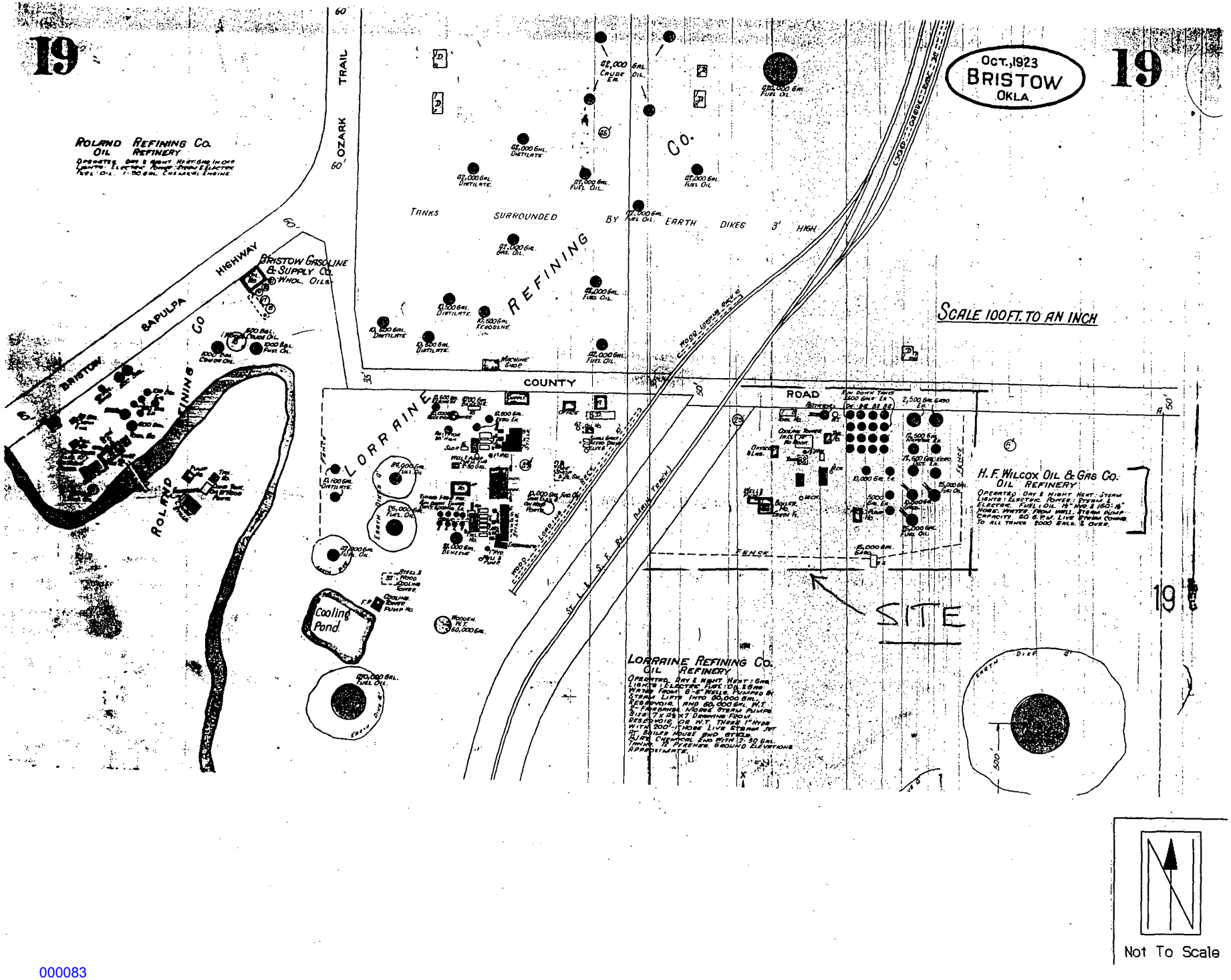
WATER FACILITIES:

Municipal owned. Water from One 15" & two 8" deep wells with deep well pumps operated by oil engs. Three 15" deep wells with pumps operated by elec. motors, also 3-8" deep wells with air lifts. 3-8" deep wells on 12 acre hill, gravity & direct pressure system. 1 reservoir, capcity 35,000 gals. each, & 1 reservoir capcity 250,000 gals. 1 Gould centrifugal pump capcity 600 gpm electricity driven. 1 Gould centrifugal pump capcity 300 gpm electricity driven. 1 Fairbanks Morse pump size 8"-10 capcity 600 gpm steam driven. 1 Pfaff pump size 6"-8 capcity 300 gpm electricity driven. 1 Gould emergency pump capcity 100 gpm gasoline driven. Standpipe capcity 94,000 gals. 100 ft high with base added 20' above business district also proposed 117 capcity 150,000 gals with base about 60' above business section. About ten miles of water pipe. 60 double hydrants. Average daily consumption 600,000 gals. Domestic pressure 60lbs. Fire pressure 100lbs at corner 6th & Main.

FIRE DEPT:

16 members in volunteer dept 1-chief partly paid. One man at fire station at all times. 1 American La France Auto combination chem. & hose cart, to be equipped with 750 gpm pumper. 600-3" cot. hose. 1-50 gal. Chemical with 300' rubber hose. 3-3 gal. chemicals, 3-40' ladders. Fire alarm, telephone & whistle at police sta.

5 miles of paved streets.
Location: Nearly level.
Public lights: elec


19
OCT., 1923
BRISTOW
OKLA.
19
ROLAND REFINING CO.
OIL REFINERY
OZARK TRAIL
HIGHWAY
SAPULPA
BRISTOW
BRISTOW GASOLINE & SUPPLY CO.
WHOL. OILS
ROLAND REFINING CO
TANKS SURROUNDED BY EARTH DIKES 3' HIGH
REFINING CO.
LORRAINE
COUNTY ROAD
SCALE 100 FT. TO AN INCH
H. F. WILCOX OIL & GAS CO.
OIL REFINERY
LORRAINE REFINING CO.
OIL REFINERY
SITE
Cooling Pond
Not To Scale

000083

Reference 8

CONSENT FOR ACCESS TO PROPERTY

I, [redacted], co-owner of a portion of the premises described in Exhibit "A", consent to officers, employees and authorized representatives of the Oklahoma Department of Environmental Health (ODEQ) entering the said premises for the express purpose of conducting a site reconnaissance on the 16 day of December, 1994. I understand that the information gathered during the reconnaissance will be included in a Preliminary Assessment, which will be prepared by the ODEQ for review by the U.S. Environmental Protection Agency, under the authority of the Comprehensive Environmental Response, Compensation and Liability Act. (42 U.S.C. §9601 et seq.)

This written permission is given voluntarily and with no expectation of receiving any compensation from ODEQ.

[redacted]

12-16-94
Date

INDEMNITY CLAUSE

ODEQ agrees to indemnify, defend, and hold harmless [redacted] for any personal injuries, including death, property damage, or other loss arising out of the activities performed by ODEQ on the 16 day of December, 1994, pursuant to the Agreement executed by [redacted] on that date.

Damon D. Wingfield, Director
Waste Management Division

12-14-94
Date

EXHIBIT A

Legal Description: [redacted], Creek County, Oklahoma

MARK S. COLEMAN
Executive Director

DAVID WALTERS
Governor

State of Oklahoma

DEPARTMENT OF ENVIRONMENTAL QUALITY

November 30, 1994

(b) (6)
Bristow, OK 74010

Re: Request for permission for State of Oklahoma, Department of Environmental Quality, personnel to gain access to the 13 acre property in the (b) (6) (b) (6) located about one half mile northeast of the Bristow City Hall on the east side of the St. Louis & San Francisco Railroad Main track and south of the county road.

Dear (b) (6)

The purpose of this letter is to request your voluntary consent for Oklahoma Department of Environmental Quality (DEQ) personnel to enter your property located approximately one half mile northeast of the Bristow City Hall for the purpose of conducting a Site Reconnaissance for a Preliminary Assessment (PA). Records at the Creek County Tax Assessors Office indicate that you are the current owners of the approximately 13 acres located in the (b) (6) which is believed to be the former site of the Wilcox Oil Company Refinery. DEQ is conducting a Preliminary Assessment of the Wilcox Oil Company Site under the authority of the Multi-Site Cooperative Agreement (CA # V-00645-01) with the U.S. Environmental Protection Agency (EPA), as authorized by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA).

CERCLA was passed by Congress in 1980, and reauthorized by SARA in 1986 and 1990. The purpose of this legislation is to provide a means of responding to threats to human health and the environment from uncontrolled releases of hazardous substances from old (usually pre-1980) sources. In creating CERCLA, Congress charged EPA to develop criteria which would allow sites that pose the greatest threat to be given priority for cleanup. In order to fulfill this obligation, EPA created the Hazardous Ranking System

(HRS) to evaluate sites for possible inclusion on the National Priorities List (NPL). The first stage of the site evaluation process is the Preliminary Assessment (PA). This is a cursory investigative report that distinguishes between the sites which pose little or no threat and the sites which need further investigation.

In general, a Preliminary Assessment is a report which compiles existing information concerning the site and the surrounding area. Special emphasis is given to people and resources which might be affected by a release of hazardous substances from the area. During the course of report preparation, it is important for the investigator to walk the site in order to make a more accurate assessment of the conditions at the site.

A site reconnaissance consists of a visual inspection of the property and the area around the site. Photographs of the area are taken. Samples are not generally collected; however, portable monitors (such as pH meters) are sometimes used during the visit.

The Oklahoma Department of Environmental Quality requests your permission to enter the property mentioned above to conduct a site reconnaissance, tentatively scheduled for the week of Monday, December 13, 1994. You may be present during the reconnaissance if you would like but it is not required. The site visit will last approximately one hour.

Although legal means are available to the DEQ, we prefer to gain the current landowner's or lessees' voluntary consent for DEQ personnel to enter the property and conduct a site reconnaissance. If you agree to allow DEQ personnel on your property for the purpose of a site reconnaissance please sign and date the enclosed document and mail it as soon as possible to the address below:

David Cates, Environmental Specialist
Oklahoma Department of Environmental Quality
Waste Management Division (Site Assessment Unit)
1000 N.E. 10th St.
Oklahoma City, Oklahoma 73117 - 1212

If you have any questions, please feel free to call me at (405) 271-7049 or Rita Kottke at (405) 271-7071.

Sincerely,

David Cates

cc: Robert Huber, Creek County DEQ
Enclosure: Consent For Access To Property

Name of Owner: [redacted]
Bristow, OK 74010

Site Name: Wilcox Oil Company Refinery Site

Location of Property: [redacted] Creek County, Oklahoma

I hereby consent to allow Oklahoma Department of Environmental Quality personnel to enter the property specified above for the express purpose of conducting a site reconnaissance. I understand that the information gathered during the reconnaissance will be included in a Preliminary Assessment, which will be prepared by the Oklahoma Department of Environmental Quality for review by the U.S. Environmental Protection Agency, under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act.

_____ _____

Signature Date

CONSENT FOR ACCESS TO PROPERTY

I, [redacted] co-owner of a portion of the premises described in Exhibit "A", consent to officers, employees and authorized representatives of the Oklahoma Department of Environmental Health (ODEQ) entering the said premises for the express purpose of conducting a site reconnaissance on the ____ day of December, 1994. I understand that the information gathered during the reconnaissance will be included in a Preliminary Assessment, which will be prepared by the ODEQ for review by the U.S. Environmental Protection Agency, under the authority of the Comprehensive Environmental Response, Compensation and Liability Act. (42 U.S.C. §9601 et seq.)

This written permission is given voluntarily and with no expectation of receiving any compensation from ODEQ.

_____ _____

[redacted] Date

INDEMNITY CLAUSE

We, David Cates, Alex Tabatabai, and Karen Khalafian, agree to indemnify, defend, and hold harmless [redacted] for any personal injuries, including death, property damage, or other loss arising out of the activities performed by us on the ____ day of December, 1994, pursuant to the Agreement executed by [redacted] on that date.

_____ _____

Karen Khalafian Date
Senior Environmental Specialist

_____ _____

David Cates Date
Environmental Specialist

_____ _____

Alex Tabatabai Date
Environmental Engineer

EXHIBIT A

Legal Description: [redacted], Creek County, Oklahoma

Reference 9

PA Guidance

Sites," OSWER Directive 9345.1-08). If during any stage of the PA investigation you come across information that leads you to believe the site might be eligible for RCRA Subtitle C corrective action, notify your Regional EPA site assessment contact, who will discuss the situation with representatives of the RCRA program and decide whether to proceed with CERCLA investigative activities.

Table 2-1
RCRA Eligibility Checklist

1. Has the facility treated, stored, or disposed any RCRA hazardous waste for any period of time since November 19, 1980? (If the facility or site is a known "protective filer," check no.)

   ☐ Yes ☐ No

   IF THE ANSWER TO QUESTION 1 IS "NO", **STOP**; SITE IS NOT ELIGIBLE FOR RCRA RESPONSE.
   IF YES, CONTINUE WITH CHECKLIST.

2. Does the facility currently have a RCRA Part B Operating Permit or a post-closure permit?

   ☐ Yes ☐ No

3. Did the facility file a Part A Permit Application? ☐ Yes ☐ No

   If yes,

   - Does the facility currently have interim RCRA status? ☐ Yes ☐ No
   - Did the facility convert its status from TSF to "Generator" or "Non-handler"?

     ☐ Yes ☐ No

   If no,

   - Is the facility a "Non- or Late Filer"? ☐ Yes ☐ No

IF ANSWERS TO ALL QUESTIONS IN PARTS 2 AND 3 ARE "NO," THE SITE IS NOT ELIGIBLE FOR RCRA RESPONSE. IF THE ANSWER TO ANY QUESTION IS "YES," DISCUSS THE SITE WITH YOUR EPA SITE ASSESSMENT CONTACT.

2.2.2 CERCLA Petroleum Exclusion

CERCLA authorized Federal response to releases or threatened releases of "hazardous substances" and "pollutants and contaminants." CERCLA excludes "petroleum, including crude oil or any fraction thereof" from the definition of these terms. However, CERCLA does not define the specific types of petroleum products excluded.

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EPA's current interpretation of the petroleum exclusion is that a release or threatened release involving solely crude oil, fractions of crude oil, or refined crude oil products (e.g., gasoline) is not eligible for CERCLA response action. However, release of a CERCLA hazardous substance (e.g., lead, polychlorinated biphenols) mixed with oil through either the addition of the hazardous substance to the oil (e.g., oil-based paint, transformer coolant), or as a result of the use of the oil (e.g., waste oil containing lead as a result of combustion) is subject to CERCLA. In addition, if a CERCLA hazardous substance and oil are commingled to the extent that they cannot be practicably separated, the entire mixture is subject to CERCLA. Be aware that EPA's interpretation of the petroleum exclusion is currently under review and the policy may change in the future.

If the only type of release or threatened release involves materials that fall under the petroleum exclusion, notify your Regional EPA site assessment contact. EPA will decide whether the investigation should continue or the site should be dropped from CERCLA consideration. Some sites may have several waste sources, some eligible, others ineligible due to the petroleum exclusion. Determining which sources are eligible and ineligible for CERCLA consideration will facilitate an accurate evaluation of targets and waste quantity (discussed in Section 3).

2.2.3 Other Environmental Statutes

CERCLA precludes Superfund response actions at particular sites that fall under the jurisdiction of the Atomic Energy Act (AEA) and the Uranium Mill Tailings Radiation Control Act (UMTRCA).

Releases of source, by-product, or special nuclear material defined in AEA Section 68, Statute 923 (e.g., process ore for fresh uranium fuel) from a nuclear incident subject to the financial protection requirements of AEA are excluded from CERCLA response. Typically, this means releases from nuclear power plants licensed by the Nuclear Regulatory Commission (NRC) are the responsibility of NRC (not including facilities licensed by States or other Federal agencies that have been granted licensing authority by NRC).

Releases of source, by-product, or special nuclear material from the 22 processing sites specifically designated in UMTRCA are excluded from CERCLA response.

Also, CERCLA notification and cost recovery provisions may not be applicable to releases associated with the legal application of certain substances regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

If you conclude after reviewing available background information that response at the site might appropriately occur under any of these statutes, discuss the situation with your Regional EPA site assessment contact.

2.2.4 Sites With No Hazardous Substances

Occasionally your review of available file information will yield no evidence or indication that hazardous substances, pollutants, or contaminants were ever handled or disposed at the site. These types of sites pose no CERCLA threat to human health or the environment because they have not released, nor can they release, hazardous substances to the environment.

You must be certain that CERCLA hazardous substances are not now, or have never been, at the site before "no further action" could be recommended on this basis. Many sites have extremely limited information concerning waste sources. Simple lack of information cannot be interpreted to indicate that no hazardous waste is present or has ever been deposited at the site. Such a determination must be supported by convincing evidence, like documentation of a complete removal of all hazardous substances. In addition, you should perform a reconnaissance of the site (Section 2.5) to visually verify the lack of hazardous waste sources.

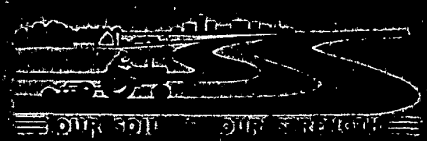
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Reference 10

Series 1950, No. 5 Issued May 1959

SOIL SURVEY

Creek County Oklahoma



UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with the
OKLAHOMA AGRICULTURAL EXPERIMENT STATION

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SOIL SURVEY OF CREEK COUNTY, OKLAHOMA

By HARVEY OAKES, Soil Survey;[1] soils surveyed by O. H. BRENSING, in charge, DALE SCRIVEN, and E. C. TALLEY, Oklahoma Agricultural Experiment Station; H. P. MIKLES, Soil Conservation Service; H. M. GALLOWAY, Soil Survey and Oklahoma Agricultural Experiment Station

Correlation by JAMES THORP, Soil Survey, United States Department of Agriculture

United States Department of Agriculture in Cooperation with the Oklahoma Agricultural Experiment Station

Geography of Creek County

Creek County is in the northeastern quarter of Oklahoma (fig. 1). It is about 72 miles south of the Oklahoma-Kansas boundary and about 96 miles west of the Oklahoma-Arkansas boundary. Sapulpa, the county seat, is in the northeastern corner of the county. It is 15 miles southwest of Tulsa and 87 miles northeast of Oklahoma City.

The county is 36 miles long from north to south and 33 miles across at the central and widest part. It is 24 miles across at the south end. All boundaries of the county are artificial. Most of the county lies between the Cimarron River on the north and the Deep Fork of the North Canadian River on the south. Small parts lie

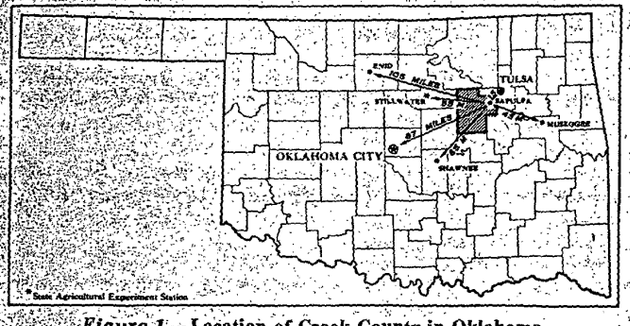


Figure 1.—Location of Creek County in Oklahoma.

north and south of these rivers. The approximate land area of Creek County is 972 square miles, or 622,080 acres.

Physiography, Relief, and Drainage

Creek County lies in the Osage Plains section of the Central Lowlands physiographic province. The Osage Plains, now a region of well-dissected sandstone hills, was formerly a gently sloping plain. Shallow narrow valleys separated by stony ridges are characteristic. The ridges lie roughly parallel in a northeast-southwest direction. Many of them have rather steep east-facing escarpments.

Creek County is underlain by interbedded sandstones and shales; each layer outcrops at its eastern edge. The shales, which erode more rapidly than the sandstones, occupy the shallow valleys. The ridges are capped by the more resistant sandstones.

The western part of the county is underlain mostly by sandstones. Streams have cut narrow V-shaped valleys. Much of this part of the county is rolling or sloping. The eastern and southeastern parts are underlain mostly by shales. The few beds of sandstone outcrop on ridges between the shallow, gently sloping or nearly level, shaly valleys.

The elevation is highest in the western part of the county. The altitude near Drumright, at the western edge, is about 1,100 feet. The altitude is lowest—about 600 feet—where the Deep Fork River leaves the southeastern corner.

The Cimarron River cuts across the north end of Creek County. Polecat Creek lies south of that river. These two streams drain the northern half of the county. Both are tributaries of the Arkansas River, which flows just northeast of Creek County. The Deep Fork of the North Canadian River, locally called the Deep Fork River, flows generally along the southern edge of the county and crosses the boundary a number of times. Together with Little Deep Fork Creek, which rises in the west-central part of the county, this river drains the southern half of the area. These two streams join just outside the county and flow into the North Canadian River about 50 miles to the southeast.

The county is well dissected by small streams, most of which have narrow valleys. The larger streams have rather wide, shallow valleys composed of narrow flood plains and nearly level terraces of old alluvium. All of the uplands and most of the bottom lands and terraces are well enough drained to be suitable for the common crops of the area. Only the flood plain of the Deep Fork River is so frequently flooded and so poorly drained as to prevent cultivation.

Climate

The climate of Creek County is continental and has pronounced seasonal changes in temperature and, to a lesser extent, in precipitation. It is generally warm to temperate and humid. There is a difference of about 40° F. between the average summer and the average winter temperatures. The prevailing winds are from the north from December to February and from the south during the rest of the year.

[1] Fieldwork for this survey was done while Soil Survey was part of the former Bureau of Plant Industry, Soils, and Agricultural Engineering. Soil Survey was transferred to the Soil Conservation Service on November 15, 1952.

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Summers are long and hot. The highest temperatures are usually accompanied by clear skies, a moderately low humidity, southern breezes, and cooler nights. Winters are short and comparatively mild. They are characterized by periods of warm, pleasant weather followed by frequent but short spells of freezing temperatures accompanied by north winds. The ground sometimes is frozen to a depth of a few inches for several days. A few light snowfalls each winter total about 6 inches, but snow seldom remains more than a few days. Spring and fall are cool and usually windy. Tornadoes and hailstorms are rare.

The average growing season is about 219 days. The average date of the last frost in spring is March 27, but frosts have occurred as late as April 18. The average date of the first frost in the fall is November 1, but frosts have occurred as early as October 9. During normal years the growing season is long enough for all common field crops to mature. Some orchard crops, especially peaches, may be damaged by frosts late in spring. Planting of cotton or cowpeas is delayed in some years by late frosts and wet cool weather.

The average annual precipitation at Bristow, near the center of the county, is 37.19 inches. This amount of moisture is usually adequate for crops. The eastern edge of the county receives about 2 inches more rainfall than the extreme western part. The precipitation is fairly well distributed during the year. About 60 percent of it comes during the planting and growing season, or between March 1 and September 1. April, May, and June have the highest rainfall. Dry spells lasting several weeks, accompanied by drying winds and a high evaporation rate, are common in July and August. These droughts may damage late crops, especially corn. September and October have more rain, but not so much as the spring months.

Fieldwork can go on throughout the winter, except for the short periods when the ground is frozen. Sometimes spring planting is delayed by cool wet weather. Heavy-textured soils, especially, may be too wet for planting early in spring.

The normal temperature and precipitation at Bristow are fairly representative for Creek County. These figures are given in table 1.

TABLE 1.—*Normal temperature and precipitation at Bristow Station, Creek County, Okla.*

[Elevation, 818 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1936)	Wettest year (1941)	Average snowfall
	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*	*Inches*
December	41.3	82	1	1.64	1.65	1.74	0.6
January	38.5	81	−13	1.91	.11	1.79	2.6
February	42.5	84	−7	1.43	.51	2.49	1.6
Winter	40.8	84	−13	4.98	2.27	6.02	4.8
March	51.0	94	−11	2.49	.44	.75	1.1
April	61.0	93	18	4.04	.30	8.62	(3)
May	69.0	98	33	4.23	3.66	6.15	(3)
Spring	60.3	98	−11	10.76	4.40	15.52	1.1
June	77.6	109	47	4.71	.90	8.04	(3)
July	82.6	114	54	3.10	.86	2.07	0
August	82.3	115	50	3.11	.25	4.18	0
Summer	80.8	115	47	10.92	2.01	14.29	(3)
September	73.9	108	33	3.87	9.62	7.36	(3)
October	63.5	98	21	4.09	3.02	16.00	0
November	49.7	88	8	2.57	1.31	2.40	.3
Fall	62.4	108	8	10.53	13.95	25.76	.3
Year	61.1	115	−13	37.19	22.63	61.59	6.2

[1] Average temperature based on a 38-year record, through 1954; highest temperature on a 21-year record, and lowest temperature on a 20-year record, through 1952.

[2] Average precipitation based on a 39-year record, through 1955; wettest and driest years based on a 26-year record, in the period 1916–55; snowfall based on a 21-year record, through 1952.

[3] Trace.

Vegetation

Most of Creek County had a forest-savanna vegetation known as the Cross Timbers.[2] Open stands of post oak, blackjack oak, and hickory grew among tall grasses. Many grassy openings were on the more clayey soils and along the foot slopes above the drainageways. Since this area became settled, the blackjack oak has spread considerably and occupied many areas that were formerly open. Much of this newer growth is small and brushy and nearly crowds out the grass.

Open prairies of bluestems, Indiangrass, and switchgrass occupy the deeper loams and clay loams and many of the shallow stony clay loams on steep slopes over interbedded clay shales and sandstones. The largest prairies occur in the eastern part of the county. The prairies were originally covered with a thick growth of coarse bunchgrasses, buffalograss (*Buchloe dactyloides*), and grama grasses. Scattered oak and sumac shrubs grew on the shallower soils. The bunchgrasses were mainly little bluestem (*Andropogon scoparius*), big bluestem (*A. gerardi*), broomsedge (*A. virginicus*), silver beardgrass (*A. saccharoides*), switchgrass (*Panicum virgatum*), and Indiangrass (*Sorghastrum nutans*). The grama grasses were mostly side-oats grama (*Bouteloua curtipendula*), hairy grama (*B. hirsuta*), and blue grama (*B. gracilis*).

All of the prairies in this county are excellent rangeland, but the deeper gently sloping soils are superior to the shallow or sloping soils. Native prairie meadows that are in excellent condition produce moderate yields of nutritious hay if the grass is cut at the right stage of growth. Many native prairie pastures and meadows have been poorly managed and now contain a high proportion of three-awn grass (*Aristida oligantha*) and weeds. The grazing is poor on such fields and the hay is of inferior quality.

The trees of the Cross Timbers consisted mainly of blackjack oak (*Quercus marilandica*), post oak (*Q. stellata*), elm (*Ulmus* sp.), and hickory (*Hicoria alba*) on the sandy soils of the uplands. On the terraces the forest was red oak (*Q. rubra*), pecan (*Carya pecan*), black oak (*Q. velutina*), elm, hickory, post oak, and blackjack oak. The bottom lands supported a fairly thick cover of elm, hack-

[2] FENNEMAN, N. M. PHYSIOGRAPHY OF EASTERN UNITED STATES. 691 pp., illus. New York and London. 1938.

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berry (*Celtis occidentalis*), pecan, white oak or overcup oak (*Q. lyrata*), cottonwood (*Populus deltoides virginiana*), ash (*Fraxinus* sp.), and willow (*Salix* sp.). The uplands and the higher, sandier terraces had a thin ground cover of scattered coarse grasses, mainly broomsedge and little bluestem, and various shrubs. The low stream terraces and bottoms had a thick ground cover of bluestem grasses, shrubs, and vines, especially wild grape (*Vitis* sp.), in open areas or in places where the tree stand was thin.

Most of the bottom lands and terraces have been cleared of forest. Many areas along the stream channels, in narrow bottoms that are frequently flooded, and on the flood plain of the Deep Fork River have not yet been cleared. The better trees of the terraces and bottom lands, such as red oak, black oak, cottonwood, and ash, are used for lumber. Most of the shallow and stony soils of the uplands still have a cover of scrubby forest. These trees are unsuitable for most commercial uses. They are used for fence posts, firewood, and rough lumber.

Water Supply

In the central and western parts of the county, a few farm ponds and perennial creeks supply water for livestock, but most of the water for livestock and for household use comes from wells. In areas underlain by sandstones or interbedded sandstones and shales, a moderate supply of good water is normally available at depths of 30 to 60 feet. In a few places the depth to water ranges from 60 to 100 feet.

In the eastern part of the county, where the prairie is underlain by shales, the water from shallow wells contains considerable gypsum and sodium and consequently is not well suited to household use. Late in summer and during droughts, the supply is likely to be inadequate. Good water is normally available in sufficient quantity from wells 60 to 150 feet deep. Water for towns and villages comes from deep wells or surface reservoirs.

In the prairie areas, surface reservoirs, commonly called farm ponds or tanks, furnish water for livestock. These reservoirs are made by constructing earth dams across natural drainageways. Most of these reservoirs are between $\frac{1}{10}$ of an acre and 1 acre in size and have a storage capacity of $\frac{1}{2}$ to 3 acre-feet of water. They lose very little water by seepage, but the loss by evaporation is high late in summer.

Settlement and Development

Creek County was part of the Indian Territory, which included most of what is now eastern Oklahoma. The Creek and Cherokee tribes lived in this area. Hunting and fishing were the Indians' chief means of subsistence, but some agriculture was practiced before 1860. After about 1865, a few white squatters began grazing cattle in the area, by agreement with the Indians.

In 1889 the Indian land was divided and allotted to individuals. After 1904 some of this land was purchased by white settlers. By the time Oklahoma was admitted as a State in 1907, Creek County had been organized and was becoming fairly well settled. The early settlers came from the southeastern States and nearby States. The population of the county in 1910 was 26,223. Only 2,914 of these inhabitants lived on farms. Cattle raising was the principal kind of farming. Corn and cotton were the main crops grown.

Population

In 1950, the total population of the county was 43,143. Of this, 23,638 or 54.8 percent, was urban; and 19,505 or 45.2 percent, was rural. The population is fairly evenly distributed over the county. The most thickly populated sections are the prairies in the north central and eastern parts of the county. The most sparsely settled sections are the shallow and stony dissected areas in the center of the county.

Sapulpa, the county seat, is located in the northeast corner of the county. It had a population of 13,031 in 1950. Other towns, and their population in 1950, are: Bristow, 5,400; Drumright, 5,028; Oilton, 1,109; Depew, 719; Mounds, 560; Kellyville, 528; Mannford, 426; Kiefer, 275; Shamrock, 263; and Slick, 151.

There was a reduction of 13.4 percent in the total population of the county in the 10 years between 1930 and 1940. A further decline of 22.3 percent occurred between 1940 and 1950. This decline in population has taken place in the rural sections of the county. Urban population has increased slightly.

Industries

The principal industry in Creek County is the production of crude petroleum and gas. Producing oilfields are near Drumright, Bristow, Slick, and Sapulpa. Isolated wells or small groups of wells are scattered throughout the county.

The first oil well in the county was completed in December 1905. In 1906 the famous Glenn pool in the northeastern corner of the county was discovered. The Cushing field near Drumright was opened in 1912, and the Slick pool in the southeastern corner of the county was developed in 1919 and 1920. The Continental or Bristow pool was opened in 1921 and 1922. In 1945 there were 2,152 producing oil wells in the county.[3] Many new wells are drilled in the county each year, and some old shallow wells are producing again from deeper sands.

Small "cracking plants" or oil refineries are located near Drumright and at Sapulpa. Several natural-gas pumping stations or plants are located in the county. The number employed in the production of crude oil and gas and allied industries has declined steadily during the last 20 years, because the oil production is diminishing.

In Sapulpa are a small food-processing and food-canning plant, a small pottery plant, and a glass works. Creameries, bottling works, monument and tombstone plants, cotton gins, and warehouses are located at Sapulpa and Bristow.

Transportation and Markets

The St. Louis-San Francisco Railway's main line between Oklahoma City and Tulsa crosses the county through Depew, Bristow, and Sapulpa. A branch line runs southeast from Sapulpa through Kiefer and Mounds. Another branch line runs northwest from Depew through Shamrock to Drumright. The Santa Fe Railroad enters

[3] National Industrial Conference Board. THE PETROLEUM ALMANAC. 420 pp. New York, N. Y. 1946.

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Soil Associations

The soils of Creek County are in three broad, general associations. Each association is dominated by soils that developed from similar or related parent materials, support similar kinds of vegetation, and have some characteristics in common. The associations differ considerably in their suitability for different systems of farming.

Figure 2 shows the general areas occupied by each of the three soil associations of the county. Sandy soils of forested areas occupy more than half the area, dark soils of the prairies about one-fourth, and soils of the bottom lands only one-fifth. These associations are mapped very broadly, and each contains many small areas of soils that belong to one of the other two associations.

Dark Soils of the Prairies

The soils in this association belong to the Dennis, Okemah, Bates, Collinsville, Woodson, Talihina, Choteau, Teller, Vanoss, and Neosho series. The association occurs mainly in two fairly distinct areas, one along the eastern side of the county and one in the northwestern corner. The area in the northwestern corner is divided by the Cimarron River. In the area on the east side of the county, strips of woodland separate tracts of prairie. Besides these two large areas, several areas too small to be shown on the soil association map are scattered throughout the county.

The pattern of geographic distribution within this association is not well defined. As a rule, the Okemah and Woodson soils occupy the nearly level floors of shallow valleys. The Dennis and Bates soils occur on the gently sloping to moderately sloping sides of valleys above the Okemah and Woodson soils. The shallow and stony Collinsville and Talihina soils are on the ridgetops and on the highest and most strongly sloping parts of the valley walls. The Vanoss, Teller, and Choteau soils occupy high, fairly distinct benches or terraces along the major streams. The Neosho soils lie in small level or slightly depressed areas within large, nearly level areas of Choteau soils.

The areas of this association are among the most important agricultural sections of Creek County. They total about 165,700 acres, or 26.6 percent of the county area. The association consists of both shallow, nonarable soils and deep, arable soils. In some places they are intermixed and in other places they occur in fairly large separate areas. Soils that are well suited to crops comprise 42 percent of the association; soils that are moderately well suited to crops comprise another 16 percent. Marginal land and soils unsuitable for crops make up the remaining 42 percent of the association.

The deep and moderately deep soils of this association have moderate to high natural fertility. Under common management they produce moderate yields of cultivated crops or native pastures. They are well suited to cotton, sorghums, small grains, corn, and native grass for hay or pasture. If properly managed, these soils will also produce moderate to high yields of sweetclover and alfalfa. The shallow soils of the association are unsuitable for crops, but they produce moderate yields of pasture and are well suited to grazing.

The arable soils occur in relatively large areas on nearly level to moderately sloping topography that is favorable for large-scale farming operations and the use of power-operated equipment. The more strongly sloping areas of these soils are very susceptible to erosion and need careful management to reduce runoff and to prevent erosion.

The system of farming in the prairie sections depends on the proportion of arable and nonarable soils on each farm. Some farms or ranches are composed almost entirely of arable soils and some almost entirely of nonarable soils. Farms consisting of deep, arable soils are used for row crops. On farms that consist of both shallow and deep soils, crop and livestock farming are combined. Cattle ranches are located on the shallow, nonarable soils. The system most common is the combination of row-crop and livestock farming.

Sandy Soils of Forested Areas

The dominant soil series in this association are the Darnell, Pottsville, Stephenville, Cleburne, Dougherty, Stidham, and Eufaula series. Talihina soils occur in the many small prairie openings and as bands on the steep slopes next to Darnell soils. Some areas of Broken or gullied sandy upland are included.

This association occurs all through the county; the largest single area includes nearly all the uplands of the central part. The pattern of distribution is fairly distinct. The Darnell and Pottsville soils and the areas of Broken or gullied sandy upland occupy sloping valley walls, dissected areas, ridgetops, and rolling to hilly areas. The Cleburne and Stephenville soils, as a rule, are on gently sloping ridgetops and the foot slopes along valley sides. The Dougherty, Stidham, and Eufaula series occur on dissected high terraces, mainly above the Deep Fork and Cimarron Rivers in the southern and northern ends of the county.

This is the most extensive soil association in the county, but the least important for agriculture. It occupies 330,600 acres, or 53.2 percent of the county. Three-fourths of the acreage consists of shallow, sloping, and nonarable soils. The rest consists of moderately deep to deep, arable soils. Most of these are only moderately well suited to crops; less than 4 percent of the association is well suited to crops. In most places the shallow and the deep soils are closely associated, but in some parts of the association the shallow soils and the deep soils occur in separate, fairly distinct areas.

These soils are low in natural fertility, and they deteriorate rapidly under cultivation. Only the Dougherty and Stidham soils, which occur along the south edge of the county, are well suited to crops. The gently sloping Cleburne and Stephenville soils are moderately well suited to crops but they do not occur in areas large enough to be important agriculturally.

These soils are very susceptible to leaching, which further depletes their fertility. The moderately deep soils of this association are easily damaged by sheet and gully erosion when cultivated and rapidly become unsuitable for crops and of low value for pasture.

Most of this soil association is scrubby woodland in which there are small prairie openings. It is used mainly for grazing. Small farms are scattered on the deeper and less strongly sloping soils. Small, irregular, cultivated fields are located among areas of woodland or abandoned fields. Crops occupy less than 6 percent of this soil association; most of the cropped areas are on the Dougherty and Stidham soils.

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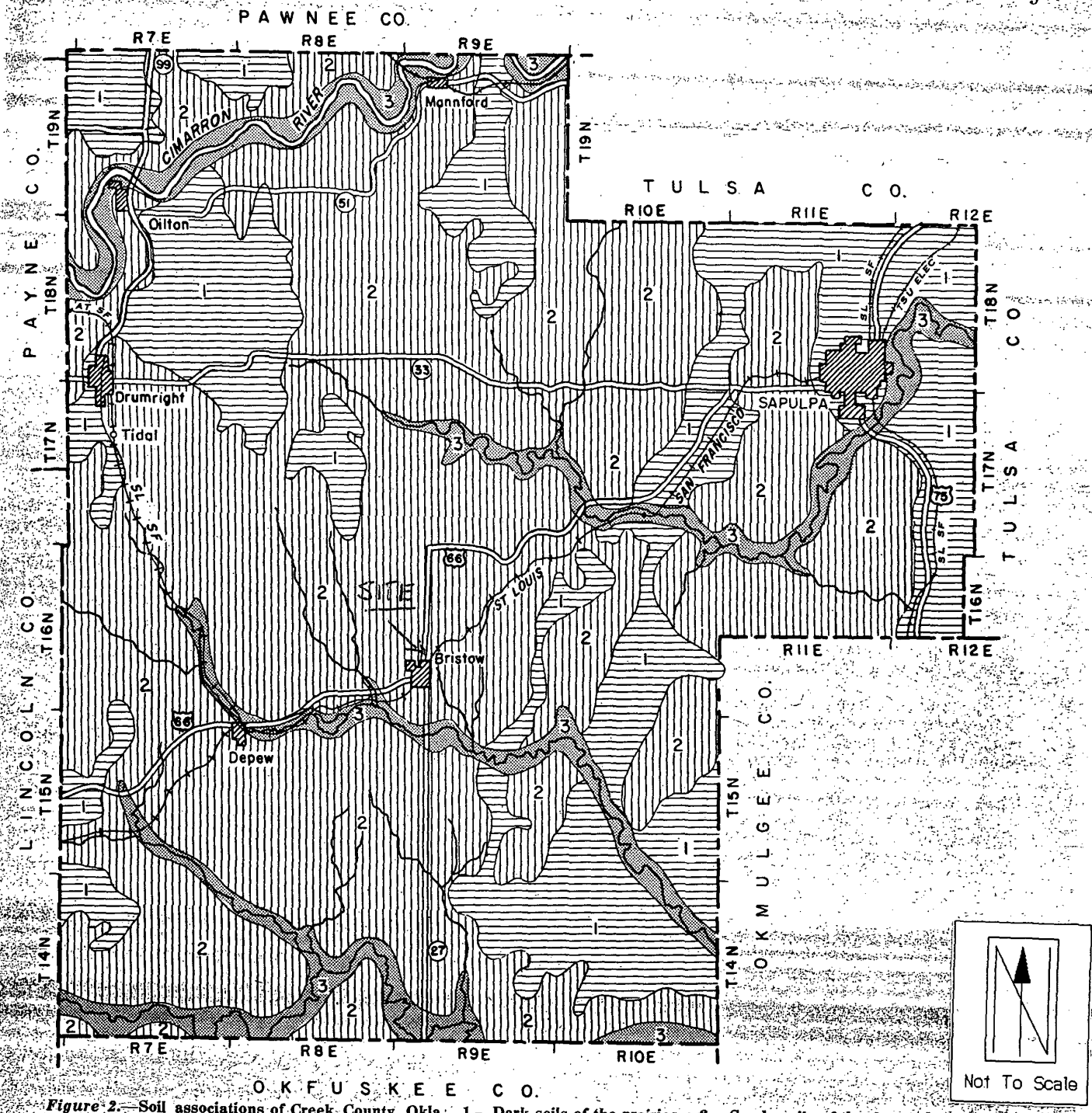


Figure 2.—Soil associations of Creek County, Okla. 1.—Dark soils of the prairies. 2.—Sandy soils of the forested areas. 3.—Soils of the bottom lands.

None of the soils of this association provide good grazing. Pastures support a thin stand of annual weeds and three-awn grasses, which are of low nutritive value. Pastures of moderate carrying capacity can be developed on the moderately deep and deep soils if they are heavily fertilized. The forest on the shallow and moderately deep soils that overlie sandstone is scrubby blackjack and post oaks. It has little economic value. Under good management, trees for fence posts or other commercial uses can be grown on the deep soils.

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Cotton, peanuts, corn, cowpeas, and sorghums are the principal crops. Yields are low to very low. Many of the farms are operated by persons who obtain most of their income from other sources.

Soils of the Bottom Lands

This association consists of soils of the Port, Yahola, Verdigris, Pulaski, Mason, Roebuck, and Reinach series and of Gullied bottom land. It occurs in the valleys of streams throughout the county. The largest areas are along the Cimarron and Deep Fork Rivers, and along Little Deep Fork and Polecat Creeks. The Mason and Reinach soils lie on low terraces. The other soils are on the flood plains.

This association is made up of the most fertile and productive soils in this county. It is very important agriculturally. It occupies about 121,200 acres, or 19.5 percent of the county. Fifty-four percent of the acreage is well suited to crops, and another 12 percent is moderately well suited to crops. Only about 34 percent, which includes all of the Gullied bottom land, is not suitable for crops. Nearly all the 34 percent that is not suited to crops is well suited to forest or pasture. Gullied bottom land, except for a few small areas, is suitable only for growing trees.

These soils are higher in natural fertility and more productive than the soils of the uplands. The fertility can be maintained or increased easily by using legumes, lime, and phosphate. Crops on these soils withstand droughts much better than crops on the higher lying soils.

Erosion is no problem on these nearly level soils, but runoff and overwash from higher areas may damage crops. Protection from floods is the most serious management problem. Soils on the flood plains of the smaller streams and the Deep Fork River are covered with water so frequently that they are not suitable for crops. Woodland is the best use for these soils. A few areas are well suited to pasture and johnsongrass hay. Other soils of the flood plains and low terraces are flooded, but less frequently, and usually early enough in the spring so that a crop can be planted later.

Few farms are composed entirely of bottom-land soils and, as a rule, these soils are used and managed along with nearby upland soils. Corn, cotton, and sorghums are the principal crops. Soils that are flooded too often to be used for crops are suitable for pastures, pecan orchards, or commercial forests.

Soil Series and Their Relations

A total of 24 soil series and 3 miscellaneous land types were mapped in Creek County. Each series differs from the others in some characteristic that affects its suitability for agriculture.

The soils of the Bates and Dennis series developed over interbedded sandstones, fine-grained sandy shales, and shales. They occupy gently sloping to moderately sloping relief. They have a dark grayish-brown, friable, acid surface soil and a dark yellowish-brown to brown, friable, slightly acid sandy clay loam to sandy clay subsoil. The Dennis soils are deeper than the Bates soils, and they have more clay in the lower subsoil. Runoff is medium to rapid, and internal drainage is medium. These are moderately productive, easily worked soils that are well suited to crops, pasture, or native hay.

The Okemah and Woodson soils are the darkest, most clayey soils of the uplands. They developed over neutral to weakly alkaline shales and clays. They are nearly level to gently sloping. They have a very dark grayish-brown, friable, slightly acid surface soil. The Okemah soils have a crumbly clay subsoil, but the Woodson soils have a heavy, compact claypan subsoil; both are slightly acid to neutral in the subsoil. Runoff is slow to medium, and internal drainage is very slow. Drainage is adequate for all of the commonly grown crops, including alfalfa, but planting may be delayed if the weather is very wet in the spring. These are among the most productive soils of the county. They are very good for crops, pasture, or native hay.

The Teller and Vanoss soils developed on moderately high, nearly level to gently sloping stream terraces. Their parent materials were sediments, mainly from the prairies and plains to the west. The Teller soils have a brown friable surface soil and a reddish-brown friable clay loam subsoil over reddish silty and sandy parent materials. They have some characteristics of the light-colored soils of the area, but they more nearly resemble the dark-colored soils. The Vanoss soils have a very dark grayish-brown friable surface soil. Their subsoil is grayish-brown sandy clay loam to friable sandy clay. It overlies dark loamy to clayey parent materials. Soils of these two series are very productive. They are friable, well drained, and easily worked. The reaction ranges from slightly acid to neutral. They are well suited to all crops commonly grown in the county, including alfalfa.

The Choteau and Neosho soils are somewhat lighter colored, less well drained, and less productive than the Teller and Vanoss soils. The Choteau soils are nearly level to gently sloping. The Neosho soils occupy level to slightly depressed spots within areas of Choteau soils. The parent materials are sandy and clayey acid sediments from both dark-colored and light-colored soils. Both series have grayish-brown, friable, acid surface soils. The Choteau soils have a mottled sandy clay subsoil that is moderately friable and permeable. The Neosho soils have a heavy, compact, mottled claypan subsoil. The Choteau soils are moderately well drained and are well suited to crops. The Neosho soils have very slow internal drainage and are not so well suited to crops.

The Collinsville and Talihina soils are shallow and stony nonarable soils of the prairies. They developed from sandstone or interbedded sandstone and shale. These areas are gently sloping to strongly sloping. They have a dark grayish-brown, friable, thin surface soil. Bedrock is about 5 to 18 inches below the surface. In most areas the soils range from slightly acid to neutral, but some spots are alkaline because of underlying limestone or calcareous shales and clays. Runoff is medium to rapid.

The soils of these two series are unsuitable for crops because they are shallow, stony, and sloping. Outcrops of bedrock and loose stones on the surface are common. These soils are well suited to grazing. They produce moderate amounts of nutritious grasses.

A few small areas of Bates soils within the mapping units are the only soils suitable for crops. Small grains and sorghums can be grown on them. However, they

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are generally surrounded by nonarable soils and might as well be used for pasture.

The Stephenville, Cleburne, Dougherty, Stidham, and Eufaula series are the moderately deep and deep soils of the forested uplands. These are all light-colored acid soils. They have low natural fertility, but they are very responsive to management and are easily worked.

The Stephenville and Cleburne soils developed over sandstones. They are of medium depth. Slopes are gentle to moderate. Both series have pale-brown sandy surface soils. The friable sandy clay loam subsoil is reddish in the Stephenville series and yellowish in the Cleburne series. Drainage is moderate to rapid. These soils are somewhat droughty. When they are well managed, they are moderately well suited to special crops and some field crops. Small areas of Darnell fine sandy loam are closely associated with Stephenville soils and are mapped in the same units.

The Dougherty and Stidham soils are deep soils that developed in old sandy alluvial sediments. They are nearly level to gently sloping. They have a pale-brown to light-brown sandy surface soil and a friable sandy clay loam subsoil. The subsoil is red in the Dougherty soils and yellowish in the Stidham soils. Both soils absorb rainfall readily and have fairly good moisture-holding capacity. They are moderately well drained to well drained. If well managed, they are well suited to special and vegetable crops, fruits, and general field crops.

The Eufaula soils are pale-brown deep sands that have no loamy material within 3 feet of the surface. These soils are too sandy and loose for most field crops. They produce fair yields of special crops if heavily fertilized.

The Darnell and Pottsville soils, along with strongly sloping or eroded nonarable soils of other series, are the shallow and stony sandy soils of forested areas. They occur in large and small areas among the deeper forested soils. They have a pale-brown, very friable, acid, sandy surface soil only a few inches thick over sandstone or interbedded sandstones and shales. Many loose stones occur on the surface. Bedrock outcrops are common on the sloping areas. These soils are too shallow, stony, or sloping for crops. They have little value for grazing; nevertheless, nearly all areas are used for woodland pasture. They support thin to moderately thick native forests of scrubby post oak and blackjack oak.

The bottom-land soils in Creek County are the Port, Pulaski, Roebuck, Verdigris, and Yahola soils of the flood plains and the Mason and Reinach soils of the low terraces.

The Port soils occur mainly on the flood plains of the Cimarron River. They developed in alluvial sediments that originated west of Creek County from grasslands overlying redbeds. They are alkaline to calcareous soils, reddish brown in color. They are deep, well drained, and highly productive.

The Pulaski soils developed from alluvial sediments washed from prairies and forested areas, both underlain by reddish sandstones. They are brown or reddish brown, slightly acid, well drained, and more or less sandy. Areas that are not flooded too often to be suitable for crops are moderately productive.

The Roebuck soil occurs mostly on the flood plain of the Deep Fork River. Soils of this series developed from reddish-brown, clayey, alluvial sediments. Most of these sediments were washed from grasslands that developed over the clays and shales of the redbeds west of Creek County. Roebuck soils are poorly drained and most areas are flooded too frequently to be suitable for crops.

Verdigris soils occur on the flood plains of streams that drain the dark-colored soils of the prairies. They have a dark grayish-brown surface layer over a slightly lighter colored silty and clayey subsoil. They are moderately well drained. Areas that are not flooded too frequently are very productive.

The Yahola soils are similar to the Port soils in surface appearance, but they have a sandier subsoil, and they are less productive. They have moderate natural fertility, but some areas are flooded too often to be used successfully for crops.

The Mason and Reinach soils occupy low terraces next to the wider flood plains. Ordinary floods do not cover these soils. During exceptionally high floods some areas are under water. The Mason soils are similar to Verdigris soils in profile characteristics, but they are better drained and are very productive. Mason soils are about the most productive soils in the county.

The Reinach soils occur mainly in the valley of the Cimarron River. They resemble the Yahola soils, with which they are usually associated. They are very productive and are easily worked. Most of their area is cultivated.

Descriptions of Mapping Units

In this section are descriptions of the soils and land types mapped in Creek County. The exact location of each area of each mapping unit is shown on the detailed soil map at the back of this report. The approximate acreage and proportionate extent of each mapping unit are listed in table 4. Table 4 also shows what percentage of each mapping unit was used for stated purposes at the time of this survey.

Bates series

Soils of the Bates series developed over noncalcareous sandstone or sandstone interbedded with sandy and silty shale. The native vegetation was grass. These soils are medium acid to slightly acid. The surface soil is dark grayish brown and friable. The subsoil is friable yellowish-brown sandy clay loam, slightly mottled with reddish brown and yellow in the lower part. The soils are of medium depth.

Bates soils are more sandy and friable in the lower subsoil than soils of the Dennis series, and they are deeper than soils of the Collinsville series. In Creek County, Bates soils are associated with Dennis soils and Collinsville soils. A shallow soil of the Bates series is mapped in a unit with Collinsville soils, and is described under the Collinsville series.

Bates fine sandy loam, gently sloping (2 to 4 percent slopes) (Ba).—This is a dark grayish-brown, friable, slightly acid soil of medium depth, developed over sandstone and sandy shale in small prairie areas. These areas are scattered through the county; most of them are in transition zones between forests and prairies. Prairie grasses were the native vegetation, but areas next to woodlands have been invaded by scrubby post oak, mesquite, and elm trees. Internal drainage is moderate,

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control cutting along streambanks. Light grazing to reduce the underbrush, protection from burning, and selective cutting of timber are good management practices for this land type.

Mason series

Soils of this series developed in slightly acid to neutral silty and clayey alluvium, slightly stratified with fine sandy loams, on low terraces along the larger streams of the county. These are dark, friable, slightly acid soils. They are moderately well drained. They are very productive and easily worked.

The profile characteristics of the Mason soils are about midway between those of the Verdigris series and those of the Vanoss series. The Verdigris soils are more frequently flooded, and they show less profile development. The Vanoss soils lie on higher terraces than the Mason soils; they are better drained and better developed and have less mottling in the lower subsoil.

Mason silt loam (0 to 2 percent slopes) (Mb).—This soil developed from silty alluvium, somewhat stratified with fine sandy loams and clays, ranging from slightly acid to weakly alkaline in reaction. It lies on nearly level low terraces along the larger creeks, about 3 to 10 feet above the present flood plains. Runoff is slow, but internal drainage is moderate. The native vegetation was a thin stand of hardwood trees and a ground cover of bluestem, Indiangrass, and switchgrass. A few small areas of Verdigris silt loam are included in this unit; these are flooded almost every year.

Profile of Mason silt loam about 2 miles southwest of Kellyville in the SE¼NE¼ sec. 27, T. 17 N., R. 10 E.:

0 to 15 inches, dark grayish-brown silt loam; the plow layer is grayish brown; moderate medium granular structure; crumbly and friable; slightly acid.
15 to 35 inches, dark grayish-brown clay loam; medium granular structure; crumbly and friable when moist, slightly sticky when wet; porous and permeable; slightly acid.
35 to 45 inches +, grayish-brown silty clay loam, coarsely mottled with strong brown and yellowish brown; sticky and plastic when wet, very hard when dry; moderately permeable; slightly acid.

Small areas have a very fine sandy loam or loam plow layer that ranges from grayish brown to pale brown in color. A few narrow areas of Verdigris silt loam comprise about 5 percent of this unit. The Verdigris soil is similar to the Mason soils, but it is on high flood plains that are flooded almost every year.

Use and management (Capability unit I–1).—This is a very productive soil, excellent for either crops or pasture. It is easy to work and is not susceptible to erosion.

About three-fourths of this soil is used for crops, mainly corn, cotton, oats, sorghums, and alfalfa. Most of the rest is in pasture but some is woodland. It is in the Loamy bottom-land range site.

Mason clay loam (0 to 2 percent slopes) (Ma).—This soil developed on nearly level, low terraces from silty to clayey old alluvium that was somewhat stratified in places with fine sandy loams. It ranged from slightly acid to weakly alkaline. The native vegetation was a thin stand of hardwood trees and a thick ground cover of bluestem grasses. Runoff is slow, and internal drainage is moderate. This soil is associated with Mason silt loam and with the lower lying soils of the Verdigris series. Mason clay loam is similar to Mason silt loam, but it is slightly darker colored throughout and has somewhat slower internal drainage.

Profile of Mason clay loam on a low terrace of Polecat Creek about 2½ miles southwest of Kellyville in the SE¼ sec. 28, T. 17 N., R. 10 E.:

0 to 14 inches, dark grayish-brown clay loam; strong medium granular structure; crumbly and friable when moist, hard when dry; slightly acid.
14 to 30 inches, dark grayish-brown silty clay loam; crumbly and friable when moist, hard when dry; moderately permeable and porous; slightly acid.
30 to 45 inches +, dark grayish-brown silty clay loam, mottled with strong brown and yellowish brown; contains a few thin lenses of silt loam or very fine sandy loam in the lower part; sticky and plastic when wet; moderately permeable; slightly acid.

The plow layer ranges in texture from clay loam to loam and in color from grayish brown to very dark grayish brown. The subsoil below about 30 inches is weakly alkaline to slightly acid in reaction. The texture ranges from clay loam to sandy clay. A few small areas of Brewer clay loam are included in this unit along Polecat Creek. These inclusions have a dark-gray surface soil and a subsoil of dark-gray to black crumbly clay.

Use and management (Capability unit I–1).—This is excellent soil for crops or pasture. It is not susceptible to erosion. It is moderately heavy but friable. More than half of this soil is used for crops, chiefly corn, cotton, oats, sorghums, and alfalfa. Most of the remainder is in pasture. A few acres are still in native woodland that is used for pasture. It is in the Loamy bottom-land range site.

Neosho series

The soils of this series developed on nearly level or depressed areas on old stream terraces. The parent materials were clayey old alluvial sediments, somewhat stratified with silts and sands. Most of these sediments were washed from soils developed over shales and fine-grained sandstones, and some were from soils developed over limestone.

These soils have a light brownish-gray acid surface soil and a mottled claypan subsoil. Drainage is poor and natural fertility is low. Neosho soils are associated with soils of the Choteau series and the Vanoss series. The Choteau soils are somewhat darker colored and better drained than the Neosho soils, and they do not have a claypan subsoil. The Vanoss soils are much darker than the Neosho soils, and they have a thick, friable, permeable surface soil and subsoil.

Only one soil of the Neosho series is mapped in Creek County.

Neosho silt loam (0 to 1 percent slopes) (Na).—This soil developed from slightly acid to weakly alkaline stratified sandy and clayey old alluvial sediments, on level to slightly depressed parts of old high terraces. The principal areas are along Little Deep Fork Creek. The native vegetation was coarse grasses and scattered post oak and elm trees. Runoff is slow or nonexistent, and internal drainage is very slow. This soil is associated with the better drained, somewhat darker colored Choteau soils.

Profile of Neosho silt loam about 3 miles southeast of Slick in the SW¼SE¼ sec. 27, T. 15 N., R. 10 E.:

0 to 15 inches, light brownish-gray silt loam, slightly mottled with brown; surface crusts on drying in cultivated fields;

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massive to weakly granular structure; friable when moist, very hard and compact when dry; slightly acid.
15 to 24 inches, grayish-brown heavy clay, mottled with yellowish red and yellowish brown; weak blocky structure; very compact and very sticky when moist, extremely hard when dry; very slowly permeable; medium acid.
24 to 42 inches+, mottled gray and light olive-brown heavy clay; very sticky and stiff when wet; very slowly permeable; slightly acid in upper part, neutral in lower part.

The thickness of the surface soil ranges from about 10 to 18 inches, and the texture ranges from very fine sandy loam to loam. On a few low sandy mounds the surface soil is fine sandy loam 18 to 30 inches thick. The third layer ranges from dense clay to compact, slowly permeable sandy clay; in places it contains pockets and lenses of sandy loam.

Use and management (Capability unit IIs-1).—This soil is not susceptible to erosion. Fertility is low to moderate. The soil remains wet and cold late in the spring, and when it dries the surface soil crusts and bakes. If the soil is not worked at exactly the right moisture content, large clods form that make it very difficult to maintain a good seedbed.

This soil is not well suited to most common field crops, but it is moderately well suited to native hay or pasture. Most of it is now used for pasture. About one-third of the soil is used for crops, mostly cotton, corn, and sorghums. This soil is in the Claypan prairie range site.

Oil-waste land

Oil-waste land (Oa).—The areas mapped in this miscellaneous land type have been practically ruined for agricultural use by oil and salt-water waste from oil wells. They are more or less gullied and eroded and are almost bare of vegetation. They range in size from about one acre to several acres.

Use and management (Capability unit VIII).—This land is of no value for crops or pasture in its present condition. Some of the less strongly sloping and less severely gullied areas may eventually be revegetated by natural means if no more oil or salt-water waste is dumped on them.

Okemah series

These soils have developed from weakly alkaline shales and clays under a cover of grass in nearly level to gently sloping shallow valleys. They are moderately well drained, dark colored, and slightly acid. They have a dark-colored, crumbly and granular surface soil and upper subsoil. Their lower subsoil is mottled olive-yellow and gray compact clay.

Okemah soils are not mapped separately in Creek County. They are closely associated with soils of the Dennis series in some places and with soils of the Woodson series in others, and are mapped in units with soils of one or the other of these series. The Woodson soils differ from the Okemah soils in being dark gray and having a claypan. The Dennis soils, where they are associated with the Okemah soils, lie in slightly higher positions and have developed from less clayey materials. The Dennis soils are browner than the Okemah soils, and they have more rapid runoff and internal drainage.

A profile of an Okemah soil as mapped with the Woodson soils is described under Okemah and Woodson clay loams, and a profile of an Okemah soil as mapped with Dennis soils is described under Dennis and Okemah loams, gently sloping.

Okemah and Woodson clay loams (0 to 1 percent slopes) (Ob).—These two soils occur intermixed in small areas or separately in areas of several acres. Woodson clay loam occupies the nearly level, usually lower-lying parts of shallow valleys, and Okemah clay loam the gently sloping, slightly higher surrounding areas, but the two soils are so closely associated that it is not practical to map them separately. They merge with little or no difference in surface appearance. The parent materials of both soils are olive or olive and yellow weakly alkaline clays and shales. The mapping unit occurs mostly in shallow valleys near Kiefer, Mounds, and Edna. Runoff is slow to moderate, and internal drainage is very slow. The native vegetation was tall grasses, mainly big bluestem, little bluestem, side-oats grama, and Indiangrass.

Profile of Okemah clay loam near Mounds in the SW¼SW¼ sec. 17, T. 16 N., R. 12 E.:

0 to 15 inches, dark-gray clay loam, lower part slightly mottled with brown; granular and friable when moist, very hard when dry; surface crusts in cultivated fields on drying; slightly acid.
15 to 20 inches, dark grayish-brown silty clay loam, slightly mottled with brownish yellow and strong brown; crumbly and friable when moist, sticky and plastic when wet; moderately permeable; slightly acid.
20 to 35 inches, mottled grayish-brown and light olive-brown heavy clay; very sticky and stiff when wet, extremely hard when dry; compact and very slowly permeable; neutral.
35 to 48 inches+, mottled light-gray and olive-yellow clay; very compact; very slowly permeable; weakly alkaline.

The texture of Okemah clay loam ranges from loam to clay loam. The depth to the heavy clay layer ranges from 18 to 25 inches. A few shotlike concretions of iron oxide occur in the two clay layers.

Profile of Woodson clay loam about 1 mile south of Kiefer in the SW¼SW¼ sec. 28, T. 17 N., R. 12 E.:

0 to 12 inches, dark-gray clay loam; the 6-inch plow layer is slightly lighter in color; crumbly and friable when moist, very hard when dry; surface crusts on drying; slightly acid.
12 to 22 inches, dark-gray heavy clay, faintly mottled with brown; very compact claypan; very sticky and stiff when wet; very slowly permeable; slightly acid to neutral.
22 to 38 inches, dark grayish-brown clay, mottled with yellowish brown; very compact; extremely hard when dry; very slowly permeable; weakly alkaline.
38 to 46 inches+, mottled gray, olive-brown, and yellowish-brown clay or shaly clay; contains a few crystals of gypsum and small shotlike concretions of iron oxide; alkaline but not calcareous.

The thickness of the surface soil ranges from 10 to 14 inches. Considerable mottling occurs in the upper subsoil in the areas that grade toward the Okemah soil.

Some small areas of Parsons silt loam near Kiefer are included in this mapping unit. These areas have a dark grayish-brown silt loam surface soil 12 inches thick which rests on a mottled grayish-brown, strong-brown, and pale-yellow claypan subsoil. The Parsons soils are not extensive enough in Creek County to be mapped separately and are not described in this report.

Use and management (Capability unit I-4).—The two soils in this mapping unit are the darkest colored and finest textured soils of the prairies. They are the most fertile and productive soils for common field crops that occur in the uplands of this county. Okemah clay loam is slightly more productive than Woodson clay loam. Both soils have a moderately high water-holding capacity

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These inclusions consist of 10 to 18 inches of light-brown fine sandy loam over dark grayish-brown silt loam or clay loam, overlain by recent deposits of lighter colored, sandier soil materials.

Use and management (Capability unit IIIw–1).—This soil is moderately productive. It is easily worked and fairly resistant to drought. It is not susceptible to erosion, but some material may be deposited on the surface by flood waters. Cropping is hazardous because most areas are flooded several times a year.

This soil is moderately well suited to crops and, in spite of the flood hazard, about one-fifth of the area is cropped. Cotton, corn, and sorghums are the chief crops. This soil is well suited to pasture, and about one-third is used for this purpose. Nearly half has been left in native forest. The soil is in the Loamy bottom-land range site.

Reinach series

Soils of the Reinach series developed from alkaline to calcareous, reddish, silty to moderately sandy alluvium on low, nearly level stream terraces. They are moderately productive soils and easily worked. They are well suited to all general crops of this area, including alfalfa.

The Reinach soils have a brown to reddish-brown friable surface soil and a silty to moderately sandy subsoil. They are similar to the Yahola soils that occur on the present flood plains, but the Reinach soils lie a little higher and are above ordinary overflow. Their surface soil is darker than the Yahola surface soil, and is alkaline, though usually noncalcareous. Only one Reinach soil is mapped in Creek County.

Reinach very fine sandy loam (0 to 1 percent slopes) (Ra).—This soil occurs on low terraces or benches a few feet higher than the flood plains of the Cimarron River. It developed from reddish, silty to moderately sandy, alkaline, calcareous alluvial sediments. Prairie grasses and scattered elm, hackberry, pecan, and oak trees were the native vegetation. Runoff is slow, and internal drainage is moderate to rapid.

Profile of Reinach very fine sandy loam about 3½ miles north of Drumright on a low terrace of the Cimarron River:

0 to 14 inches, reddish-brown very fine sandy loam; the 6-inch plow layer is light reddish brown; weak granular structure; very friable; neutral.
14 to 46 inches+, light reddish-brown very fine sandy loam that contains thin strata of reddish-brown and brown silt loam in lower part; friable; very permeable; neutral.

The surface soil ranges from brown to light reddish brown in color and from fine sandy loam to silt loam in texture. Some small areas next to more strongly sloping Teller soils have an overwash of light-brown, slightly acid fine sandy loam, 4 to 10 inches thick.

Use and management (Capability unit I–1).—This soil is well suited to crops and pasture. Most of it is cultivated. Corn, cotton, sorghums, and alfalfa are the principal crops. This soil is easily worked and is not susceptible to erosion. It is in the Loamy bottom-land range site.

Roebuck series

Soils of this series consist of only slightly modified clayey alluvium washed from prairie soils that developed over redbeds. The alluvial deposits are alkaline to weakly calcareous. The native vegetation was forest. Both runoff and internal drainage are slow to very slow. Most areas are too poorly drained or too frequently flooded to be suitable for cropping unless artificially drained and protected from floods.

The surface soil is reddish brown. The subsoil is reddish clay, slightly mottled with brown and grayish brown. Roebuck clay is the only soil of this series that is mapped in Creek County.

Roebuck clay (0 to 1 percent slopes) (Rb).—This soil occupies parts of the flood plain of the Deep Fork River, where the channel is choked or partly filled by silting. It developed from clayey and silty, alkaline or calcareous, reddish alluvium. A native forest of elm, hackberry, oak, willow, pecan, and cottonwood covers these areas.

This is a poorly drained soil. Both runoff and internal drainage are very slow. The level flood plains are subject to frequent floods. This soil is not susceptible to erosion, but most areas are rapidly being covered with silt.

Profile of Roebuck clay:

0 to 20 inches, reddish-brown clay; moderately crumbly when moist, very sticky and plastic when wet; weakly alkaline.
20 to 45 inches+, reddish-brown heavy clay, slightly mottled with other shades of brown and some grayish brown; very sticky and stiff when wet, very hard when dry; slowly permeable; weakly calcareous.

Small areas have recent deposits of reddish-brown or brown, alkaline or calcareous, somewhat stratified clay loam and clay, 5 to 15 inches thick. In some places the subsoil below about 30 inches is stratified with brown clay loam and dark-gray calcareous clay.

Use and management (Capability unit Vw–1).—Nearly all of this soil is still in woodland. It is very fertile and would be highly productive if it were drained and protected from flooding, but drainage and flood protection are so difficult as to be almost impossible. Clearing underbrush and culling trees to allow native pecan orchards and bermudagrass pastures to develop may be practical. This soil is in the Heavy bottom-land range site.

Stephenville series

Soils of this series are of medium depth over the parent materials of soft reddish sandstone or interbedded sandstone and sandy shale. They developed under a scrubby forest of mixed blackjack oak and post oak. Scattered coarse grasses grew in open areas.

These soils are slightly acid. They have a light-colored friable sandy surface layer and a yellowish-red or red friable sandy clay loam subsoil. The subsoil grades into the parent material, usually at a depth of less than 3 feet.

The Stephenville soils occupy nearly level to moderately sloping areas and are closely associated with the very shallow Darnell soils. The two soils are similar in surface appearance, but the Stephenville soils are 20 to 36 inches deep and the Darnell soils are 5 to 20 inches deep over sandstone. Sandstone outcrops are common in both.

In this county, the Stephenville soils are mapped only in units with the Darnell soils. The two series have similar uses and are about equal in productivity.

Stephenville and Darnell fine sandy loams, gently sloping (2 to 4 percent slopes) (Sa).—Stephenville fine sandy loam occupies about 70 percent of this mapping unit. Small areas of Darnell fine sandy loam make up the other 30 percent. This unit is very extensive in the central, southern, and western parts of the county.

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These shallow to moderately deep upland soils developed over reddish-yellow to red sandstone or interbedded sandstone and sandy shale. The parent materials were slightly acid to neutral. The native vegetation was a thin to moderately thick forest of scrubby blackjack oak and post oak, and a thin ground cover of bluestem grasses. Both soils are well drained. Runoff is slow to moderate, but internal drainage is moderate to rapid.

Profile of Stephenville fine sandy loam, gently sloping, under a moderately thick cover of scrubby post oak and blackjack oak and bluestem grasses, about 2 miles east of Depew in the SW¼SW¼ sec. 9, T. 15 N., R. 8 E.:

0 to 4 inches, grayish-brown fine sandy loam; in plowed fields this layer is pale brown; weak granular structure; very friable; slightly acid.
4 to 12 inches, pale-brown light fine sandy loam; very friable when moist, nearly loose when dry; slightly acid.
12 to 28 inches, yellowish-red sandy clay loam; massive structure; crumbly and friable when moist, slightly sticky when wet; porous and permeable; medium acid.
28 to 35 inches, yellowish-red sandy clay loam, mottled with red; friable; permeable; contains small soft fragments of partly weathered sandstone; medium to slightly acid.
35 inches +, yellowish-red sandstone bedrock; slightly acid to neutral.

The depth to bedrock ranges from about 20 to 40 inches; normally it is less than 30 inches. A few small outcrops of the sandstone bedrock occur.

Profile of Darnell fine sandy loam in a cultivated field of about 2 percent slope, in the NW¼NW¼ sec. 16, T. 15 N., R. 8 E.:

0 to 10 inches, pale-brown light fine sandy loam; structureless; very friable when moist, nearly loose when dry; slightly acid.
10 to 16 inches, reddish-yellow fine sandy loam, slightly heavier in lower part; structureless; friable; lower part contains small fragments of partly weathered sandstone; medium acid.
16 inches +, reddish-yellow sandstone bedrock; neutral.

The depth of the Darnell soil ranges from about 5 to 20 inches. Most areas are between 8 and 15 inches deep. Small outcrops of sandstone bedrock occur here and there. The transition between the deeper Stephenville soil and the shallower Darnell soil is hardly noticeable; there is no change in slope or in color of the surface soil. Another profile of Darnell soil, as it typically occurs when associated with soils of the Pottsville series, is described under Darnell and Pottsville soils, sloping.

Use and management (Capability unit IIIe–2).—These soils are droughty and low in fertility. They are slightly to moderately susceptible to erosion if cultivated. Most of the cleared acreage has lost up to 20 percent of its surface soil through erosion. Some shallow gullies occur on the more strongly sloping cleared areas.

These soils are moderately well suited to crops and pasture. Yields are moderate under good management. Intensive management is needed to maintain or increase productivity.

About half of this mapping unit is cleared. Most of the cleared acreage has been abandoned for cropping, and it is now used for pasture. Cotton, peanuts, sorghums, corn, cowpeas, and sweetpotatoes are the principal crops. The pastures have a thin cover of three-awn grasses, bluestem grasses, and weeds. This unit is in the Sandy savanna range site. Nearly half of it is native woodland.

Stephenville and Darnell fine sandy loams, sloping (4 to 7 percent slopes) (Sb).—These soils are like Stephenville and Darnell fine sandy loams, gently sloping, except that the surface soil is somewhat thinner, the bedrock is nearer the surface, and outcrops of sandstone are more common. About 60 percent of the acreage consists of Stephenville soils and about 40 percent of Darnell soils.

Use and management (Capability unit VIe–1).—This land is not well suited to crops. It is droughty, low in natural productivity, and highly erodible if cultivated. Moderate yields of common field crops are produced when the soils are first cultivated, but yields decline rapidly.

More than half of this mapping unit is still in woodland. The remainder has been cleared, but little is still used for crops. Cotton, corn, sorghums, peanuts, and cowpeas are grown. Yields are about three-fourths as much as on the gently sloping soils. Most of the acreage that was cleared, cultivated, and abandoned is now in pasture. The vegetation is three-awn grass and weeds. This unit is in the Sandy savanna range site.

If these soils are cultivated, very careful management is needed. They should be terraced, stripcropped, and contour-cultivated, and erosion-resistant crops should be planted. Areas where the soils are too shallow to be terraced should be used for pasture.

Stephenville and Darnell fine sandy loams, sloping, severely eroded (4 to 7 percent slopes) (Sc).—The soils in this mapping unit have been so severely eroded that they are worthless for crops. Originally, they were like Stephenville and Darnell fine sandy loams, sloping, but erosion has removed much of the surface soil. Numerous gullies are now active; some cannot be crossed with tillage implements.

Use and management (Capability unit VIIe–2).—These soils were never well suited to crops, and now they are of no value for crops. All of the acreage has been cultivated, but most of it is now idle or in pasture. A thin stand of annual grasses and weeds furnishes poor grazing. It would take careful management to establish even moderately good pastures. Cotton, corn, sorghums, cowpeas, and peanuts are still grown on a few acres, but yields are low. This mapping unit is in the Eroded savanna range site.

Stidham series

The Stidham soils developed from acid sandy old alluvium on stream terraces under a mixed hardwood forest. They are low in natural fertility, but they are very responsive to management. They are well suited to fruits, special crops, and field crops.

Soils of this series have a light brownish-gray to pale-brown, friable, acid surface soil. The subsoil is yellowish-brown friable sandy clay loam, mottled with light gray and strong brown in the lower part.

Stidham soils are closely associated with Dougherty soils, which have a reddish subsoil, and with Eufaula soils, which have no loamy subsoil within 4 feet of the surface. In Creek County, the Stidham soils are not mapped separately. They are mapped in units with soils of the Dougherty series. A profile of a Stidham soil is described under Dougherty and Stidham fine sandy loams, nearly level.

Talihina series

The Talihina soils developed from beds of slightly acid to neutral, gray, brown, and olive shale that included a little sandstone. They are very shallow, slightly acid

000105

grasses and scattered elm, hackberry, and mesquite trees grew on these soils. Runoff is slow, and internal drainage is moderate. This soil is closely associated with Teller silt loam, nearly level, but it has a darker colored surface soil and a brown or yellowish-brown, instead of a red, subsoil.

Profile of Vanoss silt loam, nearly level, in a cultivated field about 3 miles east of Oilton in the NE¼ sec. 34, T. 19 N., R. 7 E.:

0 to 16 inches, dark grayish-brown silt loam; the 6-inch plow layer is slightly lighter in color; moderate granular structure; friable when moist, hard when dry; neutral.
16 to 28 inches, dark-brown clay loam; medium granular structure; crumbly and friable when moist, hard when dry; permeable; neutral.
28 to 38 inches, brown clay loam, faintly mottled with strong brown; crumbly and friable; permeable; neutral.
38 to 48 inches +, yellowish-brown clay loam; slightly more friable and noticeably more sandy than layer above; neutral to weakly alkaline.

The surface soil ranges in color from very dark grayish brown in undisturbed areas to grayish brown in cultivated fields, and in texture from very fine sandy loam to heavy silt loam. In areas where this soil grades toward the Teller soils, the upper subsoil is brown and the lower subsoil is strong brown to reddish brown.

A few small level areas of Brewer silt loam are included in this mapping unit. These areas have a dark-gray silt loam surface soil 14 inches thick over a dark-gray crumbly clay subsoil. Brewer soils are not mapped separately in Creek County, and they are not described in this report.

Use and management (Capability unit I–3).—This is a moderately productive, easily worked soil. It responds well to good management, and it is not susceptible to erosion.

This soil is excellent for crops and well suited to pasture. About three-fourths of it is cultivated. The principal crops are cotton, corn, sorghums, and oats. The rest is used for pasture. This soil is in the Loamy prairie range site.

Vanoss silt loam, gently sloping (2 to 4 percent slopes) (Va).—This soil is similar to Vanoss silt loam, nearly level, but its slope makes it slightly susceptible to erosion if cultivated. It occurs in small areas in association with nearly level Vanoss and Teller soils.

Use and management (Capability unit IIe–1).—More than half of this soil is used for crops. The same crops are grown as on Vanoss silt loam, nearly level, but yields are slightly lower. Eroded areas are 10 to 20 percent less productive than the normal soil. Good management would restore the original productivity in 2 or 3 years. This soil is in the Loamy prairie range site.

Verdigris series

These soils occupy the flood plains of streams. The alluvium from which they developed came mostly from dark soils of the prairies; some came from light-colored soils. Soils of this series are moderately well drained, but they are flooded occasionally to frequently. The periodic floods do not prevent successful cultivation except in the narrow flood plains of small streams.

These soils have a dark grayish-brown, friable, slightly acid surface soil and a dark grayish-brown clay loam subsoil. The subsoil is slightly mottled and somewhat finer textured in the lower part. Verdigris soils are darker colored than the Pulaski soils and have more retentive, less sandy subsoils. They are similar to the Mason soils, which lie slightly higher and are above ordinary overflow.

Verdigris fine sandy loam (0 to 1 percent slopes) (Vd).—This soil occupies parts of narrow flood plains, mainly in the central and western parts of the county. The parent materials were slightly acid to weakly alkaline alluvial sediments, most of which were washed from dark soils of the prairie; some were derived from light-colored soils of forested areas. Runoff is slow, and internal drainage is moderate. These soils are flooded for short periods several times a year. Fresh alluvial sediments are deposited on most areas during floods. Native forests of elm, hackberry, oak, pecan, and cottonwood grew on these soils, and some coarse grasses and shrubs covered the ground.

Profile of Verdigris fine sandy loam:

0 to 14 inches, grayish-brown fine sandy loam, weakly stratified in lower part with dark grayish-brown silt loam; very friable when moist; slightly acid.
14 to 32 inches, dark grayish-brown clay loam; crumbly and friable when moist, moderately sticky when wet; slightly acid to neutral.
32 to 50 inches +, dark grayish-brown clay loam, mottled or splotched with light brown; contains thin seams or lenses of light-brown fine sandy loam below about 40 inches; neutral.

Most areas of this soil are covered by recent alluvium, 5 to 15 inches thick. This alluvium ranges from brown to dark grayish brown in color. The texture is fine sandy loam. It is somewhat stratified below plow depth. The clay loam subsoil is dark gray or dark grayish brown in most places.

Use and management (Capability unit I–2).—This is a moderately productive soil. It is likely to be flooded late in spring; consequently, cropping is uncertain. This soil does not erode, but a considerable amount of soil material is deposited by floodwater. Areas where floods are least frequent are well suited to crops. Corn, cotton, and sorghums are the most common crops. The soil is also well suited to pasture. Two-thirds of the acreage has been cleared for crops and pasture, and one-third is still under native forest. This soil is in the Loamy bottom-land range site.

Verdigris silt loam (0 to 1 percent slopes) (Ve).—This soil is mapped on flood plains of streams throughout the county. The parent material consisted of slightly acid to weakly alkaline alluvial sediments washed from dark soils of the prairies. The native vegetation was a hardwood forest of elm, oak, hackberry, cottonwood, and pecan trees, and scattered coarse grasses. Runoff is slow, and internal drainage is moderate. This soil is flooded one to three times a year; nevertheless, most of it can be successfully cropped.

Profile of Verdigris silt loam in a cultivated field about 4 miles west of Bristow in the SW¼SW¼ sec. 34, T. 16 N., R. 8 E.:

0 to 16 inches, dark grayish-brown silt loam; friable and easily worked when moist, hard when dry; slightly acid.
16 to 36 inches, dark grayish-brown clay loam, faintly mottled with brown in the lower part; crumbly and friable when moist, hard when dry; porous and permeable; slightly acid to neutral.
36 to 46 inches +, dark grayish-brown clay loam, splotched or mottled with brown and gray; friable, permeable, weakly alkaline.

000106

The surface layer is 10 to 20 inches thick. In some places the lower part of this layer is weakly stratified with fine sandy loam and clay loam. The subsoil is slightly acid to weakly alkaline. Stratified darker colored and lighter colored sediments may occur in the lowest layer.

Use and management (Capability unit I–2).—This soil is well suited to crops or pasture. It is somewhat more productive than Verdigris fine sandy loam. It is not susceptible to erosion, but soil material may be deposited on the surface by floods. The flood-deposited material replenishes the supply of plant nutrients. About one-fourth of this soil is still under native forest. Half of the remainder is cropped, mostly to corn, cotton, sorghums, and alfalfa. Yields range from almost complete failures to very high yields. Some of the soil is in pasture. This soil is in the Loamy bottom-land range site.

Verdigris clay loam (0 to 1 percent slopes) (Vc).—This soil occurs on the wider flood plains of the larger creeks of the county. The alluvial sediments from which it developed are slightly acid to weakly alkaline. They were washed from dark-colored soils of the prairies. Runoff is slow, and internal drainage is moderate. The native vegetation was a forest of elm, hackberry, ash, oak, pecan, and cottonwood, and coarse grasses.

Profile of Verdigris clay loam about ½ mile southeast of Sapulpa in the NW¼SW¼ sec. 6, T. 17 N., R. 12 E.:

0 to 20 inches, dark grayish-brown clay loam; moderately granular structure; crumbly and friable when moist, hard when dry; porous; slightly acid.
20 to 38 inches, grayish-brown clay loam, slightly mottled with brown and some pale brown; friable; permeable; slightly acid.
38 to 46 inches +, grayish-brown clay loam, mottled with other shades of brown; contains pockets and thin seams of brown fine sandy loam; slightly acid.

The color of the surface layer ranges from very dark brown in undisturbed areas to dark grayish brown or dark brown where cultivated. Small areas have a 3- to 5-inch layer of grayish-brown loam that has been deposited on the surface by floodwaters.

Use and management (Capability unit I–2).—This is a highly productive soil. Most of the areas are flooded one to three times a year, but this does not prevent their use for cultivated crops. This soil is not susceptible to erosion, but on most areas soil material is deposited during floods.

About one-third of this soil is cultivated. Corn, cotton, and sorghums are the principal crops. About one-fourth is in woodland. The rest is idle or used for pasture. This soil is in the Loamy bottom-land range site.

Woodson series

These are claypan soils that developed from alkaline or weakly calcareous shales and clays on nearly level to gently sloping prairies. They occupy small nearly level areas in gently sloping shallow valleys. These soils are dark grayish brown to dark gray. They are slightly acid.

Woodson soils are closely associated with soils of the Okemah series. The two series differ little in surface appearance. The Woodson soils have a thinner and more granular surface soil than the Okemah soils, and they have a dark-gray claypan subsoil. Woodson soils are not mapped separately in this county. Areas of Woodson clay loam are included in Okemah and Woodson clay loams, and a profile of the Woodson soil is described under that unit.

Yahola series

These soils occur on the flood plains of the Deep Fork and Cimarron Rivers and other large streams. The parent material was alluvium derived from grassland soils underlain by redbeds. Soils of the Yahola series have a reddish-brown alkaline or calcareous surface soil and a moderately sandy subsoil.

These soils are moderately to highly productive. Areas that are not flooded too often are well suited to general field crops. Yahola soils are similar to Port soils in surface appearance, but they have a sandier subsoil. They are more alkaline than Pulaski soils. Yahola soils have a sandier subsoil and more rapid internal drainage than the Roebuck soils.

Yahola very fine sandy loam (0 to 1 percent slopes) (Yb).—This soil occurs on the flood plains of the Cimarron and Deep Fork Rivers. It developed from calcareous or alkaline sandy alluvial sediments washed from prairies underlain by redbeds. Runoff is slow to moderate, and internal drainage is moderate to rapid. All areas of this soil are periodically flooded. Those on the flood plain of the Deep Fork River are too frequently flooded to be suitable for crops, and they have been left in native hardwood forest. The native vegetation was a forest of elm, ash, oak, cottonwood, and pecan trees. Coarse grasses grew where the forest was thin.

Profile of Yahola very fine sandy loam about ½ mile north of Oilton in the NW¼SW¼ sec. 28, T. 19 N., R. 7 E.:

0 to 16 inches, reddish-brown very fine sandy loam; structureless; very friable; alkaline but not calcareous.
16 to 46 inches+, reddish-yellow light fine sandy loam, weakly stratified in the lower part with loamy fine sand; very friable and freely permeable; alkaline but not calcareous.

The surface soil is alkaline or calcareous. In color it ranges from light brown to reddish brown and in texture from fine sandy loam to silt loam. Small areas where floodwaters have recently deposited sediments may be weakly stratified.

Use and management (Capability unit I–2).—This soil is easily worked and moderately productive. Areas that are not flooded too often are well suited to crops. The soil is not susceptible to erosion. It receives fresh deposits of soil material during floods.

All of the cropland is on the flood plain of the Cimarron River. Cotton, corn, and sorghums are the principal crops. This soil is in the Loamy bottom-land range site.

Yahola clay loam (0 to 1 percent slopes) (Ya).—This soil developed from reddish, calcareous, sandy alluvium on the flood plains of the Deep Fork and Cimarron Rivers. The native vegetation was a forest of elm, hackberry, oak, pecan, cottonwood, and ash. Coarse grasses grew where the forest was thin. Runoff is slow, but internal drainage is rapid through the sandy substratum.

This soil is associated with Yahola very fine sandy loam. It is like that soil except for having a finer textured surface soil.

Profile of Yahola clay loam:

0 to 14 inches, reddish-brown clay loam; crumbly and friable when moist, moderately sticky when wet; alkaline or weakly calcareous.
14 to 45 inches +, reddish-yellow very fine sandy loam, weakly stratified in lower part with loamy sands and clay loams; very permeable; weakly calcareous.

000107

TABLE 5.—*Chemical analyses of some horizons of selected soil types*

Soil and location of sample	Depth	Soil reaction	Total phosphorus (P)	Available phosphorus (P)	Organic matter	Total nitrogen	Available potash (K)
	Inches	*pH*	*Percent*	*Lb. per acre*	*Percent*	*Percent*	*Lb. per acre*
Bates fine sandy loam.							
Virgin: SE¼SW¼ sec. 8, T. 18 N., R. 11 E.	0–6	6.4	0.020	10.6	2.73	0.1225	208
	12–25	5.7	.015	10.6	1.34	.091	184
Cropped: NE¼NW¼ sec. 17, T. 18 N., R. 11 E.	0–6	5.5	.016	5.8	1.20	.084	88
	12–25	5.5	.015	4.2	1.18	.086	100
Dennis silt loam.							
Virgin: SE¼SE¼ sec. 5, T. 19 N., R. 7 E.	0–6	5.6	.022	9.8	3.55	.149	166
Cropped: SW¼SW¼ sec. 4, T. 19 N., R. 7 E.	0–6	5.5	.019	15.4	2.22	.0965	234
	12–20	5.3	.018	19.4	2.02	.099	166
	20–26	7.1	.014	10.6	1.08	.007	162
Dennis silt loam.							
Virgin: SE¼SE¼ sec. 14, T. 17 N., R. 10 E.	0–6	5.7	.023	5.0	3.20	.141	136
	18–26	5.7	.014	14.6	1.59	.098	216
Cropped: SW¼SW¼ sec. 13, T. 17 N., R. 10 E.	0–6	5.4	.018	8.2	1.75	.0825	132
	12–18	5.5	.017	5.8	1.60	.100	128
	18–26	5.9	.019	5.8	1.18	.0185	162
Dennis silt loam.							
Virgin: SE¼SE¼ sec. 36, T. 18 N., R. 10 E.	0–6	5.9	.018	14.6	2.59	.1225	158
	12–18	5.8	.019	1.8	1.88	.105	128
	18–26	6.4	.014	1.8	.49	.0665	98
Cropped: NE¼NE¼ sec. 1, T. 17 N., R. 10 E.	0–6	5.7	.017	5.0	1.55	.092	84
	12–18	6.1	.016	5.0	.90	.065	62
	18–26	5.9	.022	8.2	1.26	.093	230
Dougherty fine sandy loam.							
Virgin: SW¼NE¼ sec. 34, T. 14 N., R. 10 E.	0–6	6.0	.023	31.4	2.37	.112	114
	15–30	5.0	.016	36.2	.57	.072	154
Cropped: SW¼NE¼ sec. 34, T. 14 N., R. 10 E.	15–30	5.1	.015	2.6	.57	.065	200
Dougherty loamy fine sand.							
Virgin: SW¼SW¼ sec. 29, T. 14 N., R. 9 E.	0–8	5.8	.018	23.4	1.12	.078	110
	8–26	6.2	.012	4.2	.29	.063	96
	26–40	5.2	.015	1.0	.47	.0465	356
Cropped: SW¼SW¼ sec. 29, T. 14 N., R. 9 E.	0–8	6.1	.025	4.2	.20	.063	110
	8–26	6.6	.018	1.0	.43	.043	84
	26–40	5.1	.015	1.0	.37	.043	240
Mason clay loam.							
Virgin: NW¼SE¼ sec. 22, T. 18 N., R. 11 E.	0–6	6.3	.044	33.0	4.11	.1805	320
	12–26	5.5	.025	7.4	1.69	.098	186
Cropped: NW¼SE¼ sec. 22, T. 18 N., R. 11 E.	0–6	5.6	.031	5.8	2.60	.1245	154
	12–26	5.7	.025	5.8	1.69	.098	172
Mason silt loam.							
Virgin: SE¼NE¼ sec. 27, T. 17 N., R. 10 E.	0–6	6.2	.025	5.8	2.14	.1155	172
	12–26	6.0	.020	1.8	1.57	.0965	184
Cropped: NW¼SW¼ sec. 26, T. 17 N., R. 10 E.	0–6	6.2	.032	8.2	1.88	.1335	233
	12–26	5.7	.025	6.7	1.63	.1015	196
Mason silt loam.							
Virgin: SW¼SW¼ sec. 22, T. 18 N., R. 11 E.	0–6	5.8	.032	29.0	2.94	.135	128
Cropped: SE¼SE¼ sec. 21, T. 18 N., R. 11 E.	0–6	5.8	.024	14.6	2.06	.1155	188
	12–26	5.9	.025	4.2	1.29	.0955	188

000108

TABLE 5.—*Chemical analyses of some horizons of selected soil types*—Continued

Soil and location of sample	Depth	Soil reaction	Total phosphorus (P)	Available phosphorus (P)	Organic matter	Total nitrogen	Available potash (K)
	Inches	*pH*	*Percent*	*Lb. per acre*	*Percent*	*Percent*	*Lb. per acre*
Okemah silt loam.							
Virgin: SW¼SE¼ sec. 17, T. 16 N., R. 12 E.	0–6	6.0	0.021	7.4	3.12	0.127	144
	12–18	6.0	.019	10.6	1.98	.1085	128
Cropped: SE¼SW¼ sec. 17, T. 16 N., R. 12 E.	0–6	6.0	.023	5.0	2.04	.072	172
	12–18	5.8	.023	13.8	1.77	.1025	160
Okemah clay loam.							
Virgin: SE¼SE¼ sec. 29, T. 17 N., R. 12 E.	0–6	6.0	.026	5.0	3.43	.140	208
Cropped: NE¼NE¼ sec. 32, T. 17 N., R. 12 E.	0–6	6.4	.022	19.4	2.41	.113	130
	18–26	7.1	.017	17.0	1.59	.0615	184
Reinach very fine sandy loam.							
Virgin: SE¼SW¼ sec. 18 T. 19 N., R. 8 E.	0–6	6.5	.033	62.0	2.67	.1175	236
	15–30	6.6	.024	18.6	.82	.0735	162
Cropped: SE¼SW¼ sec. 18, T. 19 N., R. 8 E.	0–6	6.5	.028	49.4	.90	.070	144
	15–30	6.7	.025	57.0	.63	.0685	110
Stephenville fine sandy loam.							
Virgin: SE¼SE¼ sec. 23, T. 15 N., R. 8 E.	0–6	6.1	.017	5.0	1.26	.085	220
	12–20	5.3	.018	5.0	.55	.072	114
Cropped: NE¼NE¼ sec. 26, T. 15 N., R. 8 E.	0–6	6.5	.021	19.4	1.18	.091	178
	12–20	5.3	.016	4.2	.55	.0735	260
Teller silt loam.							
Virgin: SW¼SE¼ sec. 25, T. 19 N., R. 7 E.	0–6	6.4	.025	18.6	2.42	.1095	320
	12–26	5.3	.016	8.2	.89	.0815	316
Cropped: SW¼SE¼ sec. 25, T. 19, N., R. 7 E.	0–6	6.4	.015	10.6	1.08	.0825	232
	12–26	5.3	.015	3.4	.73	.0805	188
Vanoss silt loam.							
Virgin: NE¼NE¼ sec. 34, T. 19 N., R. 7 E.	0–6	6.0	.038	19.4	3.86	.1585	312
	15–25	6.0	.023	13.8	1.49	.100	292
Cropped: SW¼SW¼ sec. 26, T. 19 N., R. 7 E.	0–6	6.5	.022	10.6	1.90	.1085	340
Verdigris silt loam.							
Cropped: NE¼NE¼ sec. 16, T. 14 N., R. 9 E.	0–6	6.5	.029	14.6	1.62	.0945	252
	12–26	6.4	.022	6.6	1.25	.0885	226
Woodson clay loam.							
Virgin: NW¼NW¼ sec. 28, T. 17 N., R. 12 E.	0–6	5.8	.035	6.6	4.24	.163	178
	12–24	5.6	.025	5.0	2.71	.119	204
Cropped: NE¼NE¼ sec. 28, T. 17 N., R. 12 E.	0–6	6.1	.037	13.8	3.26	.133	260
	12–18	6.3	.027	11.4	2.18	.1035	222

The next broader grouping, the capability subclass, is used to indicate the dominant kind of limitation. The letter symbol "e" indicates that the main limiting factor is the hazard of erosion if a plant cover is not maintained; "w" means that excess water interferes with cultivation; and "s" shows that the soils are shallow, droughty, or unusually low in fertility.

The broadest grouping, the capability class, is identified by Roman numerals. All eight classes are represented in Creek County. All soils in one class have limitations of about the same degree but not necessarily of the same kind.

In classes I, II, and III are soils that are suitable for annual or periodic cultivation for annual or short-lived crops. Class I soils are those that have the widest range of use and the least risk of damage. They are level or nearly level, productive, well drained, and easy to work. They can be cultivated with almost no risk of erosion and will remain productive if managed with normal care. Class II soils can be cultivated regularly but do not have so wide a range of suitability as class I soils, or they need more protection. Some class II soils are gently sloping and consequently need moderate care to prevent erosion; others may be slightly droughty or slightly wet, or somewhat limited in depth. Class III soils can be cropped regularly but have a narrower range of use and need still more careful management.

In class IV are soils that should be cultivated only

000109

Woodlands.—Remove undesirable species and poor-quality trees. Thin stands to allow better tree growth. Harvest selectively to obtain the best saw logs. Protect seedlings from fire and grazing, so forests can reproduce naturally. Replant open areas where necessary. The forests of the uplands consist mainly of blackjack oak, post oak, elm, and hickory. These trees are unsuitable for most commercial uses, but they produce some fence posts, firewood, and rough lumber.

The bottom lands produce better lumber. Trees of commercial value suited to the lowlands include red oak, black oak, cottonwood, hackberry, white oak, ash, and pecan.

Native grassland.—The management of native grassland is discussed under Range Management.

Wildlife habitats.—Even though used for other purposes, land that is properly used and managed will provide some food and shelter for wildlife. Turnrows and odd areas can be used for special wildlife habitats. Plant them to evergreen trees, shrubs, grasses, legumes, or aquatic plants. Protect these areas from burning and overgrazing. Information on management of wildlife habitats can be obtained from your county agent or the local representative of the Soil Conservation Service.

Management by capability units

All soils in the same capability unit are suitable for about the same crops and need about the same kind of management. Suitable crops and appropriate management for each of the capability units in Creek County are described in the following pages.

Capability unit I–1 consists of deep, medium textured and moderately heavy textured soils that occur on nearly level high bottom lands or low terraces along streams. These soils are friable and easy to work. They have a high moisture-supplying capacity, and they are highly fertile. The soils in this unit are—

Mason clay loam.
Mason silt loam.
Reinach very fine sandy loam.

These soils are suitable for irrigation. They are well suited to all crops grown in the county, especially corn, cotton, and alfalfa. A suitable rotation would be—alfalfa for 3 to 5 years; corn for 2 years; small grain. The streambanks are good sites for raising fruits and berries. These soils are well suited to pastures of bermudagrass overseeded with legumes or of bromegrass-fescue-alfalfa mixtures.

Protect these soils against runoff water from adjacent higher land. To get high yields and to improve the surface structure, maintain a high content of organic matter by proper cropping and tillage. Destroy johnsongrass if it appears on cultivated land.

These soils are in the Loamy bottom-land range site.

Capability unit I–2 consists of deep, medium-textured to heavy-textured soils. They occur on nearly level bottom lands that are occasionally flooded. These soils are moderately fertile. Although they have moderate to high water-supplying capacity, they may not hold enough moisture for crops in dry years. The soils in this unit are—

Port clay loam.
Verdigris clay loam.
Verdigris fine sandy loam.
Verdigris silt loam.
Yahola clay loam.
Yahola very fine sandy loam.

These soils are suitable for irrigation. They are well suited to crops, but the choice of crops may be somewhat limited because of occasional flooding. A suitable rotation would be—alfalfa for 3 to 5 years; corn for 2 years; small grain. This soil is well suited to pastures of bermudagrass over-seeded with legumes, and also to pastures of bromegrass-fescue-alfalfa mixtures.

Protect these soils against runoff water from adjacent higher land. Where practical, build dikes to prevent floods. Stabilize the streambanks with trees and other vegetation. Destroy johnsongrass if it appears in cultivated fields. Crops that produce large amounts of organic residues are especially needed on the fine sandy loams to maintain organic matter and structure and to protect the soil from blowing.

These soils are in the Loamy bottom-land range site.

Capability unit I–3 consists of deep, medium-textured soils on nearly level old stream terraces. These soils are easily worked and are moderate to high in natural fertility. They have moderate to high moisture-supplying capacity. The soils in this unit are—

Choteau very fine sandy loam, nearly level.
Teller silt loam, nearly level.
Vanoss silt loam, nearly level.

These soils are suitable for irrigation. They are suited to all crops grown in the county, as well as to the kinds of trees grown in windbreaks and shelterbelts and for post production. A suitable rotation would be—small grain and sweetclover; sweetclover; corn; cotton. These soils are well suited to pastures of bermudagrass overseeded with legumes. They also will grow bromegrass-fescue-alfalfa mixtures.

Terracing and contour farming may be necessary on Teller silt loam, nearly level, and Vanoss silt loam, nearly level, to control erosion. Stabilize drainageways with vegetation, or control the water mechanically. Where necessary, divert runoff water from adjacent higher lying lands.

These soils are in the Loamy prairie range site.

Capability unit I–4 consists of deep, fine-textured soils on nearly level uplands. They are high in fertility. They have high moisture-supplying capacity, but may not supply enough moisture for crops during extended dry periods. This unit consists of Okemah and Woodson clay loams.

These are productive soils for common field crops. A suitable rotation would be—small grain and sweetclover; sweetclover; wheat; wheat or cotton. These soils are well suited to bermudagrass pastures. Fescue would provide winter and spring grazing.

Plant sweetclover and other deep-rooted legumes to help loosen the subsoil and increase the water-holding capacity. Apply lime and phosphate to legumes. Use nitrogen to increase the growth of grass. Green-manure crops are likely to deplete the moisture in the subsoil; consequently, they do not usually benefit succeeding crops.

These soils are in the Claypan prairie range site.

Capability unit IIe–1 consists of deep, medium-textured soils on gently sloping old stream terraces. These soils are easily worked and have moderate natural fertility. They have moderate to high moisture-supplying capacity. The soils in this unit are—

Choteau very fine sandy loam, gently sloping.
Teller silt loam, gently sloping.
Vanoss silt loam, gently sloping.

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These soils are in the Shallow prairie range site.

Capability unit VIs–2 consists of forested upland soils that are too shallow or too steep for cultivation. The soils in this unit are—

Darnell and Pottsville soils, sloping.
Darnell and Pottsville soils, strongly sloping.

These soils are unsuitable for any agricultural use except woodland or woodland pasture.

These soils are in the Shallow savanna range site.

Capability unit VIIe–1 consists of sloping, severely eroded soils. The soils in this unit are—

Bates fine sandy loam, sloping, severely eroded.
Dennis and Okemah loams, sloping, severely eroded.

These soils are unsuitable for crops. They should be seeded or sodded to permanent grasses and managed as grazing land. They are in the Loamy prairie range site.

Capability unit VIIe–2 consists of severely eroded and gullied sandy soils. The soils in this unit are—

Broken or gullied sandy upland.
Stephenville and Darnell fine sandy loams, sloping, severely eroded.

This unit is so badly gullied or eroded that it cannot be cultivated. It is poor for grass or trees. The most practical use for it is to plant catalpa, locust, or mulberry trees to be cut for fence posts. These trees can be planted with little preparation of the land, and they help prevent erosion.

Cleared areas could be sodded or seeded to native grasses, but the cost of establishing a stand of grass would be very high because it would be necessary to fill in the gullies and to use large amounts of fertilizer and lime. Areas now in woodland should not be cleared and should be only lightly grazed.

This unit is in the Eroded savanna range site.

Capability unit VIIs–1 consists of Eufaula loamy fine sand, strongly sloping, a deep, coarse-textured soil.

This soil is moderately well suited to woodland. Grass and shrubs in woodland provide some grazing or browse. Keep all areas in woodland, and protect them from burning and overgrazing.

This soil is in the Deep sand savanna range site.

Capability unit VIII consists entirely of Oil-waste land. This is land that has been used as a disposal ground for oil and salt-water waste from oil wells. It has no value as cropland or grassland in its present condition. Some of the less strongly sloping and less severely gullied areas may become revegetated naturally if no more waste is dumped on them.

Estimated Yields

The average crop yields that can be expected from each soil over a period of years under two levels of management are presented in table 6. The yields in columns A are those obtained under the type of management now generally used in the county. The yields in columns B are those that can be expected under better management. If erosion or poor cropping practices have seriously reduced the supply of organic matter and plant nutrients, several years of good management probably will be needed to bring the yields up to the level in columns B of the table.

Range Management

More than half of Creek County consists of native range. As a rule, the soils used for grazing are not suitable for cultivation. Most of the native range is in the savanna, which is also called the Cross Timbers. The savanna is an open forest of blackjack and post oaks with native grasses between the trees. The rest of the rangeland is on the open prairie. The bottom lands originally supported very productive stands of range grasses, but nearly all of these areas have been cultivated for field crops.

Range sites and range conditions

A range site is an area of natural grazing land that because of its particular combination of climate, soil, and topography will support a certain climax vegetation. The climax vegetation is the natural plant cover that will maintain and reproduce itself so long as the environment remains unchanged. If the natural balance between the vegetation and its environment is upset by overgrazing, burning, or trampling, some species tend to die out and to be replaced by tougher plants that are likely to be less palatable.

Range condition is a measure of the present grassland as compared with the original natural cover. It is determined by comparing the kind and amount of present vegetation with the climax vegetation. If 76 to 100 percent of the present vegetation is the same as the climax vegetation, the range is in excellent condition. If 51 to 75 percent is the same as the climax vegetation, the range is in good condition. A range is in fair condition if 26 to 50 percent of the vegetation is the same as the climax vegetation. If the percentage is less than 25 percent, the range is in poor condition.

The nine range sites in Creek County are called the Loamy prairie, Claypan prairie, Shallow prairie, Deep sand savanna, Sandy savanna, Shallow savanna, Eroded savanna, Loamy bottom land, and Heavy bottom land. Table 7 shows what soils are in each range site, what plants grow on each range site when it is in excellent condition, and how many acres will probably be needed to support one cow for one year under each class of range condition.

Loamy prairie site.—This is tall-grass prairie. Big bluestem is the dominant grass when the range is in excellent condition. Several other grasses and plants are also important parts of the stand. Deep, dark-colored, highly productive soils are characteristic of this site. Moisture and plant roots penetrate deeply. Many areas of this site are used for native hay meadows.

Claypan prairie site.—The clay loam and silt loam soils that comprise this site are underlain by layers of dense clay which limits the depths of plant root development. This is considered to be very good grazing land, but its production is somewhat lower than that of the Loamy prairie range site. This site supports the taller grasses. Under grazing abuse, the dominant little bluestem and big bluestem decline rather rapidly and are replaced by the less productive buffalograss, windmillgrass, and silver bluestem.

Shallow prairie site.—This site consists of open prairie ridges and shallow stony areas. Little bluestem, side-oats grama, tall dropseed, and meadow dropseed are abundant on this range site. The shorter grasses grow on the shallow soils because there is not room for the deep roots of the tall grasses. Tall grasses such as big bluestem, switchgrass, and Indiangrass grow on the pockets of deep

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TABLE 6.—*Estimated average acre yields of principal crops on each soil under two levels of management*

[Estimates in columns "A" are based on average management, which includes contour tillage, use of suitable plant varieties, timely planting and cultivation, insect control, and efficient harvesting methods. Estimates in columns "B" are based on good management, which includes all of the common management practices, and also crop rotations with legumes and the proper use of fertilizers. Absence of a yield figure indicates the soil is commonly considered unsuited to that crop]

Soils	Corn		Wheat		Oats		Cotton		Sorghums				Alfalfa		Native hay	Peanuts	
									Grain		Forage						
	A	B	A	B	A	B	A	B	A	B	A	B	A	B		A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*
Bates fine sandy loam, gently sloping	14	22	12	18	20	32	180	240	14	20	1.6	2.5			1.2	20	35
Bates fine sandy loam, sloping	12	20	10	16	18	28	160	220	14	20	1.6	2.5			1.1	17	32
Bates fine sandy loam, sloping, severely eroded																	
Broken or gullied sandy upland																	
Choteau very fine sandy loam, gently sloping	20	32	14	22	22	34	220	300	16	22	2.2	3.3	2.0	2.7	1.5	24	40
Choteau very fine sandy loam, nearly level	22	35	16	24	24	42	240	360	18	26	2.5	4.0	2.0	3.0	1.6	26	44
Cleburne fine sandy loam	12	20			16	24	130	220	12	20	1.5	2.3				16	33
Collinsville and Bates soils, gently sloping															.8		
Collinsville and Talihina soils, sloping															.9		
Collinsville and Talihina soils, strongly sloping															.8		
Darnell and Pottsville soils, sloping																	
Darnell and Pottsville soils, strongly sloping																	
Dennis and Okemah loams, gently sloping	18	30	12	20	25	38	180	290	18	25	1.7	3.3	2.2	3.3	1.4		
Dennis and Okemah loams, sloping	16	26	12	18	22	35			16	23	1.4	3.0			1.2		
Dennis and Okemah loams, sloping, severely eroded															.9		
Dougherty and Stidham fine sandy loams, gently sloping	15	24	8	14	14	26	140	210	16	25	1.7	2.8	1.7	2.4		25	40
Dougherty and Stidham fine sandy loams, nearly level	16	28	10	16	16	30	150	260	18	28	1.8	3.0	1.8	2.5		28	42
Dougherty and Stidham fine sandy loams, sloping	12	20	8	12	12	22	120	180	12	22	1.4	2.5					
Doutherty and Stidham loamy fine sands, gently sloping	8	15					75	130	8	16	.8	1.4				20	32
Dougherty and Stidham loamy fine sands, nearly level	10	16					80	150	10	18	1.0	1.5				24	38
Eufaula loamy fine sand, gently sloping	8	15					70	120	8	16	.8	1.4				18	32
Eufaula loamy fine sand, strongly sloping																	
Gullied bottom land																	
Mason clay loam	16	34	14	23	26	42	200	280	20	34	1.8	3.0	2.7	3.6	1.6		
Mason silt loam	18	35	14	23	28	45	210	300	20	34	1.8	3.0	2.5	3.3	1.6		
Neosho silt loam	12	26	9	17	16	30	140	230	16	26	1.6	2.9			1.2		
Oil-waste land																	
Okemah and Woodson clay loams	18	30	14	26	24	42	210	320	18	32	1.8	2.8	2.2	3.1	1.7		
Port clay loam	28	45	18	30	30	48	260	360	24	36	2.0	3.2	3.0	4.0	1.8		
Pulaski fine sandy loam	22	38	9	18	21	36	165	270	20	33	2.0	3.0	2.0	3.2		26	38
Reinach very fine sandy loam	38	60	16	28	35	50	290	400	30	46	3.0	4.2	3.2	4.5	1.8	32	50
Roebuck clay																	
Stephenville and Darnell fine sandy loams, gently sloping			6	12	12	22	110	180	11	20	1.1	2.0			1.0		
Stephenville and Darnell fine sandy loams, sloping															1.0		
Stephenville and Darnell fine sandy loams, sloping, severely eroded																	
Teller silt loam, gently sloping	16	28	12	18	22	34	220	310	20	32	2.0	3.1	2.5	3.3	1.3	23	38
Teller silt loam, nearly level	21	32	14	22	25	46	240	350	24	38	2.3	3.5	2.8	4.0	1.5	26	42
Teller silt loam, sloping			10	16	18	30					2.0	3.0			1.2		
Vanoss silt loam, gently sloping	22	35	15	21	28	42	260	350	25	35	2.5	3.5	2.6	3.5	1.5	24	38
Vanoss silt loam, nearly level	25	40	15	25	28	45	300	400	25	38	2.5	3.8	3.0	4.0	1.5	26	40
Verdigris clay loam	32	48	20	32	33	50	300	410	28	40	2.6	3.4	3.2	4.5	1.8		
Verdigris fine sandy loam	26	45	18	30	30	45	260	380	23	35	2.4	3.4	3.0	4.3	1.6	30	45
Verdigris silt loam	30	48	20	32	33	50	300	410	28	40	2.6	3.4	3.2	4.5	1.8	32	48
Yahola clay loam	33	55	18	30	35	52	290	415	30	46	2.8	4.0	3.2	4.5	1.8		
Yahola very fine sandy loam	26	45	14	26	32	48	260	380	28	42	2.6	3.8	3.0	4.0	1.6	33	50

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TABLE 7.—*Range sites and stocking rates*

Range site and soils	Dominant plants when range is in excellent condition	Recommended stocking rates by range condition class [1]			
		Excellent	Good	Fair	Poor
		Acres per cow per year	*Acres per cow per year*	*Acres per cow per year*	*Acres per cow per year*
Loamy bottom land	Eastern gamagrass, big bluestem, *Florida paspalum*, switchgrass, Maximillian sunflower, and Indiangrass, intermixed with scattered hardwood timber.	4 to 5	6 to 7	8 to 10	11 or more.
Reinach very fine sandy loam.					
Port clay loam.					
Mason clay loam.					
Mason silt loam.					
Verdigris clay loam.					
Verdigris fine sandy loam.					
Verdigris silt loam.					
Yahola clay loam.					
Yahola very fine sandy loam.					
Pulaski fine sandy loam.					
Gullied bottomland.					
Heavy bottom land	Prairie cordgrass, sedges, eastern gamagrass, Virginia wildrye, big bluestem, switchgrass, and tall dropseed, scattered indigobush, hackberry, elm, pecan, and post oak.	7 to 8	9 to 11	11 to 13	14 or more.
Roebuck clay.					
Loamy prairie	Big bluestem, switchgrass, Indiangrass, little bluestem, leadplant, and Maximillian and Ashy sunflowers.	7 to 9	10 to 13	14 to 18	19 or more.
Bates fine sandy loam, gently sloping.					
Bates fine sandy loam, sloping.					
Bates fine sandy loam, sloping, severely eroded.[2]					
Choteau very fine sandy loam nearly level.					
Choteau very fine sandy loam, gently sloping.					
Dennis and Okemah loams, gently sloping.					
Dennis and Okemah loams, sloping.					
Dennis and Okemah loams, sloping, severely eroded.[2]					
Teller silt loam, nearly level.					
Teller silt loam, gently sloping.					
Teller silt loam, sloping.					
Vanoss silt loam, nearly level.					
Vanoss silt loam, gently sloping.					
Claypan prairie	Little bluestem, big bluestem, switchgrass, Indiangrass, sideoats grama, buffalograss, Maximillian sunflower, and leadplant.	10 to 12	13 to 15	16 to 19	20 or more.
Neosho silt loam.					
Okemah and Woodson clay loams.					
Shallow prairie	Little bluestem, switchgrass, Indiangrass, big bluestem, sumac, persimmon, coralberry, and hackberry.	12 to 14	15 to 17	18 to 22	23 or more.
Collinsville and Bates soils, gently sloping.					
Collinsville and Talihina soils, sloping.					
Collinsville and Talihina soils, strongly sloping.					
Deep sand savanna	Big bluestem, little bluestem, Indiangrass, wildrye, and beaked panicum, intermixed with blackjack oak, post oak, hickory, coralberry, and sumac.	11 to 13	14 to 18	19 to 24	25 or more.
Dougherty and Stidham loamy fine sands, nearly level.					
Dougherty and Stidham loamy fine sands, gently sloping.					
Eufaula loamy fine sand, gently sloping.					
Eufaula loamy fine sand, strongly sloping.					
Sandy savanna	Big bluestem, little bluestem, purpletop, Indiangrass, arrowfeather, three-awn, and Virginia tephrosia, intermixed with blackjack oak, post oak, hickory and brush.	9 to 11	12 to 17	18 to 22	23 or more.
Cleburne fine sandy loam.					
Dougherty and Stidham fine sandy loams, nearly level.					
Dougherty and Stidham fine sandy loams, gently sloping.					
Dougherty and Stidham fine sandy loams, sloping.					
Stephenville and Darnell fine sandy loams, gently sloping.					
Stephenville and Darnell fine sandy loam, sloping.					
Shallow savanna	Big bluestem, little bluestem, sideoats grama, Indiangrass, Stuve's lespedeza, slender and roundhead lespedeza, prairieclover, and leadplant, intermixed with blackjack oak, post oak, and brush.	12 to 14	15 to 19	20 to 25	26 or more.
Darnell and Pottsville soils, sloping.					
Darnell and Pottsville soils, strongly sloping.					

See footnotes at end of table.

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TABLE 7.—*Range sites and stocking rates*—Continued

Range site and soils	Dominant plants when range is in excellent condition	Recommended stocking rates by range condition class [1]			
		Excellent	Good	Fair	Poor
		Acres per cow per year	*Acres per cow per year*	*Acres per cow per year*	*Acres per cow per year*
Eroded savanna Broken or gullied sandy upland.[2] Stephenville and Darnell fine sandy loams, sloping, severely eroded.[2]	Little bluestem, Indiangrass, switchgrass, side-oats grama, tall dropseed, roundhead lespedeza, and Stuve's lespedeza.	15 to 19	20 to 24	25 to 30	31 or more

[1] At these stocking rates, the better grasses should maintain themselves. The effects of weather and management on the better plants should be watched and the grazing adjusted accordingly. On sites in fair and poor condition, it may be necessary to defer grazing for at least two growing seasons before starting summer or year-long use.

[2] Most of these severely eroded areas were formerly cultivated and are now in poor condition. They require careful grazing management and sometimes need reseeding.

soil. This site is less productive than the Loamy prairie site because it is lower in moisture-holding capacity.

Deep sand savanna site.—The soils of this site are deep coarse sands that blow badly if cover is removed. They absorb water freely. In excellent condition, this site supports a stand of tall prairie grasses, clumps or single trees of blackjack oak and post oak, and brush. The principal desirable grasses are switchgrass, Indiangrass, little bluestem, and big bluestem. Important legumes are Virginia tephrosia, various perennial lespedezas, and tickclover. The range forage production potential is fairly good.

Sandy savanna site.—Most of this site is on gently rolling topography. Originally, post oaks and blackjack oaks were scattered among the big bluestem, Indiangrass, switchgrass, and little bluestem. Now much of this range site is in poor condition and has a thick overstory of oak brush.

Soils in this range site are deep sandy loams that have good capacity for absorbing and storing moisture. The shallow Darnell soils over sandstone store little moisture; the grasses on these soils dry out between rains, and brush is likely to be thick. Effective control of the brush is an essential step for economic management of this range site.

Shallow savanna site.—Most areas of this range site are strongly sloping to steep. Loose sand and stones occur on the surface. In many places bedrock is near the surface, and there are numerous outcrops of bedrock. Under natural conditions, this site supported grass intermixed with scattered post oaks, blackjack oaks, and brush. In most places, as a result of heavy grazing and fire, the stand of grass has been reduced and the amount of trees and brush has increased greatly. Limited amounts of big bluestem, Indiangrass, switchgrass, and little bluestem grow between the trees.

The shallowness of these soils limits the moisture-holding capacity and restricts the development of plant roots over much of the area. This site is less productive than the Sandy savanna site, but if well managed it provides fair grazing. Control of brush is usually the first step toward efficient grazing management. This site will erode severely if the plant cover is destroyed.

Eroded savanna site.—This site consists of formerly cultivated fields. The soils are severely eroded. They range from shallow sandy soils to deep sands. The potential productivity of this site is lower than that of the uneroded savanna site. Long periods of careful management are required to establish effective erosion control and fair range production. In many places special measures to control gullying are essential.

Loamy bottom-land site.—These deep soils receive additional water from overflow. They comprised the most productive range site in the county, but now practically all of the acreage has been cultivated for field crops. Areas that are flooded too often to be cultivated now support bermudagrass and johnsongrass.

The native grasses were principally eastern gamagrass, Florida paspalum, bottom-land switchgrass, and big bluestem. Some of the bottom lands originally had a savanna type of vegetation, in which hardwood timber grew along with grasses. Many such areas now support a thick stand of timber.

Heavy bottom-land site.—This site is frequently flooded. The only soil in it is Roebuch clay. The vegetation consists of the coarser grasses, including prairie cordgrass and bottom-land switchgrass, and some of the more palatable grasses, including big bluestem and Virginia wild-rye. Overgrazing on this site results in an increase in meadow dropseed, prairie dropseed, and other less palatable grasses.

Factors of management

Native range grasses are a crop and, like any other, they respond to management. To use range efficiently and bring it to maximum production, a rancher should select the kind of livestock to which the range is best suited, limit the number of livestock and the season of use, and control the distribution of grazing.

Kind of livestock.—The ranges in Creek County are grazed principally by cattle.

Proper grazing use.—The number of livestock to be grazed on the range should be decided according to the length of time that the range will be used and the amount of forage available. Enough forage should be left on the ground to—

1. Mulch the soil and increase water-absorption and water-storage capacity. More soil moisture means more grass.

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2. Permit deep vigorous growth of grass roots. Enough green leaves should remain on each plant to provide food to be stored in the roots for early and vigorous spring growth. Generally, about one-half of the leaves can be removed without damaging a plant's vigor and productivity.

3. Protect the soil from wind and water erosion. A good grass cover will prevent eorsion and reduce runoff.

4. Allow the climax grasses to crowd out weeds and other inferior plants. This will improve range condition.

5. Provide a feed reserve for periods of drought that might otherwise force sale of livestock at a time when prices are low.

Season of use.—Grasses that grow well during cool weather generally furnish the earliest spring grazing and may also supply fall grazing. Warm-season grasses should be used during the summer months. The nutritive value of native meadow hay declines as the plants approach maturity. Most grasses in Creek County grow most rapidly in spring and early in summer. Livestock on grass gain the most weight during this period.

The kinds and amounts of grass that each range will produce and the best time for grazing depend on the range site and the condition of the range. Ranges in fair to poor condition usually should be rested until fall or winter, to permit the better grasses to spread from underground stems and by seeding. Ranges that are in good or excellent condition can also benefit from an occasional rest from grazing during the growing season of the principal forage plants. Your Soil Conservation Service technician can advise on seasons of use and rest for individual ranges.

Distribution of grazing.—Many ranges in Creek County are overgrazed. Some are undergrazed or not grazed at all. The distribution of grazing can be improved by the location of water and salt or by fencing.

Poor distribution of water is one of the main causes of uneven grazing. Watering places should be developed over the entire range if possible, so that livestock do not have to walk far to get water. Generally, water is required at about 1-mile intervals in rough country and at 2-mile intervals on more level range.

Salt should be placed in lightly grazed areas where forage is abundant, and where livestock can reach it from several directions. It should not be placed in sandy or other erodible spots. Livestock do not require water and salt at the same location.

Fences are necessary to provide separate pastures for different classes of livestock and for different seasons of use. Where possible, fences should be located on the boundary between two range sites, so that livestock will not overgraze the preferred range site while grazing the other site too lightly.

Origin and Classification of Soils

Soils are developed by the action of several soil-forming processes on accumulated materials. The factors that determine the characteristics of the soil at any given place are (1) the kind of parent material, (2) the climate under which the parent material has accumulated and has existed since its accumulation, (3) the plant and animal life on and in the soil, (4) the relief, or lay of the land, and (5) the length of time the forces of soil development have acted on the soil material.

Soils that have well-developed soil characteristics that are due mainly to the influence of climate and vegetation are zonal soils. The Red-Yellow Podzolic soils and the Reddish Prairie soils are the zonal great soil groups represented in this county. Intrazonal soils also have well-developed characteristics, but the influence of climate and vegetation is overshadowed by that of one or more of the other factors of soil formation. The Planosols are the only intrazonal soils in this county. Their dominating characteristics are due to the fine texture of the parent materials, level relief, and age. Azonal soils do not have strongly developed profile characteristics because of extreme youth, strong relief, or unusually stony parent material. The Lithosols and the Alluvial soils are the two azonal great soil groups of this county.

Creek County has a warm-temperate climate. It is in the humid zone, but its climate is drier than the average humid-zone climate. Most of the county is level to gently sloping. Half of the area has slopes of less than 4 percent. In a few places, slopes are steep enough to retard soil development.

The parent materials of the soils of this county consist of products weathered from sandstones and shales and a little that weathered from limestones or limy sandstones on the uplands; old alluvium washed from these kinds of rocks and deposited on stream benches; and recent alluvium deposited on the bottom lands.[4] Most of the sandstones are red or brown in color, and soft. They contain little lime, phosphate, or other easily weathered minerals. Two thick beds of gray shale crop out in the eastern and northern parts of the county. Thinner beds of red shale crop out elsewhere. These shales are high in easily weathered minerals, and the soils formed mostly from them contain moderate amounts of lime, phosphate, and potash. Most of the soils were formed from mixed sandstone and shale materials, however, and contain a moderate or low supply of these nutrients. Few of the soils are more than slightly acid.

Most of the areas underlain by shale had a prairie vegetation of tall grass or shorter grasses, depending on the depth of the soils. The soils of these areas belong to the Reddish Prairie great soil group. The areas underlain by sandstone generally have a scattered forest in which prairie grasses grow between the trees. Red-Yellow Podzolic soils developed in these places.

The Reddish Prairie soils, the Red-Yellow Podzolic soils, and the Planosols are mature soils. They have developed the characteristics that are normal to the climate, vegetation, and relief. The Lithosols and the Alluvial soils are youthful soils, which have not had time to develop fully.

Table 8 shows the classification of the soils of this county into the zonal, intrazonal, and azonal orders and into great soil groups. Some of the factors that affected the development of the soils are also shown in the table.

[4] FATH, A. E. GEOLOGY OF THE BRISTOW QUADRANGLE, CREEK COUNTY, OKLAHOMA. U. S. Geol. Sur. Bul. 759, 63 pp., illus. 1925.

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TABLE 8.—*Classification of soils into orders, great soil groups, and series, and some of the factors that influenced soil formation*

Great soil group and series	Parent material	Slopes	Drainage		Vegetation
			Surface	Internal	
ZONAL					
Reddish Prairie soils:					
Bates	Neutral sandstone and subsidiary layers of shale	Gentle to moderate.	Moderate	Moderate	Grass.
Choteau	Slightly acid silty and clayey alluvial sediments overlain by loess.	Level to gentle.	Slow to very slow.	Slow	Grass.
Dennis	Interbedded neutral sandy shale, sandstone, and subsidiary clay shale.	Gentle to moderate.	Moderate	Slow	Grass.
Okemah	Weak alkaline clay and shaly clay, with local calcareous lenses.	Gentle to moderate.	Slow to moderate.	Very slow	Grass.
Teller	Neutral to alkaline reddish loamy alluvial deposits and loess.	Level to moderate.	Slow to moderate.	Moderate	Open stand of trees with coarse grasses.
Vanoss	Neutral to alkaline brownish loamy alluvial and loessal sediments.	Level to gentle.	Slow to moderate.	Moderate	Grass.
Red-Yellow Podzolic soils:					
Cleburne	Slightly acid to neutral sandstone	Nearly level to gentle.	Moderate to rapid.	Moderate	Trees.
Dougherty	Reddish slightly acid sandy alluvial sediments	Level to moderate.	Slow to moderate.	Moderate to rapid.	Trees.
Eufaula	Reddish acid sandy alluvial or eolian deposits	Level to strong.	Slow to moderate.	Moderate to rapid.	Trees.
Stephenville	Reddish slightly acid to neutral sandstone or interbedded sandstone and sandy shale.	Gentle to moderate.	Slow to moderate.	Rapid	Trees.
Stidham	Brownish acid sandy alluvial sediments	Level to moderate.	Slow to moderate.	Moderate to rapid.	Trees.
INTRAZONAL					
Planosols:					
Neosho	Neutral clayey alluvial sediments, somewhat stratified with silts and sands.	Level to concave.	Slow to very slow.	Very slow	Grass.
Woodson	Weakly alkaline clays and shaly clays, locally calcareous.	Level to gentle.	Slow to moderate.	Very slow	Grass.
AZONAL					
Lithosols:					
Collinsville	Neutral to slightly acid sandstone with subsidiary layers of sandy shale.	Gentle to moderate.	Moderate	Moderate	Grass.
Darnell	Slightly acid to neutral reddish sandstone	Moderate to strong.	Moderate to rapid.	Moderate	Scrubby trees.
Pottsville	Acid to neutral interbedded clay shale, sandstone, and sandy shale.	Moderate to strong.	Rapid	Very slow	Scrubby trees.
Talihina	Neutral to slightly acid clay shale with lenses of sandstone and sandy shale.	Moderate to strong.	Rapid	Very slow	Grass.
Alluvial soils:					
Mason	Neutral to alkaline and silty to clayey alluvial sediments, somewhat stratified with fine sandy loam.	Level	Slow	Moderate	Trees with ground cover of grass.
Port	Neutral to alkaline silty, recent alluvium, derived mainly from areas underlain by redbeds.	Level	Slow	Moderate	Trees.
Pulaski	Slightly acid sandy alluvium, mainly from sandstone areas.	Level	Moderate	Moderate	Trees.
Reinach	Weakly alkaline to calcareous, silty and moderately sandy alluvial deposits.	Level	Slow	Moderate	Trees with ground cover of grass.
Roebuck	Weakly calcareous or alkaline clayey alluvium, mainly from areas underlain by redbeds.	Level	Very slow	Very slow	Trees.
Verdigris	Slightly acid to weakly alkaline, stratified, loamy to clayey recent alluvium, from the dark prairies.	Level	Slow	Slow to moderate	Trees.
Yahola	Alkaline to calcareous sandy and loamy reddish alluvium, mainly from areas underlain by redbeds.	Level	Slow	Moderate to rapid.	Trees.

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Reddish Prairie Soils

The Reddish Prairie soils of this county are generally better developed than the Reddish Prairie soils of cooler regions. Their horizons are well differentiated in texture, structure, color, and reaction.

Most of the Reddish Prairie soils have a slightly acid to neutral, granular, friable A horizon that ranges in color from brown to dark grayish brown. The texture ranges from fine sandy loam to clay loam. In undisturbed areas the surface soil is moderately high in organic matter. The subsoil is yellowish-brown to grayish-brown clay loam or clay, usually mottled somewhat with reddish brown. The subsoil is medium to slightly acid, friable, and massive to granular in the upper part.

The following profile of Okemah silt loam is representative of the very gently sloping Reddish Prairie soils of the county. In texture and structure, the horizons are somewhat more clearly differentiated than in more strongly sloping Reddish Prairie soils. The Okemah soils developed from more clayey and alkaline parent materials and have a heavier lower subsoil than other Reddish Prairie soils. This profile was observed on a slope of 1½ percent in a concave field used for cotton, corn, small grains, and sorghum.

Profile of Okemah silt loam in SW¼SW¼ sec. 17, T. 16 N., R. 12 E; near Mounds:

A	0 to 15 inches, very dark grayish-brown (10YR 3/2, dry; 10YR 2/2, moist) to very dark brown (10YR 2/2, moist) silt loam; strong medium granular structure; friable when moist, hard when dry; a thin platy crust forms on surface of cultivated field if soil dries undisturbed after a rain; slightly acid; grades to B_1 horizon.
B_1	15 to 22 inches, dark grayish-brown (10YR 4/2, dry; 10YR 2.5/2, moist) to very dark grayish-brown (10YR 3/2, moist) silty clay loam; mottles of brown and strong brown comprise 5 to 10 percent of the mass; compound subangular blocky and medium granular structure; crumbly and friable when moist, moderately sticky and plastic when wet; slightly acid.
B_2	22 to 38 inches, mottled grayish-brown (2.5Y 5/2, dry; 2.5Y 3/2, moist) and light olive-brown (2.5Y 5/4, dry; 2.5Y 4/4, moist) clay; weak blocky structure; very compact when moist, extremely hard when dry; very slowly permeable; contains numerous small dark shot-like concretions of iron; slightly acid to neutral.
C_1	38 to 50 inches, mottled light-gray (2.5Y 7/2, dry; 2.5Y 6/2, moist), olive-yellow (2.5Y 6/8, dry; 2.5Y 5/8, moist), and pale-olive (5Y 6/4, dry; 5Y 5/4, moist) clay; massive structure; very slowly permeable; contains a few small concretions of iron; weakly alkaline.
C	50 to 65 inches +, pale-olive (5Y 6/4, dry; 5Y 5/4, moist) and yellow (5Y 7/6, dry; 5Y 6/6, moist) shale; alkaline; contains laminations of light-gray calcareous clay and sandstone.

The thickness of the A horizon ranges from 10 to 18 inches. The color is very dark gray in undisturbed areas under native grass, but in cultivated areas the color ranges to grayish brown. The texture of the B_1 horizon ranges from clay loam to silty clay, and the structure ranges from strong medium granular to compound subangular blocky and granular. In some places the B_1 horizon is mottled with brown. The combined thickness of the A and B_1 horizons ranges from 16 to 28 inches.

Other soils of the Reddish Prairie group differ from the above profile because of differences in parent material, relief, and drainage.

The Dennis soils have more sandstone in their parent material, which is less clayey and more permeable than the parent material of the Okemah soils. The soils are more friable and less clayey. They are slightly lighter colored throughout, but have more mottling of red, brown, and reddish brown in the lower horizons than the Okemah. They occur on stronger slopes.

The Bates soils developed from sandstone that contains lenses of sandy shale. They are browner throughout, and have a friable sandy clay loam B horizon. The Choteau soils are somewhat similar to Dennis soils, but they developed from old acid silty and sandy alluvium on nearly level stream terraces.

The Vanoss soils are youthful but moderately well developed Reddish Prairie soils that formed under grass in silty or sandy eolian or alluvial materials over neutral to alkaline sandy or silty clay loam. They are brown, deep, friable, and permeable. They are neutral to slightly acid.

The Teller soils are transitional to Red-Yellow Podzolic soils. They developed under a savanna forest from alkaline, reddish, loamy sediments washed mainly from grasslands. They are browner in the upper part than typical Red-Yellow Podzolic soils. The A_1 horizons are darker colored and have better developed and more distinct structure.

Red-Yellow Podzolic Soils

The Red-Yellow Podzolic soils of this county have developed under hardwood trees and grass. They are not as clearly characteristic of this great soil group as Red-Yellow Podzolic soils that developed in more humid climates under a pine-and-hardwood forest. Some, however, have the thin organic-mineral A_1 horizon, the light-colored, leached, acid A_2 horizon, and the yellowish or reddish, friable, acid sandy clay loam subsoil that are typical of the Red-Yellow Podzolic soils.

The Red-Yellow Podzolic soils of this county are best represented by the following profile of Dougherty fine sandy loam. It was observed in a gently sloping (2 percent) cultivated field that had moderate runoff and moderate internal drainage. The original vegetation was a thick cover of red oak, post oak, blackjack oak, and hickory trees.

Profile of Dougherty fine sandy loam:

A_1	0 to 6 inches, grayish-brown (10YR 5/2, dry) to brown (10YR 4/3, moist) light fine sandy loam; structureless; very friable; slightly acid.
A_2	6 to 14 inches, light yellowish-brown (10YR 6/4, dry; 10YR 5/4, moist) light fine sandy loam; the lower 2 inches is reddish-yellow fine sandy loam or loam; very friable; medium acid.
B_{21}	14 to 34 inches, red (2.5YR 5/6, dry; 2.5YR 4/6, moist) sandy clay loam; massive structure; friable when moist, hard when dry; permeable; medium acid.
B_{22}	34 to 54 inches, reddish-yellow (5YR 6/8, dry; 5YR 5/8, moist) sandy clay loam; massive structure; friable when moist, moderately hard when dry; medium acid.
C	54 to 70 inches +, reddish-yellow sandy clay loam alluvium, weakly stratified with red and yellowish sandy loam; slightly acid.

In areas where Dougherty soils are transitional to Stidham soils, the upper subsoil is reddish yellow.

The Stidham soils have a light brownish-gray A_1 horizon, a very pale brown A_2 horizon, and an upper subsoil of yellowish-brown sandy clay loam. Their lower

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subsoil, beginning 26 to 36 inches below the surface, is yellowish, slightly mottled sandy clay or sandy clay loam; it is moderately plastic and is somewhat less permeable than the subsoil of the Dougherty soil.

The Cleburne soil is similar to the Stidham soil except that it lacks the sandy clay lower subsoil. It developed from sandstone residuum, which lies at depths of about 26 to 46 inches.

The Stephenville soils are similar to the Dougherty soils, but shallower. They are underlain at depths of 20 to 40 inches by partly weathered sandstone.

The Eufaula soils are related to the Stidham and Dougherty soils and are closely associated with them. They have a much thicker A horizon and have no loamy or distinctly heavier layer within 3 feet of the surface. The following profile of Eufaula loamy fine sand was observed on a gently sloping high terrace about 30 feet above the flood plain of the Deep Fork River. The vegetation is a native cover of blackjack oak and post oak.

Profile of Eufaula loamy fine sand in SE¼SW¼ sec. 31, T. 14 N., R. 9 E., about 12 miles south of Bristow:

A_1 0 to 3 inches, dark grayish-brown (10YR 4/2, dry; 10YR 3/2, moist) loamy fine sand; weak granular structure; very friable; slightly acid.

A_{21} 3 to 10 inches, light brownish-gray (10YR 6/2, dry; 10YR 5/2, moist) loamy fine sand; structureless; nearly loose when dry; slightly acid.

A_{22} 10 to 44 inches, light yellowish-brown (10YR 6/4, dry; 10YR 5/4, moist) loamy fine sand; structureless; very friable when moist, loose when dry; medium acid.

B 44 to 54 inches, reddish-yellow (7.5YR 6/6, dry; 7.5YR 5/6, moist) sandy clay loam, splotched or mottled with light brownish gray and brownish yellow; structureless; friable; permeable; medium acid.

C 54 to 70 inches, alternating strata of reddish-yellow (7.5YR 6/8, dry) fine sandy loam and fine sand; slightly acid to neutral.

The B horizon may be as described, or it may be yellowish-brown loamy fine sand with narrow bands of reddish-yellow loam or sandy loam.

Planosols

The Planosols in this county developed on nearly level relief. Their parent materials were shales or slowly permeable sandy clays and clays.

Woodson clay loam is representative of the Planosols in the county. The following profile was observed in a nearly level cultivated area in a shallow valley where common field crops are grown. Runoff is slow. Internal drainage is very slow but adequate for the crops commonly grown in the county, including alfalfa.

Profile of Woodson clay loam near Kiefer in the SW¼SW¼ sec. 28, T. 17 N., R. 12 E.:

A 0 to 12 inches, dark-gray (10YR 4/1, dry; 10YR 2/1, moist) clay loam; moderate medium granular structure; aggregates in lower 2 inches faintly coated with gray; friable when moist, very hard when dry; slightly acid.

B_1 12 to 22 inches, dark-gray (10YR 4/1, dry; 10YR 2/1, moist) clay, faintly mottled with yellowish brown; mottling in lower part comprises about 10 percent of the mass; weak blocky structure; very compact; extremely hard when dry; neutral.

B_2 22 to 34 inches, dark grayish-brown (2.5Y 4/2, dry; 2.5Y 3/2, moist) clay, yellowish-brown and olive-brown mottles comprise 10 to 15 percent; massive structure; very compact; contains a few small crystals of gypsum and small shotlike concretions of iron oxide in lower part; neutral.

C_1 34 to 44 inches, mottled gray (10YR 6/1, dry), yellowish-brown (10YR 5/6, dry), and olive-brown (2.5Y 4/5 dry) clay; massive structure; very slowly permeable contains few to numerous small crystals of gypsum and small concretions of iron oxide; alkaline but not calcareous.

C 44 to 56 inches+, partly weathered light olive-gray (5Y 6/2) and light olive-brown (2.5Y 5/4) shale or shaly clay; contains a few small crystals of gypsum, but is not calcareous.

The Neosho soil developed in clayey alluvial sediments on level or concave surfaces. Its profile is somewhat similar to that of the Woodson soils in thickness, structure and consistence of horizons. This soil has a lighter colored A horizon and a more mottled and more compact upper subsoil.

Lithosols

The soils in this great soil group are very shallow and stony. They lack well-developed profile characteristics because the strong relief allows rapid erosion, which removes soil about as soon as it develops. The vegetation may be either trees or grasses.

The principal Lithosols of the county are underlain by sandstone, shale, or interbedded sandstone and shale at depths of 5 to 15 inches. A few small areas are underlain by interbedded limestone and shale or interbedded sandy limestone and shale. The rocks under these soils vary so much within short distances and they are so near the surface that the thin profiles of the skeletal soils vary considerably.

The following profile of Darnell stony fine sandy loam was observed on a slope of 7 percent under a cover of scrubby blackjack oak and post oak. It is representative of the shallow Lithosols that overlie sandstone and have a scrubby forest cover.

Profile of Darnell stony fine sandy loam about 5 miles west of Bristow in the SW¼SW¼ sec. 33, T. 16 N., R. 8 E.:

A_1 0 to 4 inches, dark grayish-brown (10YR 4/2, dry; 10YR 3/2, moist) light fine sandy loam; weak granular structure; very friable; numerous fragments of sandstone ranging up to 12 inches in diameter occur on surface; many outcrops of sandstone; slightly acid.

A_2 4 to 10 inches, light-brown (7.5YR 6/4, dry; 7.5YR 5/4, moist) light fine sandy loam; structureless; very friable when moist, nearly loose when dry; contains numerous fragments of sandstone; slightly acid; grades to C horizon through a 1- to 2-inch transition zone of yellowish-red (4YR 5/8, dry; 5YR 4/8, moist) fine sandy loam that contains numerous particles of soft partly weathered sandstone.

C 10 to 40 inches, reddish-yellow (5YR 6/8) to red (2.5YR 5/8) sandstone bedrock; slightly acid to neutral.

Pottsville stony loam, which is closely associated with the Darnell soil, has a thin A_1 horizon of dark grayish-brown loam and a thin A_2 horizon of reddish-yellow loam or clay loam. Slightly acid, thin-bedded, partly weathered, olive-brown, red, or olive-yellow shale or shaly clay and reddish-brown sandstone lie 3 to 15 inches beneath the surface. Sandstone fragments occur on the surface. Outcrops of slightly weathered shale, covered by 2 to 4 inches of sandy clay loam, are common on the steeper slopes. In some places a thin transition layer of reddish-yellow clay lies above the shaly parent material but beneath the soil profile.

Some soils under a grass cover have somewhat similar thin profiles. They most commonly overlie sandstones

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and shales, but many combinations of interbedded sandy limestone, limestone, sandstone, and shale occur. Examples are the Collinsville soils, which developed under grass over sandstone. Their profile consists of 8 to 10 inches of slightly acid, dark grayish-brown, granular loam or fine sandy loam over yellowish-brown, slightly acid sandstone bedrock. Outcrops of bedrock and large sandstone fragments on the surface are characteristic. Where the Collinsville soil is transitional toward Bates fine sandy loam, it has a thin, weakly developed B_1 horizon of yellowish-brown loam or sandy clay loam, 3 to 6 inches thick, just above the sandstone. Undisturbed areas of Collinsville soil support a moderately thick cover of bunchgrasses and scattered mesquite shrubs.

Soils of the Talihina series are closely associated with Collinsville soils, but they occupy more strongly sloping surfaces. They are on shaly slopes below ridgetops of Collinsville soils. The Talihina soils overlie shale or interbedded sandy shale, shale, and sandstone, but fragments of sandstone from the higher Collinsville soils are common on the surface of the Talihina soils. The Talihina soils are more clayey. The thin profile consists of olive-gray to dark grayish-brown clay loam over olive-colored, slightly weathered, neutral shale. The vegetation is a mixture of short and tall prairie grasses, and scattered shrubs and scrubby trees. The trees are rather thick in areas next to, or transitional to, Pottsville soils.

Alluvial Soils

The Alluvial soils in this county range from slightly acid to calcareous in reaction and from dark grayish brown to brown or red in color, depending on the source of the soil materials. They developed from sediments carried by streams and deposited on terraces and flood plains. Some of these materials have not been in place long and have been only slightly modified by soil-forming forces.

The Mason soils are the most extensive Alluvial soils of the area. They show slight profile development. The profile described is on a low terrace about 3 to 5 feet above the flood plain of Polecat Creek. The area is moderately well drained. It is used for growing all crops common in the area, including alfalfa.

Profile of Mason silt loam about 2 miles southwest of Kellyville in the SE¼NE¼ sec. 27, T. 17 N., R. 10 E.:

0 to 15 inches, very dark grayish-brown (10YR 3/2, dry; 10YR 2/2, moist) silt loam; the 5-inch plow layer is grayish brown; moderate medium granular structure; crumbly and friable when moist, hard when dry; slightly acid; grades to horizon below.

15 to 35 inches, dark grayish-brown (10YR 4/2, dry; 10YR 3/2, moist) silty clay loam; weak granular structure; numerous pinholes; friable when moist, moderately plastic when wet; slightly acid.

35 to 45 inches, grayish-brown (2.5Y 5/2, dry; 2.5Y 4/2, moist) light clay; strong-brown (7.5YR 5/8, dry) and yellowish-brown (10YR 5/6, dry) mottles comprise 10 to 15 percent of the mass; moderately crumbly and friable when moist, plastic when wet; permeable; slightly acid.

45 to 60 inches+, dark grayish-brown clay loam that contains thin strata of light-brown fine sandy loam; neutral.

The Verdigris soils are closely related to the Mason soils, but are of more recent origin and show no profile development. They are still flooded periodically. Some areas of Verdigris soils that are next to entrenched channels and are not flooded as often as the others have a weak color profile.

The Pulaski soils consist of brown to reddish-brown slightly acid sandy sediments that have been only slightly altered into a soil. Most of the material was washed from light-colored soils, but some came from Reddish Prairie soils.

The Port, Roebuck, and Yahola soils occur almost entirely on the flood plains of streams that carry sediments from areas of Reddish Prairie and Reddish Chestnut soils underlain by redbeds.

The Port and Yahola soils are similar in surface appearance, but Yahola soils are underlain by more sandy sediments. Yahola soils are generally more calcareous throughout than Port soils. Roebuck soils are poorly drained and normally calcareous. They have a more clayey and mottled subsoil than Port or Yahola soils.

The Reinach soils are similar to the Yahola soils, but they have a somewhat darker surface soil. They are high enough above the stream to be safe from ordinary floods. As a rule, they are more leached of carbonates than the Yahola soils.

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CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Roads
- Good motor
- Poor motor
- Trail
- Marker, U. S. (33)

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferry
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
- School
- Church
- Station

Mine and Quarry
- Shaft
- Dump
- Prospect

Pits, gravel or other

Power line

Pipeline

Cemetery

Dam

Levee

Tank

Oil well

Windmill

Canal lock (point upstream)

BOUNDARIES

- National or state
- County
- Township, civil
- U. S.
- Section
- City (corporate)
- Reservation
- Land grant

DRAINAGE

Streams
- Perennial
- Intermittent, unclass.
- Crossable with tillage implements
- Not crossable with tillage implements

Canals and ditches (CANAL / DITCH)

Lakes and ponds
- Perennial
- Intermittent

Wells (flowing)

Springs

Marsh

Wet spot

RELIEF

Escarpments
- Bedrock
- Other

Prominent peaks

Depressions

	Large	Small
Crossable with tillage implements		
Not crossable with tillage implements		
Contains water most of the time		

SOIL SURVEY DATA

Soil type outline and symbol (Dx)

- Gravel
- Stones
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land

Erosion
- Uneroded spot (U)
- Sheet, moderate (S)
- Sheet, severe (SS)
- Gully, moderate (G)
- Gully, severe (GG)
- Sheet and gully, moderate (SG)
- Wind, moderate
- Wind, severe
- Blowout
- Wind hummock
- Overblown soil

Gullies

Areas of alkali and salts
- Strong (A)
- Moderate (M)
- Slight (S)
- Free of toxic effect (F)
- Sample location (2E)
- Saline spot

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

CREEK COUN

SOILS LEGEND

SYMBOL	NAME
Ba	Bates fine sandy loam, gently sloping
Bb	Bates fine sandy loam, sloping
Bc	Bates fine sandy loam, sloping, severely eroded
Bd	Broken or gullied sandy upland
Ca	Choteau very fine sandy loam, gently sloping
Cb	Choteau very fine sandy loam, nearly level
Cc	Cleburnes fine sandy loam
Cd	Collinsville and Bates soils, gently sloping
Ce	Collinsville and Talihina soils, sloping
Cf	Collinsville and Talihina soils, strongly sloping
Da	Darnell and Pottsville soils, sloping
Db	Darnell and Pottsville soils, strongly sloping
Dc	Dennis and Okemah loams, gently sloping
Dd	Dennis and Okemah loams, sloping
De	Dennis and Okemah loams, sloping, severely eroded
Df	Dougherty and Stidham fine sandy loams, gently sloping
Dg	Dougherty and Stidham fine sandy loams, nearly level
Dh	Dougherty and Stidham fine sandy loams, sloping
Dk	Dougherty and Stidham loamy fine sands, gently sloping
Dl	Dougherty and Stidham loamy fine sands, nearly level
Ea	Eufaula loamy fine sand, gently sloping
Eb	Eufaula loamy fine sand, strongly sloping
Ga	Gullied bottom land
Ma	Mason clay loam
Mb	Mason silt loam
Na	Neosho silt loam
Oa	Oil-waste land
Ob	Okemah and Woodson clay loams
Pa	Port clay loam
Pb	Pulaski fine sandy loam
Ra	Reinach very fine sandy loam
Rb	Roebuck clay
Sa	Stephenville and Darnell fine sandy loams, gently sloping
Sb	Stephenville and Darnell fine sandy loams, sloping
Sc	Stephenville and Darnell fine sandy loams, sloping, severely eroded
Ta	Teller silt loam, gently sloping
Tb	Teller silt loam, nearly level
Tc	Teller silt loam, sloping
Va	Vanoss silt loam, gently sloping
Vb	Vanoss silt loam, nearly level
Vc	Verdigris clay loam
Vd	Verdigris fine sandy loam
Ve	Verdigris silt loam
Wa	Riverwash
Ya	Yahola clay loam
Yb	Yahola very fine sandy loam

WORKS AND

Roads
- Good motor
- Poor motor
- Trail
- Marker, U. S.

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferry
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
- School
- Church
- Station

Mine and Quarry
- Shaft
- Dump
- Prospect

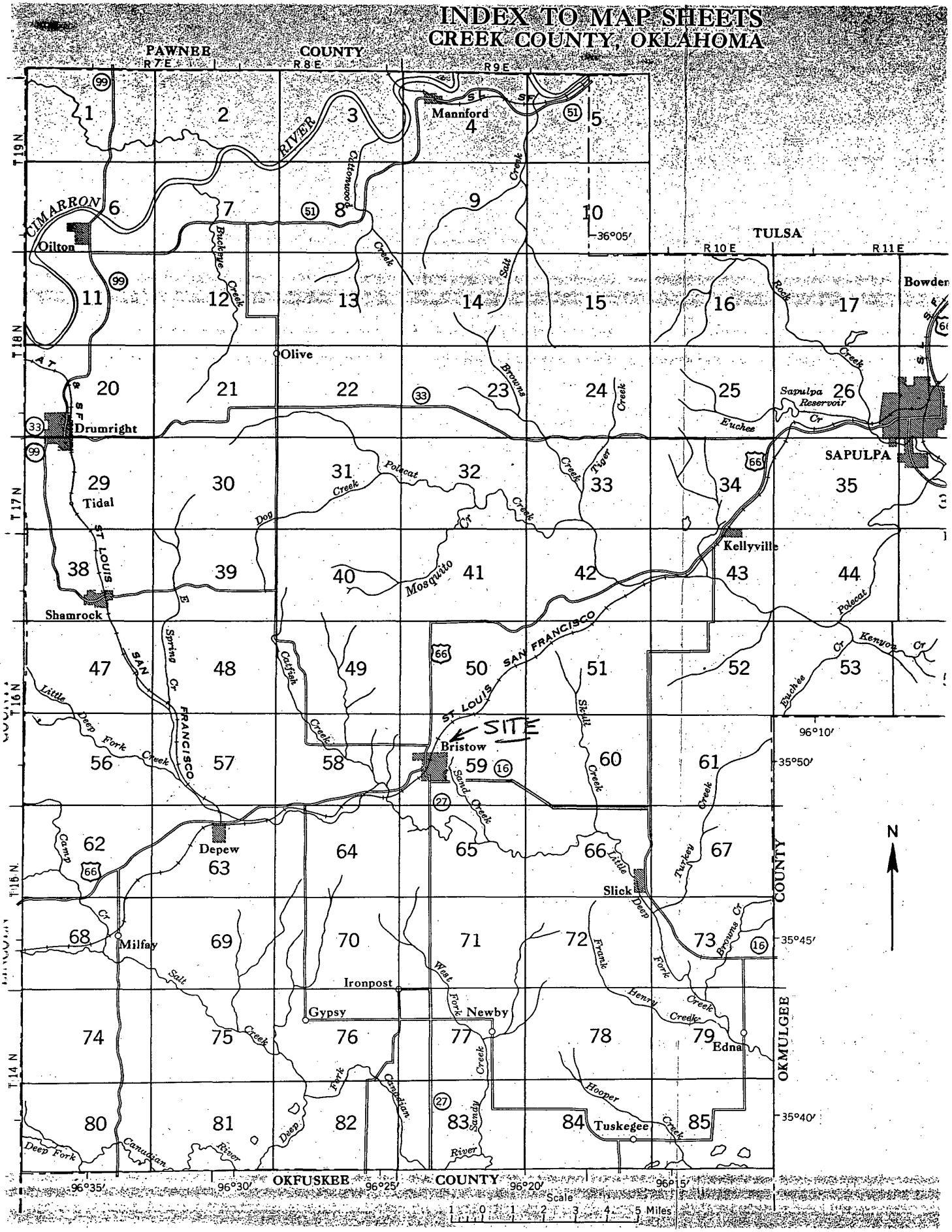
Pits, gravel or other
- Power line
- Pipeline
- Cemetery
- Dam
- Levee
- Tank
- Oil well
- Windmill
- Canal lock (point upstream

Soils surveyed 1940-1949 by O. H. Brensing, Dale Scriven, E. C. Talley, Oklahoma Agricultural Experiment Station; H. P. Mikles, Soil Conservation Service, and H. M. Galloway, Oklahoma Agricultural Experiment Station and U. S. Department of Agriculture.
Correlation by James Thorp, U. S. Department of Agriculture.

Soil map constructed by Cartographic Division, Soil Conservation Service, USDA, from 1949 aerial photographs. Controlled mosaic based on polyconic projection, 1927 North American datum.

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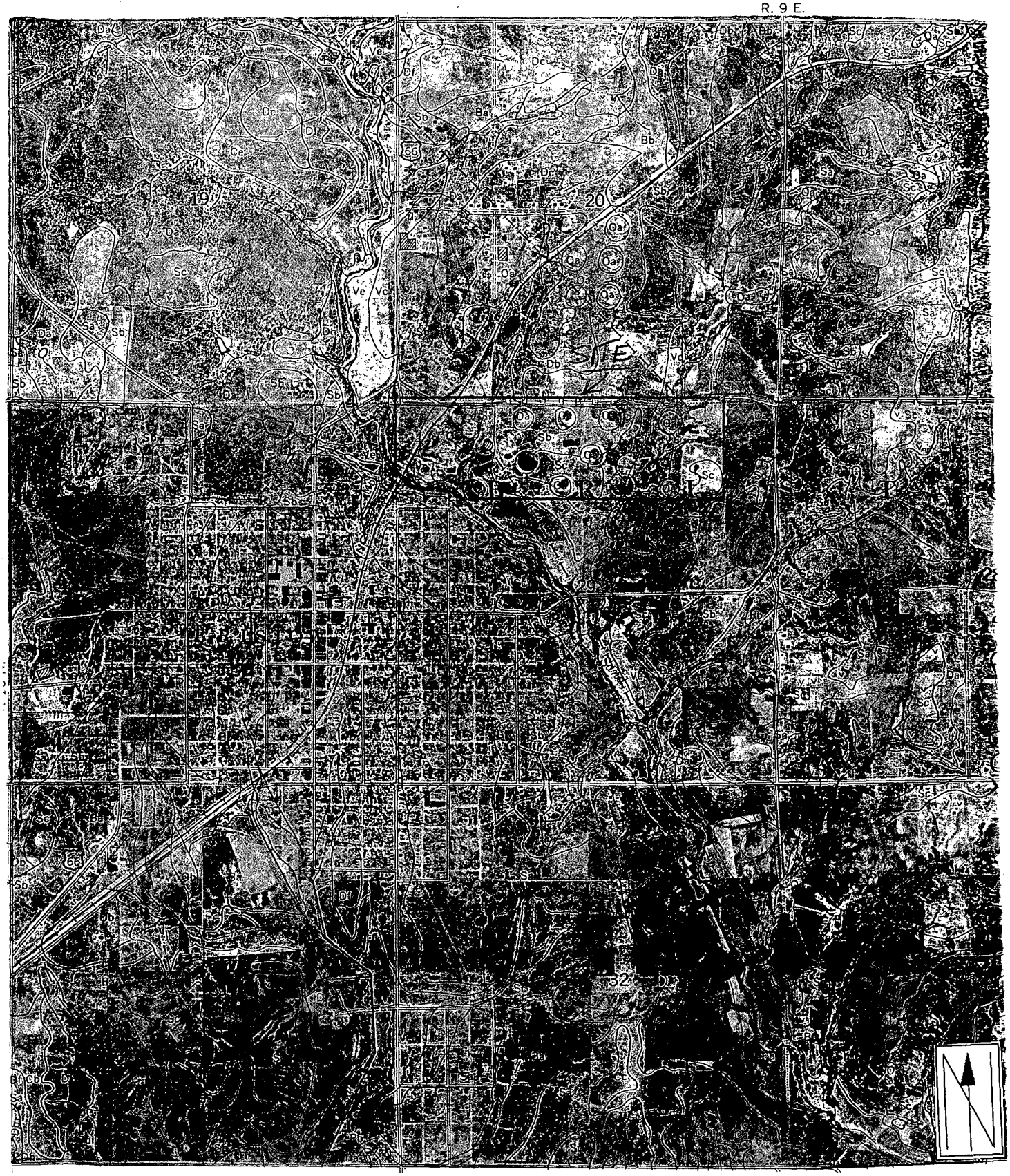
INDEX TO MAP SHEETS
CREEK COUNTY, OKLAHOMA



000122

CREEK COUNTY, OKLAHOMA

R. 9 E.



0 ½ 1 Mile Scale 1:20 000 0

000123

Reference 11

MEMORANDUM

November 8, 1994

To: Rita Kottke (Senior Environmental Specialist), Waste Management Division, Site Assessment Unit.

From: David Cates (Environmental Specialist), Waste Management Division, Site Assessment Unit.

Re: Hydrogeology and Ground Water Use. **Site:** Wilcox Oil Company Refinery. **Location:** Bristow (NE/4 NW/4 NW/4 of Section 29, Township 16 North, Range 9 East of Creek County, Oklahoma).

Regional Hydrogeology

Principal ground water resources in Creek County, as mapped by Johnson (1983), include alluvial and terrace deposits where present throughout the county and the Pennsylvanian age Vamoosa-Ada aquifer in the west. The alluvial and terrace deposits are unconsolidated while the Vamoosa-Ada is considered a bedrock aquifer. Older Pennsylvanian rocks, including the Barnsdall Formation, produce ground water for municipal, domestic and industrial supplies in the central and eastern part of the county.

Quaternary age alluvial aquifers are the youngest in Creek County. Alluvial deposits are wedge shaped layers of sand, silt, clay, and gravel found along the Deep Fork and Cimarron Rivers and their major tributaries. Sediment is continually being eroded, reworked, and redeposited by the rivers and streams. Alluvial deposits range from 0 to 100 feet in thickness for the Deep Fork and Cimarron Rivers, and less for minor streams (Oakes, 1959).

Terrace deposits were formed when ancient streams deposited alluvium consisting mostly of sand, silt, clay, and gravel. Since the ancient streams were the ancestors of the Deep Fork and Cimarron Rivers, terrace deposits are located adjacent to these present-day rivers and streams, but at higher elevations. Like the younger alluvium, the composition and thickness of terrace deposits can vary greatly over short lateral distances.

Water suitable for domestic purposes can be found in the alluvial and terrace aquifers. Ground water in these aquifers is usually found under unconfined (water table) conditions and is susceptible to contamination from surface sources. Alluvial and terrace sediments are moderately permeable and wells yield about 25 to 50 gallons of water per minute (gpm) (Bingham and Moore, 1983).

Underlying the alluvial and terrace deposits in Creek County is bedrock assigned to the Virgilian and Missourian Series of the Pennsylvanian age. These strata outcrop at the surface with the progressively younger beds exposed to the west. The Pennsylvanian strata strike north-south and regional dip is westerly about 30 to 90 feet/mile (Oakes, 1959). However, east dips are encountered around surface folds and faults.

Most of the surface faults in Creek County trend northwest to southeast. They are several miles long with up to 100 feet of vertical displacement which decreases with depth (D'Lugosz et al., 1986). Larger subsurface faults trending northeast to southwest exist at depth but have no direct influence on the near surface ground water hydrology except possibly in the very eastern part of the county. The surface faults, however, may retard ground water flow or provide conduits for rapid recharge depending on the degree of fracturing, brecciation and shearing of the near surface rocks along the fault zones.

The Vamoosa-Ada aquifer consists of, in ascending order, the uppermost part of the Barnsdall Formation, the Tallant Formation. the Vamoosa Formation, the Ada Group and the lower part of the Vanoss Group. The Vamoosa Formation and the Ada Group make up the bulk of the aquifer. The Vamoosa-Ada strata outcrop in the western one third to one half of Creek County and are predominantly composed of red and brown coarse to fine grain well sorted sandstones interbedded with dark red sandy to silty shale. Individual sandstone beds range in thickness from 5 to 60 feet and tend to be either thick and lenticular or thin with large lateral extent. Chert conglomerates and coarse grained sandstones are present near the base of the Vamoosa Formation in the southern part of the county. Oakes (1959) reported that sandstone percentage, bed thickness, and grain size tend to decrease to the north. The thickness for the aquifer ranges between 200 in the south to between 500 and 800 feet elsewhere (Johnson, 1983).

Because of their resistance to weathering the sandstones form east facing escarpments which are a few miles long or, in some cases, extend across the county. The intervening valleys are underlain by silty sandstones and shales. The land is covered by grasses, scrubby blackjack and oak trees.

Ground water under unconfined conditions exists in the outcrop area of the aquifer and for a short distance west of the point where the aquifer is overlain by less permeable rocks. However, confined conditions generally exist at depth even under the outcrop areas because of the presence of shale beds. The occurrence and movement of ground water is controlled by regional and local geologic structures, lateral and vertical distribution of sandstone and shale units, and the physical character of the rocks. The physical characteristics also control the hydraulic properties of the aquifer and are directly related to sedimentary source and depositional environment.

The average hydraulic conductivity for the Vamoosa-Ada aquifer is 3 ft/day based on well test data and an average value for storage coefficient for the confined part of the aquifer is 0.0002 (D'Lugosz et al., 1986). Specific yield for the unconfined part of the aquifer was estimated by D'Lugosz et al. (1986) to be a value of 0.12 and specific capacities for gun perforated wells were reported to be about 1 (gal/min)/ft of drawdown. Wells commonly yield 25 to 150 gpm; and some may yield as high as 300 gpm locally (Johnson, 1983). Water wells in the Vamoosa-Ada are from 30 to 750 feet deep (Bingham and Moore, 1975).

Water from the Vamoosa-Ada aquifer is of generally good quality, ranging in total dissolved solids (TDS) concentrations between 200 to 1,000 milligrams per liter (mg/l) (Johnson, 1983). Ground water composition tends to be dominated by sodium, calcium, and bicarbonate (D'Lugosz et al., 1986). However, sodium, sulfate, and chloride may constitute high proportions in places.

Underlying the Vamoosa Formation are the rocks of the Missourian Series which consist of, in descending order, the Ochelata Group and the Skiatook Group. The strata of the Ochelata Group (in descending order) are the Tallant, Barnsdall, Wann, Iola and Chanute Formations. The rocks of the Skiatook Group consist of (in descending order) the Dewey, Nellie Bly, Hogshooter, Coffeyville, Checkerboard and Seminole Formations. These formations outcrop successively from west to east in the eastern two thirds to one half of the county.

The lithology of these strata is similar to that of the Vamoosa, being composed of resistant sandstone beds and clayey, silty, sandy shale. The sandstone beds tend to be coarse grained, conglomeratic and massive in the south. In the north sandstone units contain thin beds of fine to medium grained sandstone which are interbedded with silty and sandy shale; the shale content being greater in this direction. The Missourian Series strata contain several limestone formations and some coal beds. The shale, limestone and coal beds in the Pennsylvanian section affect ground water by acting as confining beds (aquitards).

In contrast to the Vamoosa-Ada aquifer, none of the older rocks are identified as principal bedrock aquifers (Johnson, 1983). However, wells yield 25 to 50 gpm at depths from 20 to 200 feet from these formations. The quality of ground water is more variable, with some generally good quality water produced just east of the Vamoosa-Ada (TDS of 150 to 500 mg/l) and fair to poor water (650 to 50,000 mg/l TDS) produced in the eastern one third of the county (Bingham and Moore, 1975). The composition of the fresh ground water tends to be mainly made up of calcium, magnesium and bicarbonate but indications of contamination are evidenced by water with large TDS concentrations of which sodium, sulfate and chloride constitute major proportions (Morton, 1986).

Ground water is found at shallow depths in Creek County, usually within 25 feet of ground surface. However, deeper wells may be required to obtain producible quantities of ground water. The base of fresh water (i.e., water containing less than 1,000 mg/l TDS) is encountered at depths of 200 to 500 feet below ground level in the eastern part of Creek County, but is found at depths of 500 to 1,000 feet in the west (Bingham and Moore, 1983). Areas with a deep zone of fresh water tend to be correlated with thick sandstone accumulations (D'Lugosz et al., 1986). Below fresh water is a zone of brackish water followed by brines at greater depths. These deep formation brines constitute a large potential source of contamination of fresh ground water as a result of oil-field activities (Morton, 1986).

The regional ground water flow direction is from west to east as is surface drainage. However, locally the shallow ground water flows in various directions to points of discharge into surface water bodies, such as rivers, creeks, lakes, and ponds. Impacted ground water discharging into a creek may serve as source of surface water pollution.

Almost all recharge to ground water comes from downward infiltration of precipitation that falls on the land surface. However, most of the precipitation is lost to evapotranspiration and surface runoff, thus only about 4 to 10 % reaches the zone of saturation (D'Lugosz et al., 1986). Recharge to the Pennsylvanian aquifers occurs where the formations outcrop. This constitutes a large area in Creek County. Most recharge to ground water occurs during the winter months when evapotranspiration is low.

The shallow subsurface soils and rocks of Creek County have not been reported to be prone to solution cavities. Although high sulfate values in ground water from the Pennsylvanian rocks may be attributed to gypsum dissolution, sink holes have not been reported in the area. Furthermore, a review of the United States Geological Survey topographic map for the site does not show geomorphology of karst terrain. However, clays of outcropping Pennsylvanian rocks are prone to formation of desiccation cracks during dry periods. Also, zones of highly fractured rock may exist near surface faults.

Site Hydrogeology and Ground Water Use

The Barnsdall Formation outcrops under the Wilcox Oil Company Refinery site. The Barnsdall Formation is heterogeneous in character containing sandstone beds collectively known as the Okesa Sandstone Member which are interbedded with silty and sandy shales. Alluvial deposits of the Sand and Little Deep Fork Creeks are present to the south of the site. The site has been spotted on the following reference material: A) Geologic Map of Creek County (Oakes, 1959); B) Maps Showing Principal Ground Water Resources and Recharge Areas in Oklahoma (Johnson, 1983); and C) Geologic Map of the Oklahoma City Quadrangle, (Bingham and Moore, 1975). These maps indicate that the Vamoosa Formation outcrops about one mile to the west of the site. However, the site is shown to be within the potential recharge area for the Vamoosa-Ada aquifer (Johnson, 1983).

The Barnsdall Formation is the principal source of ground water to the eight active municipal water supply wells of Bristow, Oklahoma according to published records. These wells are located within 2 miles west of the site. One of the wells is located about one quarter mile southwest of the site in the NE/4 SE/4 NE/4 of section 30-T16N-R9E. This well, City of Bristow #7, has been capped and is not active at this time. However, it is capable of producing if re-entered according to Danny Trout of the Bristow Department of Public Works. Ground water from the Barnsdall Formation is produced from a domestic well located within one quarter mile north of the site in the SW/4 SW/4 SW/4 of section 20-T16N-R9E. The OWRB Multipurpose Water Well report for this well indicates that it was drilled in 6/2/83 to a depth of 230 feet. Another municipal water supply well was drilled in the center of section 29-T16N-R9E to a depth of 200 feet; but this well has been plugged and abandoned. It is located within one half mile southeast of the site and its production history is unknown.

The shallow ground water system near the site is found in upper weathered bedrock zones and alluvial deposits at depths less than 20 feet in nearby domestic wells. The shallow ground water system is under unconfined (water table) conditions and flow at the site is probably toward the south to southeast, discharging into Sand Creek nearby or the Deep Fork located about 3 miles farther south of the site (professional judgement). Ground water in the Barnsdall Formation is probably under confined conditions at depth due to the presence of shale beds within the formation. The deep ground water may be influenced by pumping from Bristow's water wells and the domestic well cited above; thus the flow direction may be to the southwest, west or north depending on the extent of well pumpage at any specific time.

The shallow aquifer at the site is predominantly composed of sandstone and shale which is

weathered near the ground surface, and is probably not in direct hydraulic connection with the deeper parts of the underlying aquifer in the Barnsdall Formation. Based on professional judgement, contaminants in the shallow soil or ground water environments at the site could migrate to the adjacent alluvial aquifers or the shallow portions of the underlying Barnsdall aquifer. Also, improperly constructed water wells and oil wells in the vicinity could serve as direct conduits for migration of potential contaminants to the aquifers. In fact, as indicated on the Herdon map (which is included in the reference material), there are two abandoned oil-exploration wells located within one quarter mile southeast of the site. It is unlikely, however, that contaminants at the site could reach the Vamoosa-Ada aquifer since it outcrops west of the site and overland flow is locally to the south and southeast. Also, a shale section 30 to 60 feet in thickness within the Tallant Formation may act as a protective barrier against contamination of the Vamoosa-Ada aquifer from below.

References

Bingham R. and Moore R., 1975, Hydrologic Atlas 4, "Reconnaissance of the Water Resources of the Oklahoma City Quadrangle Central Oklahoma", Oklahoma Geological Survey.

D'Lugosz, J.J., McClaflin, R.G., and Marcher, M.V., 1986, "Geohydrology of the Vamoosa-Ada Aquifer East-Central Oklahoma", Oklahoma Geological Survey Circular #87.

Johnson, K., 1983, "Maps Showing Principal Ground-Water Resources and Recharge Areas in Oklahoma", Oklahoma State Department of Health, Complied by Kenneth S. Johnson, Oklahoma Geological Survey, 1983.

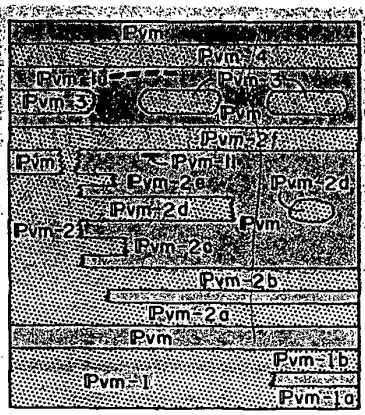
Morton, R.B., 1986, "Effects of Brine on the Chemical Quality of Water in Parts of Creek, Lincoln, Okfuskee, Payne, Pottawatomie, and Seminole Counties, Oklahoma", Oklahoma Geological Survey Circular #89.

Oakes, M.C., 1959, "Geology and Mineral Resources of Creek County, Oklahoma", Oklahoma Geological Survey Bulletin #81.

SYSTEM: PENNSYLVANIAN

SERIES: VIRGIL

GROUP: MISSOURI



VAMOOSA FORMATION

(Resistant sandstone units [Pvm-1, 2, 3, 4] interbedded and intergrading with nonresistant sandstone and sandy, silty shale [Pvm]. In upper part are two sandy limestone beds [Pvm-ll] and [Pvm-lu]. Mapped sandstone units consist of closely related lenses approximately but not strictly in a constant stratigraphic interval.)

unconformity

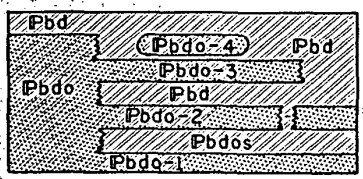
SERIES: OSAGE

GROUP: CHEROKEE



TALLANT FORMATION

(Lower sandstone member [Ptl-1] containing shale lens [Ptl-1a], and upper shale member [Ptl-2] containing a few thin sandstones.)



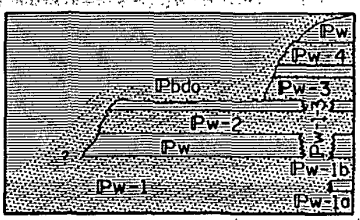
BARNSDALL FORMATION

(Unnamed shale member [Pbd] and Okesa sandstone member [Pbdo]. South of Little Deep Fork Creek the Okesa may include representatives of the lower part of the Wann formation. North of Little Deep Fork Creek the Okesa consists of mappable sandstones [Pbdo-1, 2, 3, 4] and shale [Pbdos] as indicated. The top of the Okesa is not everywhere the same bed.)

unconformity

SERIES: OSAGE

GROUP: OCHELATA



WANN FORMATION

(Sandstone units [Pw-1, 2, 3, 4] and intervening units of sandy shale [Pw]. Overlain unconformably by Okesa sandstone member of Barnsdall formation [Pbdo]. Remnants of the basal part of the Wann present south of Little Deep Fork Creek, if any, are mapped with the Okesa.)

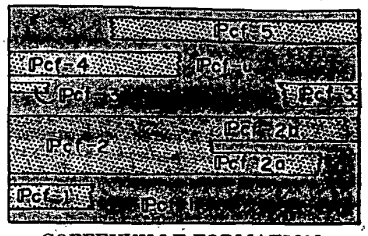
SYSTEM: PENNSYLVANIAN

SERIES: MISSOURI

GROUP: SKIATOOK

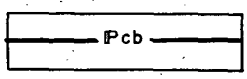
HOGSHOOTER FORMATION

(Nellie Bly formation: Shale, sandstone, and sparse li stone. The lower shale unit [Pnb-l] bifurcates southward contains a sandstone lens [Pnb-1]. Sandstone unit [Pnb- composed of resistant and nonresistant sandstone and tremely sandy shale; bases of resistant ledges within the indicated by black lines. The middle shale unit [Pnb-m tains four mapped sandstone lenses [Pnb-3], not prec equivalent. Sandstone unit [Pnb-] contains local sandy l stone beds. The upper shale unit Pnb-u contains two ma calcareous sandstone lenses [Pnb-5], not precisely equiva and one mapped sandy limestone bed Pnb-ls. Hogshooter formation Ph: Represented by gray sandy l stone and calcareous sandstone which crop out from pla place in shale above sandstones of the Coffeyville forma and below sandstones of the Nellie Bly formation.)



COFFEYVILLE FORMATION

(Units Pcf-l, u are composed of silty, sandy shale. U Pcf 1, 2, 3, 4, 5 are composed of resistant sandstone le nonresistant sandstone, and extremely sandy, silty s Bases of resistant ledges within units are indicated by l lines. Neither top nor base of any sandstone unit is the bed throughout.)



CHECKERBOARD LIMESTONE

(A single massive bed of dark blue fossiliferous limes generally about 2.5 feet thick.)



SEMINOLE FORMATION

(Sandstone and shale, undifferentiated. Contains also s thin impure fossiliferous limestone lenses of local occurr Dawson coal shown by a single heavy dashed black li

unconformity

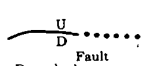
SERIES: DES MOINES

GROUP: MARMATON



HOLDENVILLE SHALE

(Dominantly dark gray shale. Only the upper few feet out in Creek County, southeast of Mounds.)



Fault
Dotted where concealed;
U, upthrown side
D, downthrown side

Quarry



U. S. highway



State highway

Paved road

Improved road

Unimproved road, trail

Railroad

Abandoned Railroad

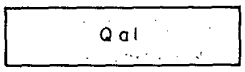
Electric Railway

WILLIAMS & HEINTZ LITHOGRAPH CORPORATI

000130



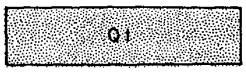
EXPLANATION



ALLUVIUM

nd, silt, and clay on flood plains of present streams.)

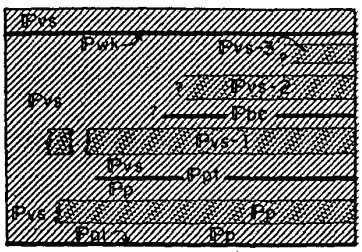
unconformity



TERRACE DEPOSITS

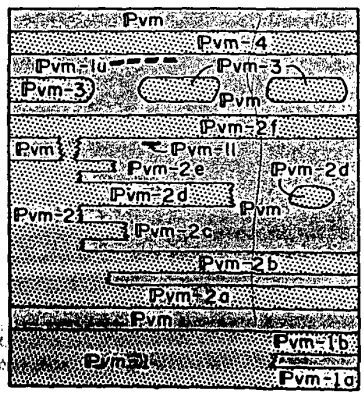
nd, silt, and clay deposited by ancient streams. Includes some eolian deposits.)

unconformity



VANOSS FORMATION (LOWER PART)
AND
PAWHUSKA FORMATION

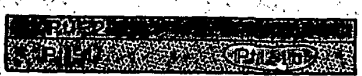
noss formation: Gray to red shale [Pvs] and sandstones -1, 2, 3]. Intergrades laterally with the Pawhuska forma- and interfingers with the Bird Creek limestone [Pbc]. Contains Wakarusa limestone [Pwk] in upper part. huska formation: Turkey Run limestone member [Ppt] at op and Lecompton limestone member [Ppl] at the base, rated by one or more sandstones and two or more shales [Pp].)



VAMOOSA FORMATION

tant sandstone units [Pvm-1, 2, 3, 4] interbedded and rading with nonresistant sandstone and sandy, silty [Pvm]. In upper part are two sandy limestone beds -l] and [Pvm-lu]. Mapped sandstone units consist of related lenses approximately but not strictly in a constant stratigraphic interval.)

unconformity



TALLANT FORMATION

sandstone member [Ptl-1] containing shale lens a], and upper shale member [Ptl-2] containing a few thin sandstones.)



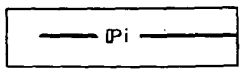
000131

PENNSYLVANIAN SYSTEM

MISSOURI SERIES

SKIATOOK GROUP

OCHELATA GROUP



IOLA FORMATION

(Sandy limestone, calcareous siltstone, fossiliferous sandstone, and shale. In Creek County the boundaries are indefinite and in part gradational.)



CHANUTE FORMATION

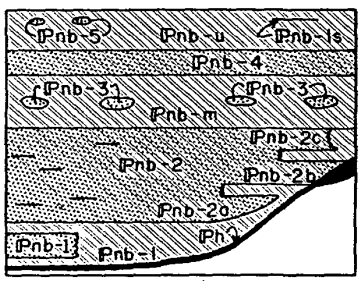
(Sandstone [Pch-1] and shale [Pch-2].)

unconformity



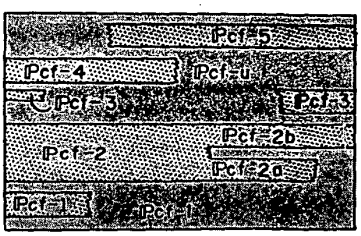
DEWEY FORMATION

(Lower part sandstone, upper part shale. Contains a few local thin sandy limestone beds.)



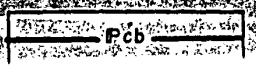
NELLIE BLY FORMATION
AND
HOGSHOOTER FORMATION

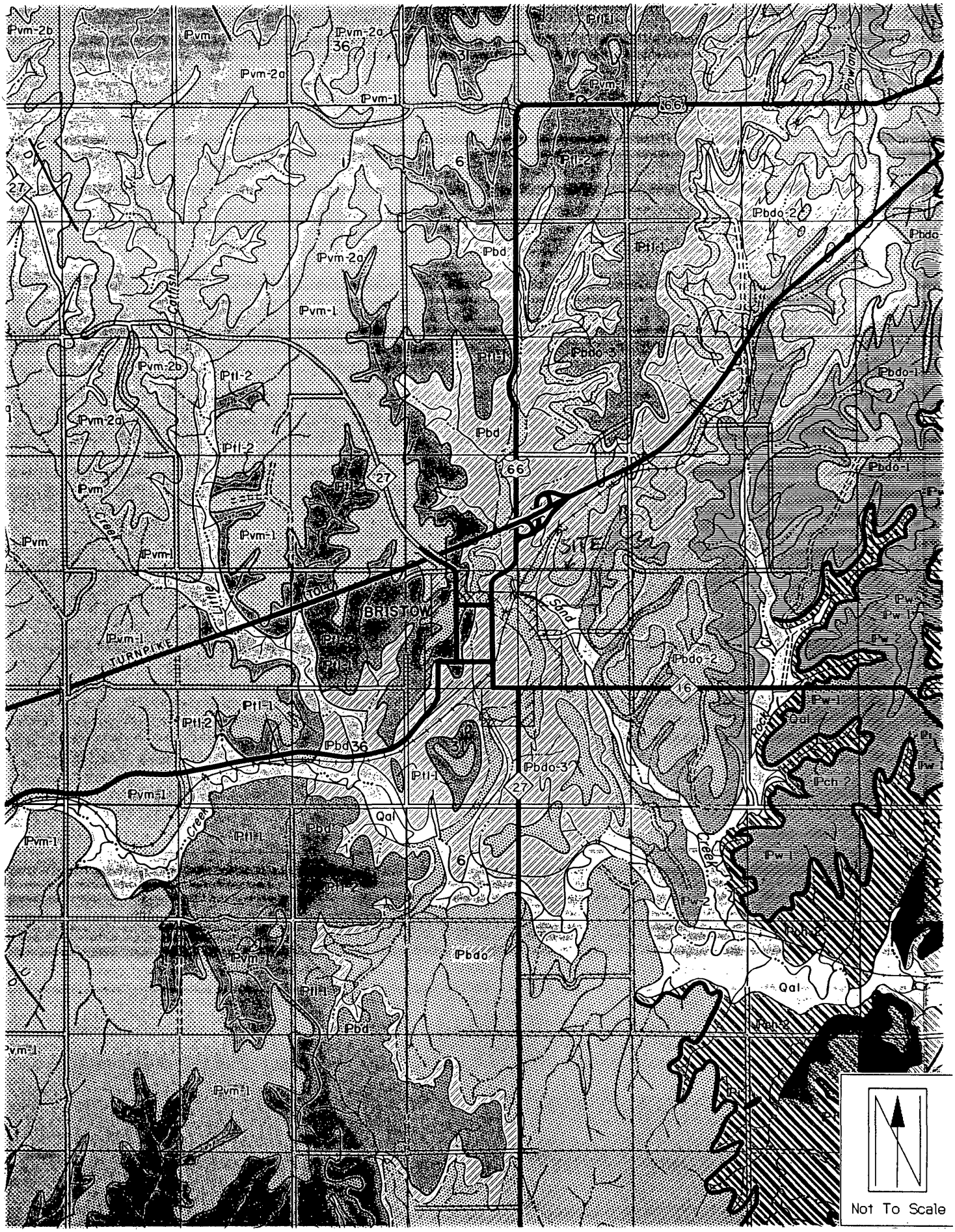
(Nellie Bly formation: Shale, sandstone, and sparse limestone. The lower shale unit [Pnb-l] bifurcates southward and contains a sandstone lens [Pnb-1]. Sandstone unit Pnb-2 is composed of resistant and nonresistant sandstone and extremely sandy shale; bases of resistant ledges within the unit indicated by black lines. The middle shale unit Pnb-m contains four mapped sandstone lenses [Pnb-3], not precisely equivalent. Sandstone unit Pnb-4 contains local sandy limestone beds. The upper shale unit Pnb-u contains two mapped calcareous sandstone lenses [Pnb-5], not precisely equivalent, and one mapped sandy limestone bed Pnb-ls.
Hogshooter formation Ph: Represented by gray sandy limestone and calcareous sandstone which crop out from place to place in shale above sandstones of the Coffeyville formation and below sandstones of the Nellie Bly formation.)



COFFEYVILLE FORMATION

(Units Pcf-l, u are composed of silty, sandy shale. Units Pcf 1, 2, 3, 4, 5 are composed of resistant sandstone lenses, nonresistant sandstone, and extremely sandy, silty shale. Bases of resistant ledges within units are indicated by black lines. Neither top nor base of any sandstone unit is the same bed throughout.)



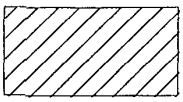

Pvm-2b
Pvm
Pvm-2a
Pvm-1
Ptl-1
Ptl-2
Pbd
Pbdo-2b
Pbdo
Pbdo-3
Pbdo-1
Pbdo-2
Pbdo
Pw-1
Pw
Pch-2
Qal
Pch-3
SITE
BRISTOW
TURNPIKE
Creek
Sand
Rowland
Cotton
36
27
66
6
16

Not To Scale

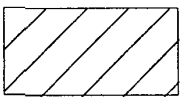
EXPLANATION

RECHARGE AREAS

Patterns of red lines on the map show known or potential recharge areas for the various bedrock aquifers.



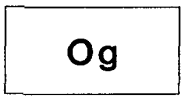
Recharge Areas. This pattern shows areas that are known to be part of the recharge area for a bedrock aquifer: includes outcrops of the aquifer and of overlying porous and permeable rocks hydraulically connected with the aquifer.



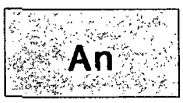
Potential Recharge Areas. This pattern shows areas that may be part of the recharge area for a bedrock aquifer: includes areas where confining strata may contain pathways for downward movement of water to the aquifer, and safety zones (generally extending 4 miles beyond the known limits of the aquifer) that may overlie unknown extensions of the aquifer or rocks hydraulically connected with the aquifer.

BEDROCK AQUIFERS

Colored areas on the map show distribution of bedrock aquifers, which are the rock units generally considered favorable or moderately favorable for development of ground-water resources. Bedrock aquifers are listed below by geologic age from oldest to youngest. References, listed at the end of each aquifer description, include Hydrologic Atlases (HA) and Other Reports that provide more detailed information. All references are given in the 4-page pamphlet that accompanies this map.



Ogallala Formation (Tertiary in age). Loosely cemented layers of fine- to medium-grained sand, silt, clay, and gravel in western Oklahoma and Panhandle; locally contains thin beds of caliche. Thickness generally ranges from 100 to 700 ft. in Panhandle and 100 to 400 ft. elsewhere. Wells commonly yield 25 to 1,500 gpm of water that is of good quality (generally less than 500 mg/L dissolved solids). Recharge areas include all areas where Ogallala crops out or is covered by younger porous and permeable sediments. References: HA-5, HA-8, HA-250, HA-373, HA-450; also Other Reports 12, 13, 17, 21, 22, 23, 24, 25, 26, 28, 30, 31, 32, 33, 40, 42, 43, 52, 54, 55, 61, 66.



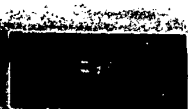
Antlers Sandstone (Cretaceous in age). Loosely cemented fine-grained sand and sandstone with some layers of shale and clay in southeastern Oklahoma. The aquifer includes underlying Holly Creek Formation in T. 6 S., Rs. 24-27 E., of eastern McCurtain County. Antlers aquifer typically ranges from 200 to 700 ft. thick. Wells commonly yield 10 to 50 gpm, but in some areas they may yield up to 400 gpm. The water is of good quality (generally 200 to 1,000 mg/L dissolved solids). Recharge areas include outcrops of Antlers Sandstone and overlying Goodland Limestone; potential recharge areas include areas where aquifer underlies younger Cretaceous strata in the south. References: HA-3, HA-9; also Other Reports 9, 20, 33, 61.



Elk City Sandstone (Permian in age). Fine-grained sandstone with minor amounts of silt and clay in southwestern Oklahoma. Maximum thickness is about 185 ft. Wells commonly yield 25 to 300 gpm of water that is of good quality (generally less than 500 mg/L dissolved solids). Recharge areas include all outcrops of Elk City Sandstone. References: HA-5; also Other Reports 33, 47, 61.



Rush Springs Sandstone and Marlow Formation (Permian in age). Fine-grained sandstone with some layers of gypsum, shale, and dolomite in western Oklahoma. The amount of shale increases in Dewey County and farther north. Thickness of aquifer ranges from 400 ft. in the south to 200 ft. in the north. Wells commonly yield 25 to 300 gpm of water that is of good quality (generally 200 to 1,000 mg/L dissolved solids), although in some areas of Dewey County and farther north the water locally is of fair to poor quality (1,500 to 4,000 mg/L dissolved solids). Recharge areas include Rush Springs and Marlow outcrops and extend to limits of outcrop on south and east; recharge areas also include outcrops of gypsum and other rocks of overlying Cloud Chief Formation in parts of Caddo, Custer, and Washita Counties. Potential recharge areas in the west extend 4 miles beyond the western limit of the aquifer. References: HA-3, HA-5, HA-6, HA-8; also Other Reports 6, 7, 15, 19, 33, 41, 46, 50, 53, 61, 64, 69.

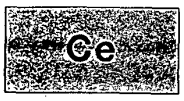


Blaine and Dog Creek Formations (Permian in age). Gypsum and dolomite layers (locally fractured or cavernous) interbedded with shale in southwestern Oklahoma. The total thickness of the aquifer (the lower part of the Dog Creek Formation and the entire Blaine Formation) is about 250 ft. Wells commonly yield 300 to 2,500 gpm of water that is of fair to poor quality (generally

in Dewey County and farther north. Thickness of aquifer ranges from 400 ft. in the south to 200 ft. in the north. Wells commonly yield 25 to 300 gpm of water that is of good quality (generally 200 to 1,000 mg/L dissolved solids), although in some areas of Dewey County and farther north the water locally is of fair to poor quality (1,500 to 4,000 mg/L dissolved solids). Recharge areas include Rush Springs and Marlow outcrops and extend to limits of outcrop on south and east; recharge areas also include outcrops of gypsum and other rocks of overlying Cloud Chief Formation in parts of Caddo, Custer, and Washita Counties. Potential recharge areas in the west extend 4 miles beyond the western limit of the aquifer. References: HA-3, HA-5, HA-6, HA-8; also Other Reports 6, 7, 15, 19, 33, 41, 46, 50, 53, 61, 64, 69.



Blaine and Dog Creek Formations (Permian in age). Gypsum and dolomite layers (locally fractured or cavernous) interbedded with shale in southwestern Oklahoma. The total thickness of the aquifer (the lower part of the Dog Creek Formation and the entire Blaine Formation) is about 250 ft. Wells commonly yield 300 to 2,500 gpm of water that is of fair to poor quality (generally 1,500 to 6,000 mg/L dissolved solids). Recharge areas are outcrops of Blaine, Dog Creek, Rush Springs, and Marlow Formations that overlie the aquifer. Potential recharge areas include other outcrops of Rush Springs, Marlow, Dog Creek, and Blaine strata that dip toward the aquifer. References: HA-5, HA-6; also Other Reports 33, 56, 61, 62.



Cedar Hills Sandstone (Permian in age). Fine-grained sandstone interbedded with layers of siltstone and shale in northwestern Oklahoma. Thickness typically is about 180 ft. Wells commonly yield 150 to 300 gpm of water that is of good to poor quality (generally 500 to 3,000 mg/L dissolved solids). Recharge areas include Cedar Hills outcrops and extend to limits of outcrop on east; potential recharge areas in south and west extend 4 miles beyond the limits of aquifer. References: HA-7, HA-8; also Other Reports 15, 57, 63.



Garber Sandstone and Wellington Formation (Permian in age). Fine-grained sandstone irregularly interbedded with shale and siltstone in central Oklahoma; grades into shale to north and south. Thickness of aquifer ranges from about 300 ft. in the south to about 800 ft. in the north. Wells commonly yield 25 to 400 gpm of water that is of good quality (generally 200 to 1,000 mg/L dissolved solids). Recharge areas consist of outcrops of the aquifer and extend eastward to the approximate top of shales that make up much of the lower one-third of the Wellington Formation. Potential recharge areas include areas in the west where aquifer underlies younger Permian strata; also areas that extend 4 miles south, west, and north of aquifer limits. References: HA-4; also Other Reports 4, 5, 29, 33, 61, 67, 68.



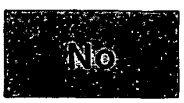
Oscar Group (Early Permian or Late Pennsylvanian in age). Area designated a consists of fine-grained sandstone interbedded with shale and siltstone in central Oklahoma; contains some conglomerate in the south. Main part of aquifer is in lower half of Oscar Group; upper half of Oscar is predominantly shale. Thickness of aquifer ranges from about 150 ft. in south to 300 ft. in north. Wells commonly yield 25 to 50 gpm of water that is of good quality (generally 300 to 1,000 mg/L dissolved solids). Recharge areas include outcrops of Oscar Group; also included are outcrops of shales and sandstones in lower part of overlying Wellington Formation that appear to be hydraulically connected with either the Oscar or the Garber-Wellington aquifer. Potential recharge areas extend 4 miles north, east, and south of aquifer limits. References: HA-4.



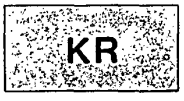
Oscar Group (Early Permian or Late Pennsylvanian in age). Areas designated b consist of interbedded sandstones and shales in south-central Oklahoma. Total thickness is 300 to 500 ft. Wells commonly yield 50 to 180 gpm of water that is of good to fair quality (generally 500 to 1,500 mg/L dissolved solids). The Oscar Group does not crop out where it is an aquifer, and thus its recharge area is uncertain. Potential recharge areas include, and extend 4 miles beyond, the known limits of the aquifer. References: HA-3, HA-6; also Other Reports 33, 61.



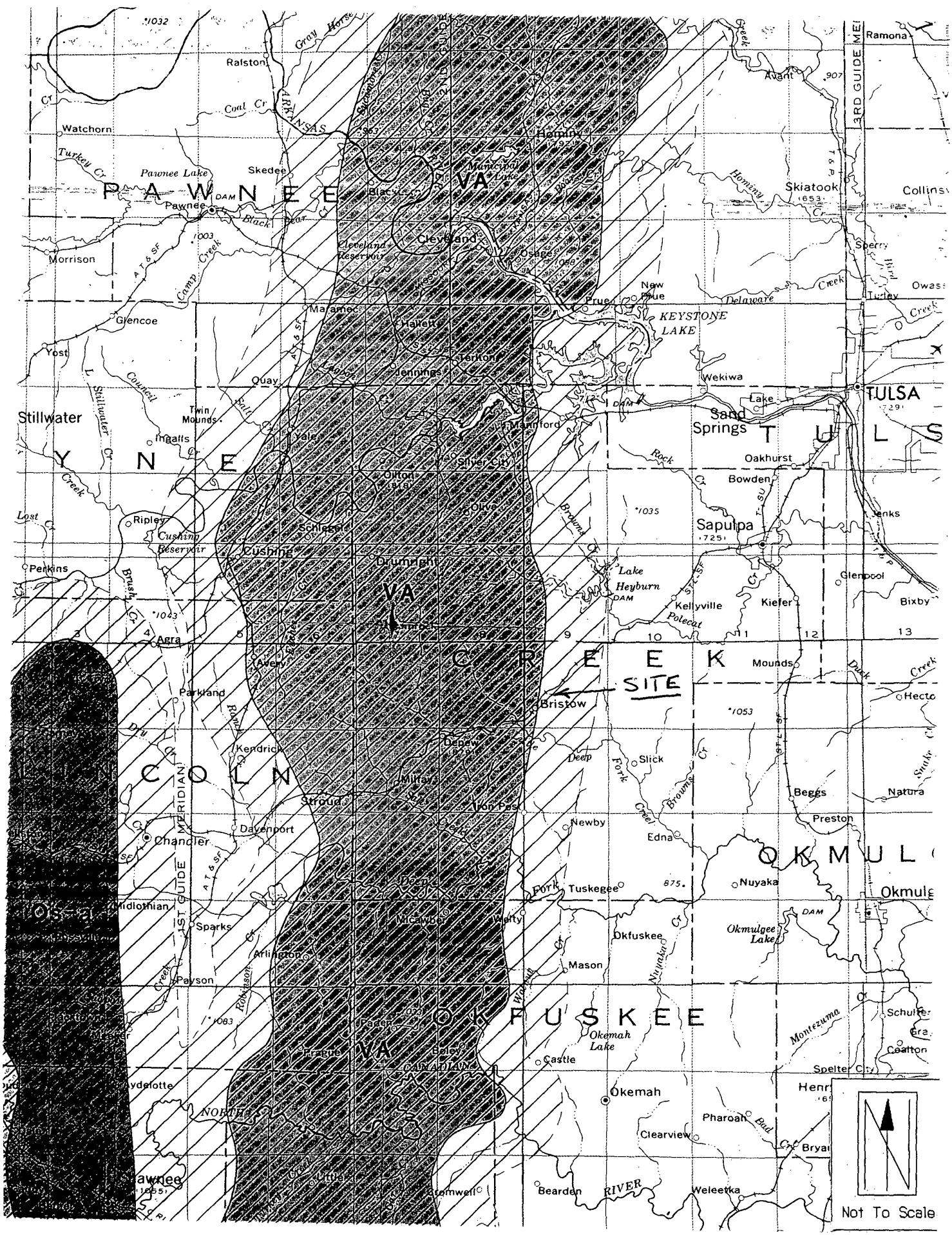
Vamoosa Formation and Ada Group (Pennsylvanian in age). Fine- to coarse-grained sandstone interbedded with shale and siltstone in central and northern Oklahoma; contains some conglomerate in the south. Mapped aquifer locally includes sandstones and shales of overlying Vanoss Group that are hydraulically connected with Vamoosa-Ada aquifer. Boundaries of aquifer shown here represent maximum extent reported on HA-4 and HA-7, or by D'Lugosz, McClaflin, and Marcher (1981). Thickness of aquifer ranges from about 200 ft. in the south to about 500 to 800 ft. elsewhere. Wells commonly yield 25 to 150 gpm, and locally yield as much as 300 gpm, of water that is of good quality (generally 200 to 1,000 mg/L dissolved solids). Recharge areas include outcrops of aquifer and, locally, some hydraulically connected rocks. Potential recharge areas extend 4 miles beyond the aquifer limits. References: HA-3, HA-4, HA-7; also Other Reports 3, 10, 11, 14, 15, 33, 38, 61.

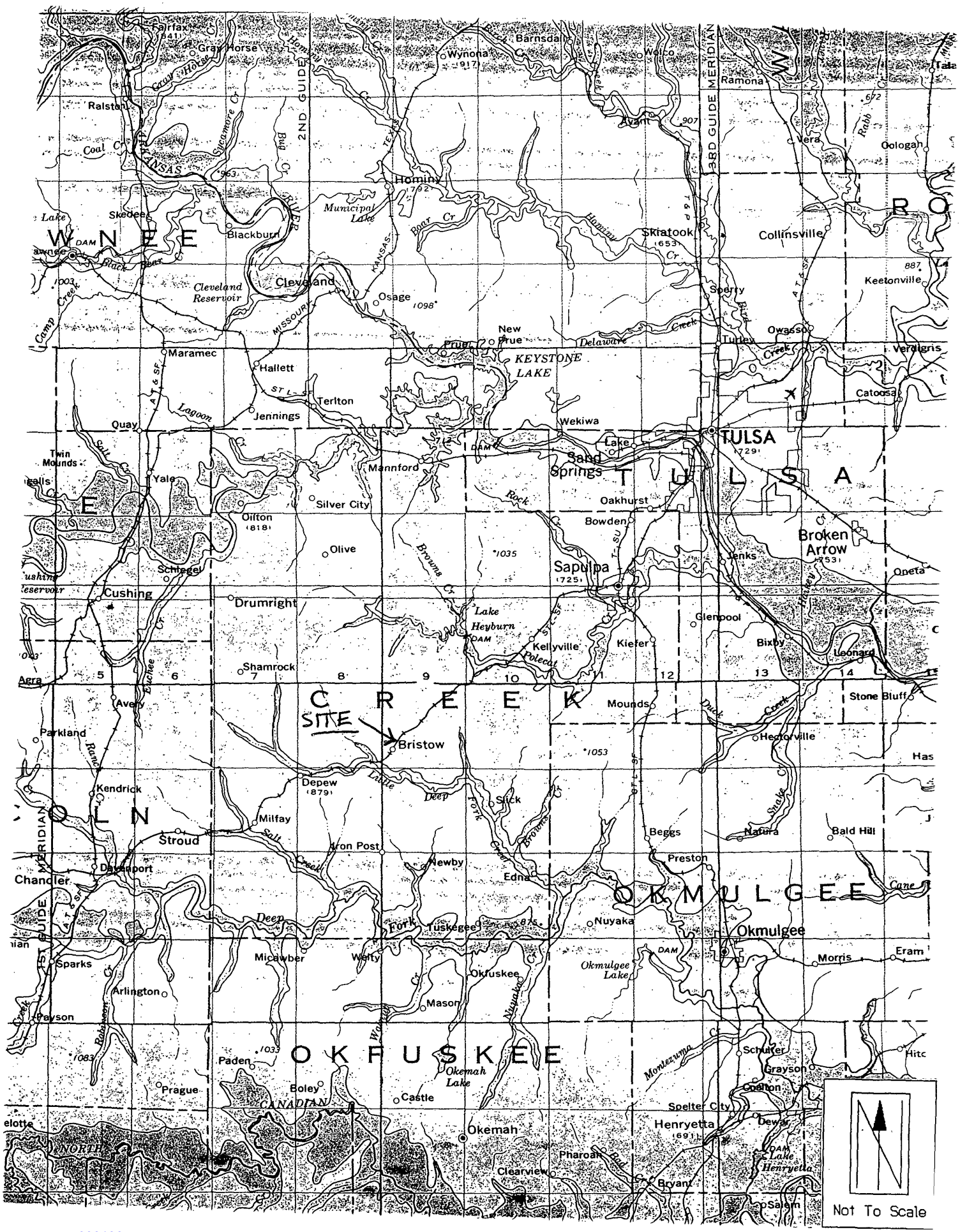


Noxie Sandstone (Pennsylvanian in age). Coarse-grained sandstone with some shale layers in northeastern Oklahoma. Thickness ranges from about 50 to 100 ft. Wells commonly yield 10 to 50 gpm of water that is of good quality (generally less than 1,000 mg/L dissolved solids). Recharge areas include outcrops of aquifer and overlying sandstones and shales of Chanute Formation. Potential recharge areas include areas in west where aquifer underlies younger Pennsylvanian rocks; also areas that extend 4 miles south of aquifer limits. References: HA-2; also Other Reports 14, 33, 38.



Keokuk and Reeds Spring Formations (Mississippian in age). This northeastern Oklahoma unit, also referred to as the "Boone Formation" or "Boone Chert," consists of limestone and cherty limestone beds that locally are fractured or cavernous. Thickness ranges from 250 ft. in south to about 400 ft. in north. Wells consistently yield more than 3 gpm, and some yield as much as 50

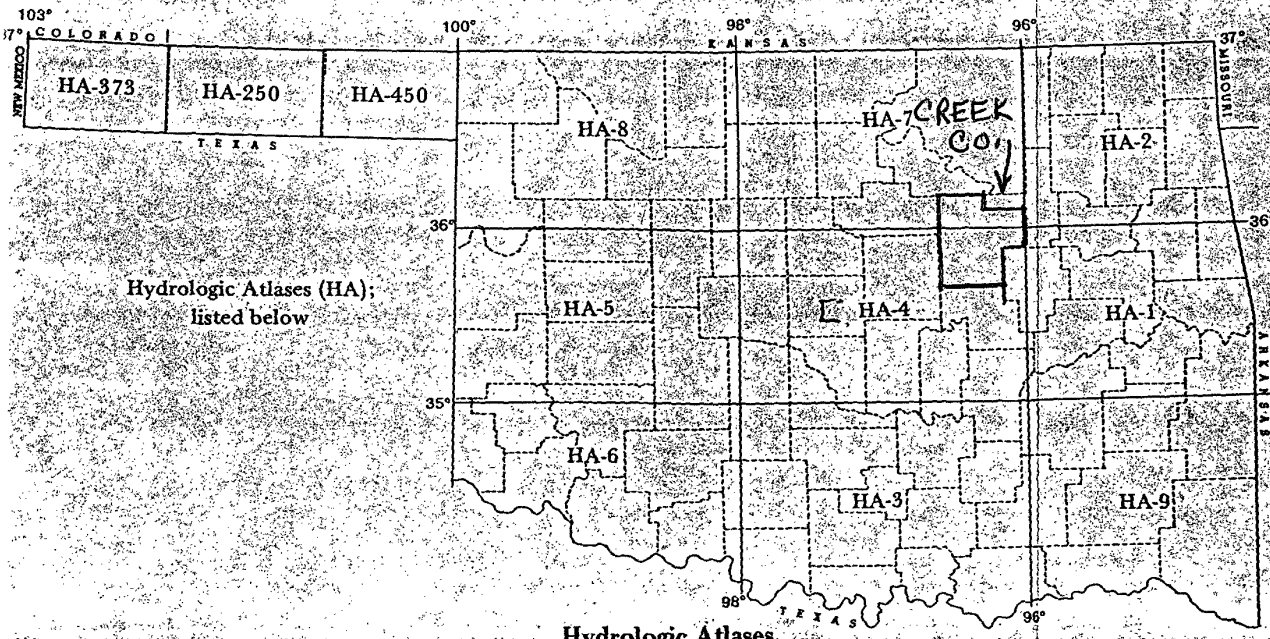

SITE
Not To Scale
Ralston
Watchorn
Pawnee
Skedee
Cleveland
Morrison
Glencoe
Yost
Stillwater
Ripley
Perkins
Agra
Avery
Parkland
Kendrick
Chandler
Davenport
Midlothian
Sparks
Payson
Mannford
Sand Springs
TULSA
Oakhurst
Bowden
Sapulpa
Kellyville
Kiefer
Bristow
Slick
Beggs
Preston
Newby
Edna
Nuyaka
Okmulgee
Okfuskee
Mason
Okemah
Castle
Clearview
Pharoah
Bearden
Weleetka
Stroud
Chandler
Arlington
Sheridan
Drumright
Cushing
Yale
Quay
Jennings
Terlton
Prue
Keystone Lake
Hominy
Skiatook
Collinsville
Ramona
Avant
Wekiwa
Lake Heyburn
Okemah Lake
Okmulgee Lake
Mounds
Glenpool
Bixby
Jenks
Tuskegee
Okmulgee
Schulter
Spelter City
Henryetta
Bryan
Bad Creek
Pawnee Lake
Keystone Lake
Lake Heyburn
Okemah Lake
Okmulgee Lake
Cleveland Reservoir
Cushing Reservoir
Arkansas River
Cimarron River
Deep Fork
Polecat Creek
Coal Creek
Camp Creek
Stillwater Creek
Rock Creek
Bird Creek
Dark Creek
Hominy Creek
Delaware Creek
Turkey Creek
Gray Horse Creek
Lost Creek
Brush Creek
Dry Creek
Robinson Creek
Wolf Creek
Nuyaka Creek
Montezuma Creek
Bad Creek
Browns Creek
Shuler Creek
Council Creek
Black Bear Creek
Osage
Pawnee
Payne
Lincoln
Creek
Okfuskee
Okmulgee
Tulsa
Osage
Pawnee
Creek
Lincoln


SITE
CREEK
OKMULGEE
OKFUSKEE
TULSA
WAGONER
ROGERS
LINCOLN
PAYNE
Not To Scale
000136

EXPLANATION

Alluvium and Terrace Deposits (Quaternary in age). Unconsolidated deposits of sand, silt, clay, and gravel that occur along or adjacent to modern and ancient rivers and streams. Thickness generally ranges from 10 to 50 ft. (locally as much as 100 ft.). Wells generally yield 10 to 500 gpm of water (locally several thousand gpm), and most water is of good quality (less than 1,000 mg/L). Recharge areas are essentially the same as distribution of the alluvium and terrace deposits.

REFERENCES



Hydrologic Atlases (HA); listed below

Hydrologic Atlases

HA-1. Marcher, M.V., 1969, Reconnaissance of the water resources of the Fort Smith Quadrangle, east-central Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 1, 4 sheets, scale 1:250,000.

HA-2. Marcher, M.V., and Bingham, R.H., 1971, Reconnaissance of the water resources of the Tulsa Quadrangle, northeastern Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 2, 4 sheets, scale 1:250,000.

HA-3. Hart, D.L., Jr., 1974, Reconnaissance of the water resources of the Ardmore and Sherman Quadrangles, southern Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 3, 4 sheets, scale 1:250,000.

HA-4. Bingham, R.H., and Moore, R.L., 1975, Reconnaissance of the water resources of the Oklahoma City Quadrangle, central Oklahoma: Oklahoma Geo-

HA-7. Bingham, R.H., and Bergman, D.L., 1980, Reconnaissance of the water resources of the Enid Quadrangle, north-central Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 7, 4 sheets, scale 1:250,000.

HA-8. Morton, R.B., 1980, Reconnaissance of the water resources of the Woodward Quadrangle, northwestern Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 8, 4 sheets, scale 1:250,000.

HA-9. Marcher, M.V., and Bergman, D.L., in preparation, Reconnaissance of the water resources of the McAlester and Texarkana Quadrangles, southeastern Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 9, 4 sheets, scale 1:250,000.

HA-250 Wood, P.R., and Hart, D.L., Jr., 1967, Availability of ground water in Texas County, Oklahoma: USGS Geological Survey Hydrologic

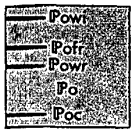
Match line; joins with Beaver County, below

PENNSYLVANIAN

Gearyan

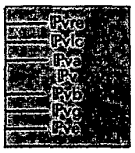
WELLINGTON FORMATION

Red-brown shale and orange-brown fine-grained sandstone, containing much maroon mudstone conglomerate and chert conglomerate to south. Thickness ranges from about 150 feet in south to 500 feet in north.



OSCAR GROUP

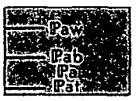
Red-brown to gray shale and orange-brown fine-grained, crossbedded sandstone; grades southward into arkosic sandstone and conglomerate. Includes *Herington Limestone* at top in Payne County, *Neva Limestone* (0.2 to 1.2 feet thick) at base in Lincoln County, and *Hart Limestone* (4 to 10 feet thick) at base in Pottawatomie County. In Payne County, includes thin stringers of *Winfield Limestone,* Powi (75 feet below top), *Fort Riley Limestone,* Pofr (245 feet below top), *Wreford Limestone,* Powr (345 feet below top), and *Cottonwood Limestone,* Poc (525 feet below top). Thickness ranges from 300 feet in south to 600 feet in north.



VANOSS GROUP

Red-brown to gray shale and orange-brown fine-grained, crossbedded sandstone; grades southward into arkosic sandstone and conglomerate. Includes many thin limestone beds and shale units north of North Canadian River (descending): *Roca Shale* (75 feet thick), *Red Eagle Limestone,* Pvre (3 to 8 feet thick), *Johnson Shale* (60 feet thick), *Long Creek Limestone,* Pvlc (9 to 12 feet thick), *Hughes Creek Shale* (52 feet thick), *Americus Limestone,* Pva (1.0 to 2.5 feet thick), *Admire Shale* (70 feet thick), *Brownville Limestone,* Pvb (1 to 3 feet thick), *Pony Creek Shale* (75 feet thick), *Grayhorse Limestone,* Pvg (1 foot thick), unnamed shale (70 feet thick), *Elmont Limestone,* Pve (1.2 to 7.8 feet thick), *Stonebreaker Shale* (60 feet thick), and *Reading Limestone* (1.5 feet thick), at base. Total thickness of group ranges from 250 feet in south to 490 feet in north.

Virgilian



ADA GROUP

Mostly orange-brown fine-grained sandstone and red-brown to gray shale; grades southward into chert conglomerates. Includes the following thin limestone beds and shale units north of North Canadian River (descending): *Auburn Shale* (80 feet thick), *Wakarusa Limestone,* Paw (1 to 6 feet thick), unnamed shale (95 feet thick), *Bird Creek Limestone,* Pab (1 to 9 feet thick), *Severy-Aarde Shale* (45 feet thick), *Turkey Run Limestone,* Pat (1 foot thick), unnamed shale (45 feet thick), and *Lecompton Limestone* (1.5 to 10 feet thick), at base. Total thickness of group ranges from 100 feet in south to 280 feet in north.



VAMOOSA FORMATION

Alternating thin to massive layers of fine- to coarse-grained sandstone and sandy, silty shale containing some chert conglomerate in middle and lower parts of formation. Thickness ranges from about 200 to about 690 feet.

UNCONFORMITY

Fault, approximately lo
upthrown side; D, downt

000138

EXPLANATION

The stratigraphic nomenclature and age determinations used herein are those accepted by the Oklahoma Geological Survey and do not necessarily agree with those of the U.S. Geological Survey.

Qal

ALLUVIUM

ay, and lenticular beds of gravel. Thickness about 30 to 100 feet and probably averages t along major streams. Along minor streams, ges from a few feet to about 50 feet and prob- s about 25 feet. Alluvium is a major aquifer uadrangle.

Qt

TERRACE DEPOSITS

eds of sand, silt, clay, and gravel. Thickness a few feet to about 100 feet and probably aver-) feet along major streams. These deposits are s along Cimarron, Canadian, and North Cana-

UNCONFORMITY

Pm

MARLOW FORMATION

ge-brown fine-grained gypsiferous sandstone, ed-brown shale. Contains 10 feet of calcitic enses near middle and 2 thin dolomites (or top. Exposed thickness, about 50 feet (top 50 ded).

Pdc

DOG CREEK SHALE

rown silty shale and some fine-grained sand- ins one or two layers of thin dolomite (or gyp- r part; basal part grades southward into Chick- tion. Thickness averages about 200 feet near 30 feet near Chickasha.

Pb

BLAINE FORMATION

gypsums with thin dolomites below each gyp- dded with red-brown shale; grades southward ha Formation. Thickness, 50 to 75 feet.

Pf

FLOWERPOT SHALE

rown silty clay shale with stringers of gypsum nd selenite); grades southward into Chickasha Thickness, 20 to 40 feet.

Pc

CHICKASHA FORMATION

mudstone conglomerate and red-brown to n silty shale and siltstone, with minor amounts own fine-grained sandstone; upper part grades

Missourian

NIAN

Phi

HILLTOP FORMATION

Mainly shale, grading upward into massive siltstone and fine-grained sandstone; grades northward into Barnsdall Formation, Chanute Formation, and Dewey Limestone. Thickness ranges from 0 to 200 feet.

Pb

BELLE CITY LIMESTONE

Consists of two fossiliferous limestone units with an intervening fossiliferous shale. Thickness ranges from 12 to 20 feet; present in southern part of area only, where it is below Hilltop Formation.

Pta

TALLANT FORMATION

Mostly fine- to medium-grained sandstone 10 to 60 feet thick overlain by shale 25 to 65 feet thick. Cut out by Vamoosa Formation in central part of area. Total thickness ranges from 0 to 100 feet.

Pbd

BARNSDALL FORMATION

Mostly fine-grained sandstone overlain by shale; may grade northward into Wann Formation. Thickness ranges from about 80 to about 200 feet.

Pwi

WANN FORMATION and IOLA LIMESTONE

Wann Formation, shale and fine- to medium-grained sandstone; thickness, 40 to 180 feet. Underlying *Iola Limestone,* mainly fine-grained calcareous sandstone and limestone with some shale; thickness, 15 to 20 feet.

CHANUTE FORMATION

Mainly fine- to medium-grained sandstone 3 to 20 feet thick, overlain by shale 20 to 80 feet thick. Total thickness ranges from about 25 to 90 feet.

Pd

DEWEY LIMESTONE

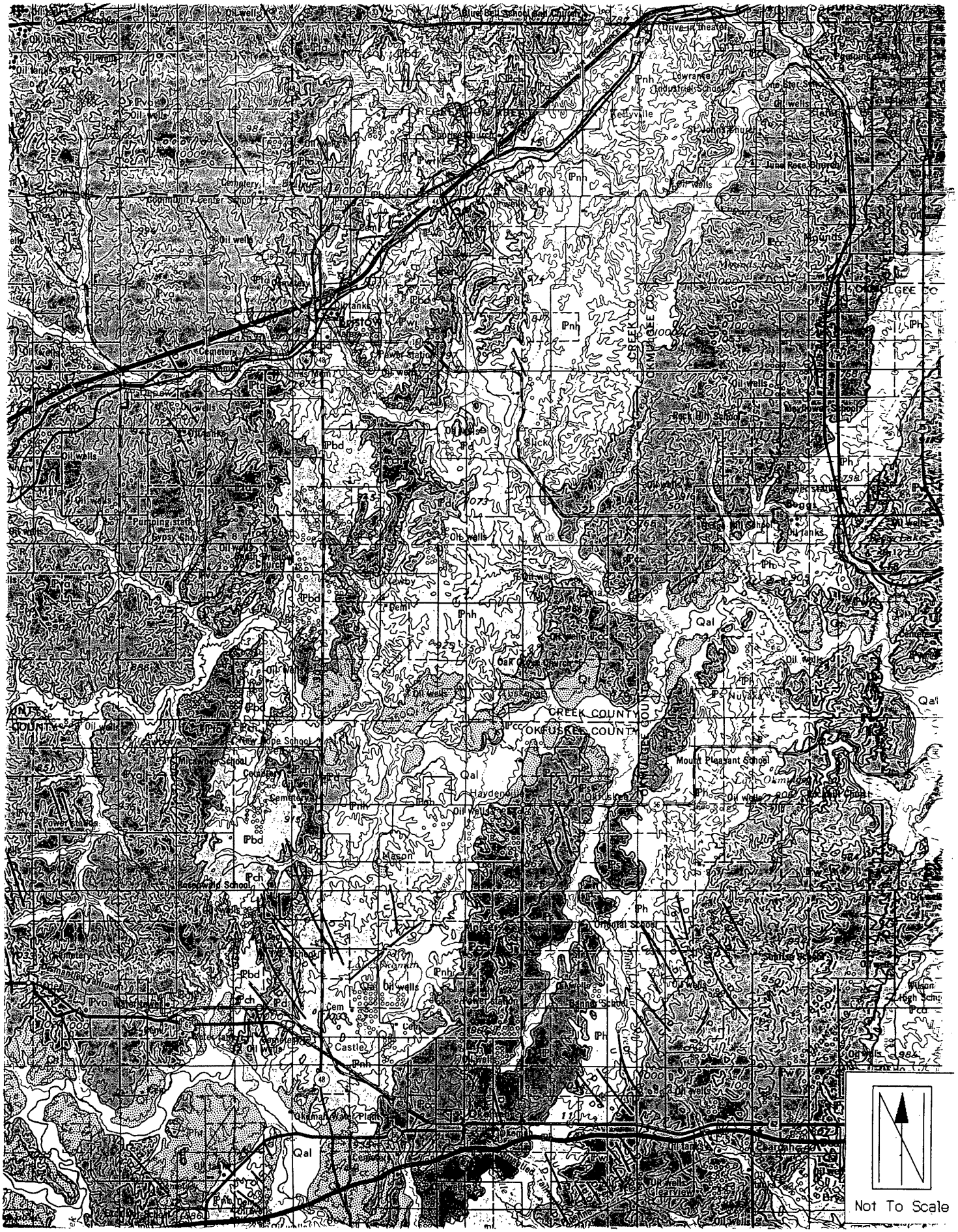
Mainly sandy limestone or calcareous sandstone containing limestone lenses 1.5 to 20 feet thick, overlain by shale 5 to 50 feet thick. Total thickness ranges from 20 to 60 feet.

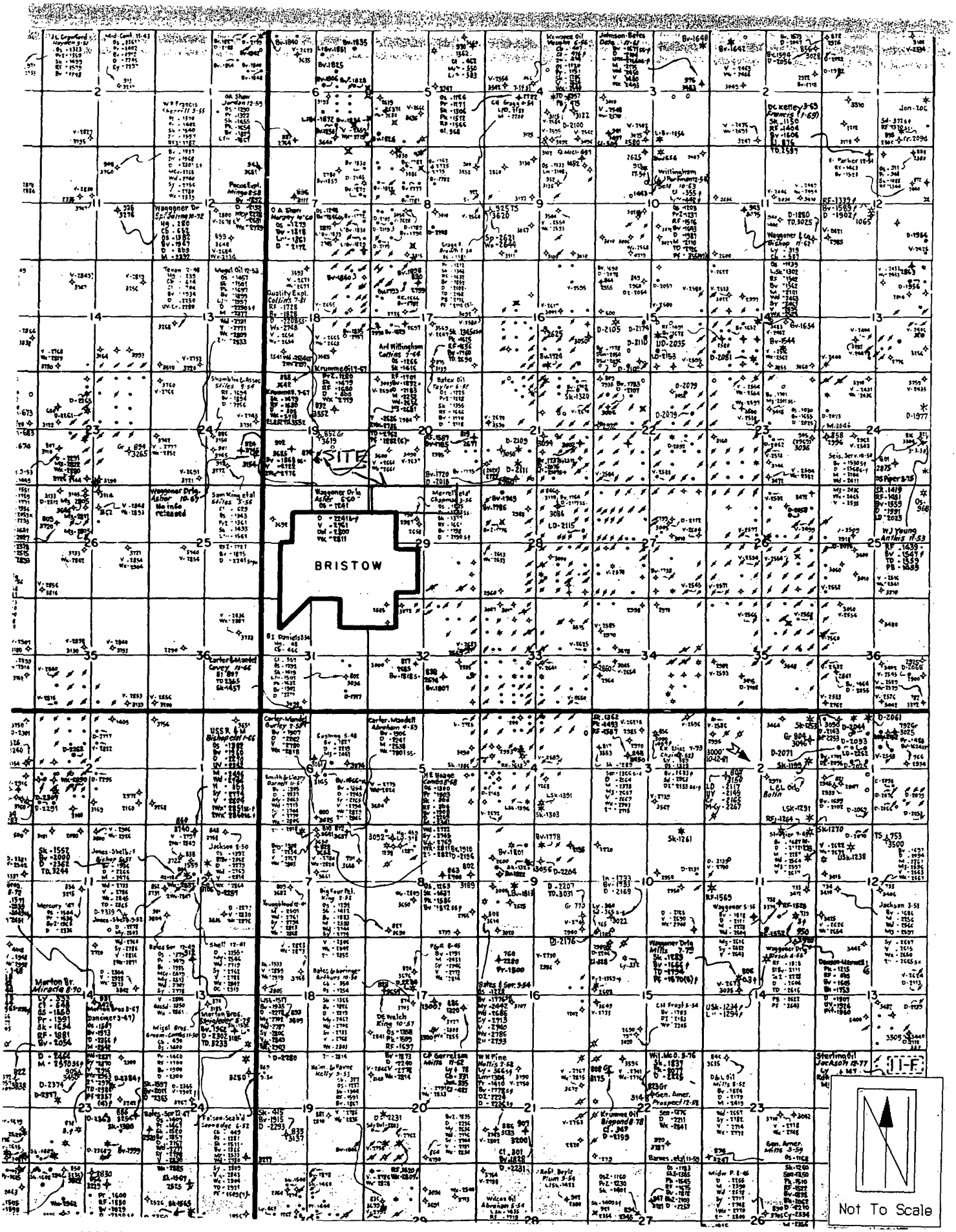
Pnh

NELLIE BLY FORMATION and HOGSHOOTER LIMESTONE

Nellie Bly Formation, mainly shale with many fine-grained

000139


Not To Scale



000141

MARK S. COLEMAN
Executive Director



DAVID WALTERS
Governor

State of Oklahoma

DEPARTMENT OF ENVIRONMENTAL QUALITY

August 5, 1993

Mr. Scott Christenson
United States Geological Survey
202 Northwest 66th Street
Building 7
Oklahoma City, Oklahoma 73101

Dear Mr. Christenson:

The purpose of this letter is to request any information regarding the location and use of wells located in the areas listed on the attached page. The information provided by your office will be used to partly describe ground water targets preliminary site assessments conducted by the DEQ (Superfund), as authorized through a cooperative agreement with the U.S. Environmental Protection Agency. For your convenience, I have enclosed a sample of the type of information needed by your office.

Your assistance is greatly appreciated by me and our division. If you have any questions, please call me at 271-7049.

Sincerely,

Scott Stegmann

Scott Stegmann
Site Assessment Unit
Waste Management Division

Attachments

000142

SITE NAME	Sections	Township	Range	County
AT & SF Roundhouse	1, 10-15, 21-28, 33-36	10 N	3 E	Pottawatomie
	5-10, 14-23, 26-35	10 N	4 E	
	1-4, 10-14	9 N	3 E	
	2-10, 16-18	9 N	4 E	
Ben Franklin Refining Company	9-17, 20-36	4 S	4 W	Jefferson
	7, 8, 16-21, 28-33	4 S	3 W	
	1-6, 8-16, 22-24	5 S	4 W	
	4-9, 17, 18	5 S	3 W	
Chicago, Rock Island, & Pacific Roundhouse	35, 36	11 N	3 E	Pottawatomie
	31-33	11 N	4 E	
	1-3, 9-16, 21-28, 33-36	10 N	3 E	
	3-10, 14-23, 26-34	10 N	4 E	
	1-3, 11, 12	9 N	3 E	
	3-8.	9 N	4 E	
Mercury Oil Refining Company	7, 17-21, 28-33	11 N	2 W	Oklahoma
	9-17, 19-36	11 N	3 W	
	4-8, 17, 18	10 N	2 W	
	1-17, 21-24	10 N	3 W	
Rock Island Roundhouse - Haileyville	10-16, 20-29, 32-36	5 N	16 E	Pittsburg
	7, 17-21, 28-33	5 N	17 E	
	1-5, 8-17, 21-24	4 N	16 E	
	4-9, 16-20	4 N	17 E	
10th Street Sludge	10-16, 21-28, 33-36	12 N	3 W	Oklahoma
	7-9, 15-22, 26-35	12 N	2 W	
	1-4, 9-15, 24	11 N	3 W	
	2-10, 16-19	11 N	2 W	
Tide Water Associated Oil Company	25, 26, 35, 36	18 N	6 E	Creek
	19-22, 26-36	18 N	7 E	
	1-3, 10-15, 23-26, 36	17 N	6 E	
	1-24, 26-34	17 N	7 E	
United States Smelting	13, 23-26, 35, 36	12 N	16 E	McIntosh
	4, 7-36	12 N	17 E	
	18, 19, 30, 31	12 N	18 E	
	1, 2, 12	11 N	16 E	
	1-18.	11 N	17 E	
	6	11 N	18 E	
Victory Metals	13, 22-27, 33-36	12 N	12 E	Okmulgee
	17-22, 26-35	12 N	13 E	
	1-4, 9-16, 22-26	11 N	12 E	
	2-11, 14-22, 28-30	11 N	13 E	
Wilcox Oil Company	1-2, 10-15, 22-27, 34-36	16 N	8 E	Creek
	3-11, 13-36	16 N	9 E	
	1-3, 11, 12	15 N	8 E	
	2-10, 17, 18	15 N	9 E	

LOCAL WELL NUMBER	OWNER	DEPTH DRILLED (FEET)	DEPTH OF WELL (FEET)	ALTITUDE OF LAND SURFACE (FEET)	WATER LEVEL (FEET)	WATER-LEVEL DATE	AQUIFER CODE	PRIMARY USE OF WATER
10N-03W-14 CDC 1	Moore, City of, Well 3	—	690	1230	—	—	318GRBR	P
10N-03W-14 DB 1	Moore, City of, Test Hole Loc B.	864	864	1240	—	—	317GBWG	U
10N-03W-14 DBB 1	Moore, City of, (Abandoned)	—	501	1250	160	11-10-42	318GRBR	P
10N-03W-15 ABB 1	Moore, City of, Well 9	—	800	1250	250	00-00-63	318GRBR	P
10N-03W-15 ACC 1	Moore, City of, Well 2	609	609	1240	215.12	07-23-45	318GRBR	P
10N-03W-15 CBA 1	Moore, City of, Well 6	—	735	1240	220	06-08-62	318GRBR	P
10N-03W-15 CDC 1	Moore, City of, Well 1	—	750.	—	—	—	317GBWG	P
10N-03W-16 AAA 1	Moore, City of, Well 31	—	—	—	—	—	317GBWG	P
10N-03W-16 ACA 1	Moore, City of, Well 20	—	750	—	—	—	317GBWG	P
10N-03W-17 BAA 1	Mustang, City of, Well 2	820	820	1222	447	09-08-86	317GBWG	P
10N-03W-17 CBC 1	Mustang, City of, Well 1	845	795	1190	423	11-22-83	317GBWG	P
10N-03W-17 DB 1	Mustang, City of Test Hole 1	891	891	1210	—	—	—	U
10N-03W-17 DDC 1	Mustang, City of, Test Hole M-ii	1000	1000	1200	—	—	—	U
10N-03W-21 AAA 1	—	—	318.00	1228	284.26	03-04-87	318GRBR	U
10N-03W-21 AAA 2	—	—	93.00	—	—	—	112TRRCH	U
10N-03W-21 AC 1	Miller 1	8914.	8914	1217	—	—	318HNSS	Z
10N-03W-22 CBA 1	Moore, City of, Well 12	—	880	1214	—	03-31-84	318GRBR	P
10N-03W-22 CCC 1	Moore, City of, Well 21	805	795	1210	370	09-05-86	317GBWG	P
10N-03W-22 DAD 1	Moore, City of, Well 10	—	795	1210	400.00	08-04-87	318GRBR	P
10N-03W-23 ACA 1	Moore, City of, Well 19	—	—	1210	—	—	317GBWG	P
10N-03W-23 DCC 1	Moore, City of, Well 28	820	820	1225	449	09-05-86	317GBWG	P
10N-03W-23 DDD 1	Moore, City of, Well 23	—	—	1225	—	—	317GBWG	P
10N-03W-24 AAA 1	Moore, City of, Well 24	—	767	1185	—	—	317GBWG	P
10N-03W-24 ABB 1	Moore, City of, Well 15	—	734	1220	—	—	317GBWG	P
10N-03W-24 CAA 1	Moore, City of, Well 30	—	—	—	—	—	317GBWG	P
15N-08E-11 AAA 1	—	—	119	—	—	—	323TLNT	U
15N-09E-07 DDA 1	—	—	69.0	—	43.00	04-01-70	323BRDL	U
16N-08E-13 DCD 1	—	—	158	—	—	—	—	U
16N-08E-22 CCD 1	—	—	92.0	850	65	10-15-70	322VMOS	U
16N-08E-27 DDA 1	—	—	140	—	—	—	—	U
16N-09E-06 DA 1	Krumme Oil Co.	—	400	—	50	08-01-69	323WANN	N
16N-09E-06 DDD 1	—	—	120	—	—	—	323TLNT	U
16N-09E-08 CB 1	Krumme Oil Co.	—	325	—	60	11-01-65	323WANN	U
16N-09E-25 ABB 1	—	—	52.0	830	37.00	10-01-70	323DEWY	U
16N-09E-29 C 1	Bristow, City of	—	200	—	120	07-20-71	323BRDL	P
17N-07E-02 BAB 1	—	—	121	—	—	—	—	U
17N-07E-05 A 1	Krumme Oil Co.	—	1145	—	—	—	323BRDL	U
17N-07E-05 AD 1	Gulf Oil Co.	—	1138	—	649	06-01-62	323BRDL	U
17N-07E-06 ACB 1	Drumright, City of	—	260	930	85	07-23-71	322VMOS	P
17N-07E-08 CBC 1	Drumright, City of	—	403	900	75	07-23-71	322VMOS	P

Reference 12

MARK S. COLEMAN
Executive Director

RECEIVED
AUG - 9 1994
Oklahoma Water Resources Board

DAVID WALTERS
Governor

State of Oklahoma

DEPARTMENT OF ENVIRONMENTAL QUALITY

August 5, 1994

RECEIVED
AUG 2 9 1994
Superfund Program

Gary Glover, Hydrologist
Ground Water Division
Oklahoma Water Resources Board
6000 North Harvey
P.O. Box 150
Oklahoma City, Oklahoma 73101-50

Dear Mr. Glover:

The purpose of this letter is to request copies of domestic well logs for both **private** and **municipal** wells that are presumably active and are in the locations described on the attached sheet. Please include copies from your files, archive files, and permit application files; (copies of the actual well log are preferred, and most helpful since they contain local geological information).

Copies of the well logs may be sent to the Department of Environmental Quality (DEQ) through inter-agency mail. The information provided by your office will be used to describe ground water targets in preliminary site assessments being conducted by the DEQ (Superfund), as authorized through a cooperative agreement with the U.S. Environmental Protection Agency.

Your assistance is greatly appreciated by me and our division. If you have any questions, please call me at 271-7049.

Sincerely,

Scott Stegmann

Scott Stegmann
Site Assessment Unit
Waste Management Division

Attachment

SITE NAME	Sections	Township	Range	County
AT & SF Roundhouse	1, 10-15, 21-28, 33-36	10 N	3 E	Pottawatomie
	5-10, 14-23, 26-35	10 N	4 E	
	1-4, 10-14	9 N	3 E	
	2-10, 16-18	9 N	4 E	
Ben Franklin Refining Company	9-17, 20-36	4 S	4 W	Jefferson
	7, 8, 16-21, 28-33	4 S	3 W	
	1-6, 8-16, 22-24	5 S	4 W	
	4-9, 17, 18	5 S	3 W	
Chicago, Rock Island, & Pacific Roundhouse	35, 36	11 N	3 E	Pottawatomie
	31-33	11 N	4 E	
	1-3, 9-16, 21-28, 33-36	10 N	3 E	
	3-10, 14-23, 26-34	10 N	4 E	
	1-3, 11, 12	9 N	3 E	
	3-8.	9 N	4 E	
Mercury Oil Refining Company	7, 17-21, 28-33	11 N	2 W	Oklahoma
	9-17, 19-36	11 N	3 W	
	4-8, 17, 18	10 N	2 W	
	1-17, 21-24	10 N	3 W	
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	7, 17-21, 28-33	5 N	17 E	
	1-5, 8-17, 21-24	4 N	16 E	
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United States Smelting	13, 23-26, 35, 36	12 N	16 E	McIntosh
	4, 7-36	12 N	17 E	
	18, 19, 30, 31	12 N	18 E	
	1, 2, 12	11 N	16 E	
	1-18.	11 N	17 E	
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	17-22, 26-35	12 N	13 E	
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	3-11, 13-36	16 N	9 E	
	1-3, 11, 12	15 N	8 E	
	2-10, 17, 18	15 N	9 E	

OMB Approval Number: 2050-0095
Approved for Use Through: 4/95

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION State: OK CERCLIS Number: not assigned CERCLIS Discovery Date: 6-7-94

1. General Site Information

Name:	Street Address:
Wilcox Oil Company	

City:	State:	Zip Code:	County:	Co. Code:	Cong. Dist:
Bristow	OK	74010	Creek	19	

Latitude:	Longitude:	Approx. Area of Site:	Status of Site:
[redacted] (b) (6)		110 acres	Inactive

2. Owner/Operator Information

Owner:	Operator:
[redacted] (b) (6)	Wilcox Oil Company
Street Address:	Street Address:
[redacted] (b) (6)	n/a
City:	City:
Bristow	n/a
State: Zip Code: Telephone:	State: Zip Code: Telephone:
OK 74010 [redacted] (b) (6)	
Type of Ownership:	How Initially Identified:
Private	State/Local Program

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION State: OK CERCLIS Number: not assigned CERCLIS Discovery Date: 6-7-94

3. Site Evaluator Information

Name of Evaluator:	Agency/Organization:	Date Prepared:
David Cates	State of Oklahoma - DEQ	12-30-94
Street Address:	**City:**	**State:**
1000 N.E. 10th Street	Oklahoma City	OK
Name of EPA or State Agency Contact:	**Telephone:**	
Lon Biasco		
Street Address:	**City:**	**State:**
1445 Ross Avenue	Dallas	TX

4. Site Disposition (for EPA use only)

Emergency Response/Removal Assessment Recommendation: No	CERCLIS Recommendation: Higher Priority SI	Signature:
Date:	Date:	Name: Position:

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION State: OK CERCLIS Number: not assigned CERCLIS Discovery Date: 6-7-94

5. General Site Characteristics

Predominant Land Uses Within 1 Mile of Site:	Site Setting:	Years of Operation:
Industrial	Rural	Beginning Year: 1923
Commercial		Ending Year: 1963
Residential		
Agricultural		

Type of Site Operations:
Other:
oil refining

Waste Generated:
Onsite

Waste Deposition Authorized
By: Former Owner

Waste Accessible to the Public
Yes

Distance to Nearest Dwelling, School, or Workplace:
1 Feet

6. Waste Characteristics Information

Source Type	Quantity	Tier
Surface impoundment	4.13e+00 acres	A
Pile	6.49e+00 acres	A
Contaminated soil	1.84e+00 acres	A
Pile	1.84e+00 acres	A
Surface impoundment	1.08e+00 acres	A

General Types of Waste:
- Metals
- Organics
- Inorganics
- Solvents
- Acids/Bases
- Oily Waste

Physical State of Waste as Deposited
- Solid
- Liquid
- Sludge
- Gas

Tier Legend
C = Constituent W = Wastestream
V = Volume A = Area

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION State: OK · CERCLIS Number: not assigned · CERCLIS Discovery Date: 6-7-94

7. Ground Water Pathway

Is Ground Water Used for Drinking Water Within 4 Miles: No	Is There a Suspected Release to Ground Water: Yes	List Secondary Target Population Served by Ground Water Withdrawn From:	
Type of Ground Water Wells Within 4 Miles: Municipal · Private	Have Primary Target Drinking Water Wells Been Identified: No	0 - 1/4 Mile	3
		>1/4 - 1/2 Mile	0
		>1/2 - 1 Mile	176
Depth to Shallowest Aquifer: 25 Feet		>1 - 2 Miles	4368
	Nearest Designated Wellhead Protection Area: None within 4 Miles	>2 - 3 Miles	54
Karst Terrain/Aquifer Present: No		>3 - 4 Miles	78
		Total	4679

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION State: OK CERCLIS Number: not assigned CERCLIS Discovery Date: 6-7-94

8. Surface Water Pathway — Part 1 of 4

Type of Surface Water Draining Site and 15 Miles Downstream: Stream	Shortest Overland Distance From Any Source to Surface Water: 0 Feet (0.0 Miles)
Is there a Suspected Release to Surface Water: Yes	Site is Located in: >10 yr - 100 yr floodplai

8. Surface Water Pathway — Part 2 of 4

Drinking Water Intakes Along the Surface Water Migration Path: No

Have Primary Target Drinking Water Intakes Been Identified: No

Secondary Target Drinking Water Intakes:
None

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION State: OK CERCLIS Number: not assigned CERCLIS Discovery Date: 6-7-94

8. Surface Water Pathway — Part 3 of 4

Fisheries Located Along the Surface Water Migration Path: Yes

Have Primary Target Fisheries Been Identified: No

Secondary Target Fisheries:

Fishery Name	Water Body Type/Flow(cfs)
Little Deep Fork Cre	moderate-large stream/ >100-1000

8. Surface Water Pathway — Part 4 of 4

Wetlands Located Along the Surface Water Migration Path? (y/n) Yes

Have Primary Target Wetlands Been Identified? (y/n) No

Secondary Target Wetlands:
None

Other Sensitive Environments Along the Surface Water Migration Path: Yes

Have Primary Target Sensitive Environments Been Identified: Yes

Secondary Target Sensitive Environments:
None

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION State: OK CERCLIS Number: not assigned CERCLIS Discovery Date: 6-7-94

9. Soil Exposure Pathway

Are People Occupying Residences or Attending School or Daycare on or Within 200 Feet of Areas of Known or Suspected Contamination: Yes
Total Resident Population: 8

Number of Workers Onsite: None

Have Terrestrial Sensitive Environments Been Identified on or Within 200 Feet of Areas of Known or Suspected Contamination: No

10. Air Pathway

Total Population on or Within:

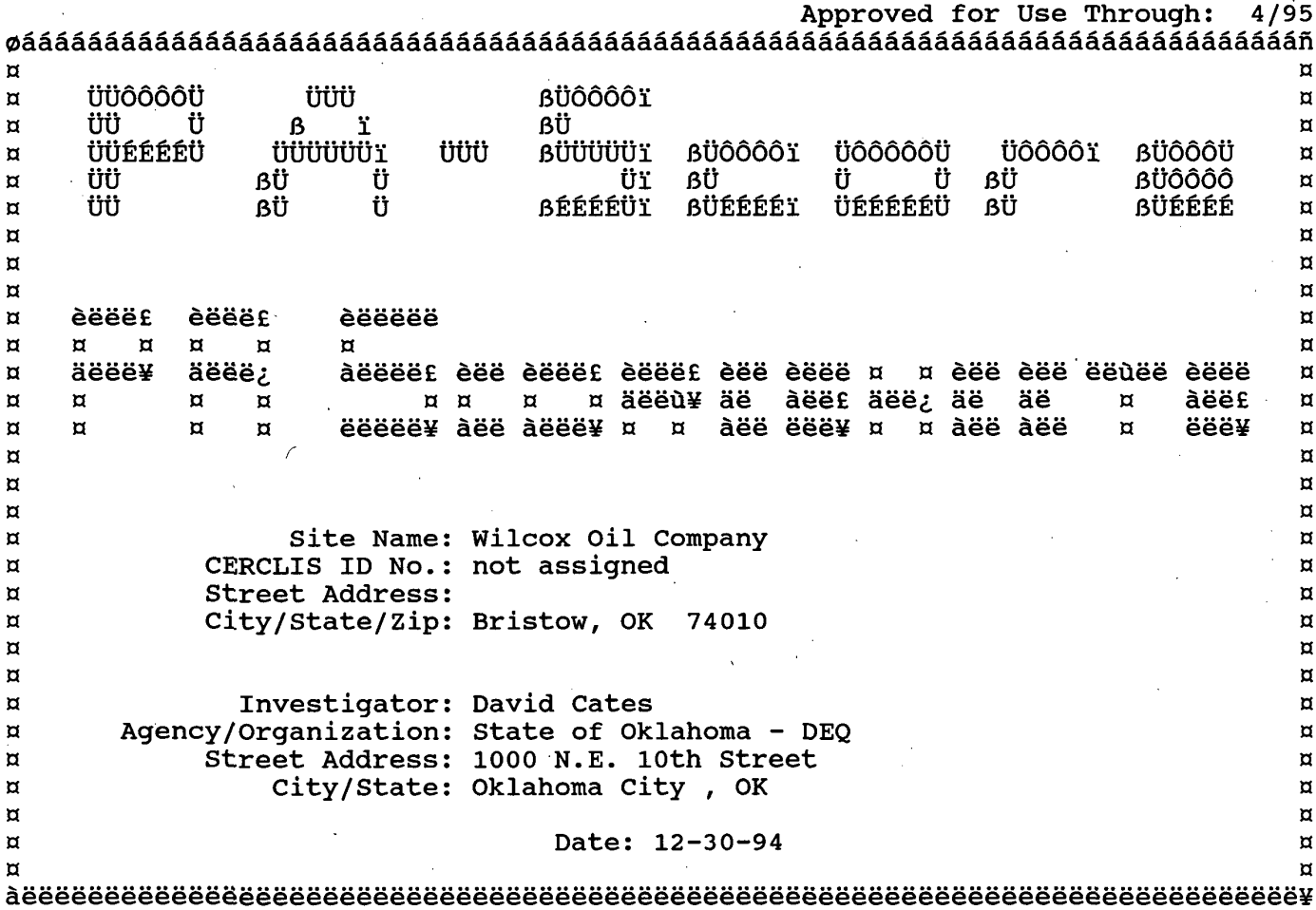
Onsite	0
0 - 1/4 Mile	62
>1/4 - 1/2 Mile	495
>1/2 - 1 Mile	1836
>1 - 2 Miles	2691
>2 - 3 Miles	1017
>3 - 4 Miles	517
Total	6618

Is There a Suspected Release to Air: Yes
Wetlands Located Within 4 Miles of the Site: Yes
Other Sensitive Environments Located Within 4 Miles of the Site: No

Sensitive Environments Within 1/2 Mile of the Site:

Distance	Sensitive Environment Type/Wetlands Area(acres)
0 - 1/4	Wetlands (1 to 50 acres)
>1/4 - 1/2	Wetlands (1 to 50 acres)

OMB Approval Number: 2050-0095
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WASTE CHARACTERISTICS

Waste Characteristics (WC) Calculations:

1 Pits	Surface impoundment	Ref: 2	WQ value	maximum
Area	4.13E+00 acres		1.42E+04	1.42E+04

The area of the pits which contained oily sludge was estimated from aerial photos and from the site reconnaissance.
Pit #1: 400'x 200' = 80,000 sq ft = 1.84 ac
Pit #2: 200'x 250' = 50,000 sq ft = 1.15 ac
Pit #3: 200'x 150' = 30,000 sq ft = 0.69 ac
Pit #4: 200'x 100' = 20,000 sq ft = 0.46 ac

Total: 180,000sq ft = 4.13 ac
Ref: 2

2 Bermed areas	Pile	Ref: 2	WQ value	maximum
Area	6.49E+00 acres		2.24E+04	2.24E+04

There are nine abandoned bermed storage tank areas which have asphalt-like waste present. They are approximately 100 feet in radius as determined from the site reconnaissance and the aerial photos. The areas were calculated using the formula for area of a circle (pi times radius squared).

100' x 100' x 3.14 = 31,400 sq ft./berm x 9 berms = 282,600 sq ft.
282,600 sq ft / 43,560 = 6.49 acres.
Ref: 2

3 Contaminated soil	Contaminated soil	Ref: 2	WQ value	maximum
Area	1.84E+00 acres		2.36E+00	2.36E+00

The area of contaminated soil was 200 feet wide and 400 feet long a s determined by aerial photos and during the site reconnaissance.

200' x 400' = 80,000 sq ft.

80,000 sq ft / 43,60 = 1.84 ac.
Ref: 2

4 Waste piles	Pile	Ref: 2	WQ value	maximum
Area	1.84E+00 acres		6.34E+03	6.34E+03

There were two areas on the [redacted] property of about 200 feet by 200 feet each which had asphalt-like waste, coke and what appeared to be elemental sulphur covering the ground.

WQ total 4.67E+04

**** Only First WC Page Is Printed **** Waste Characteristics Score: WC = 100

Ground Water Pathway Criteria List Suspected Release	
Are sources poorly contained? (y/n/u)	Y
Is the source a type likely to contribute to ground water contamination (e.g., wet lagoon)? (y/n/u)	Y
Is waste quantity particularly large? (y/n/u)	Y
Is precipitation heavy? (y/n/u)	Y
Is the infiltration rate high? (y/n/u)	N
Is the site located in an area of karst terrain? (y/n)	N
Is the subsurface highly permeable or conductive? (y/n/u)	N
Is drinking water drawn from a shallow aquifer? (y/n/u)	Y
Are suspected contaminants highly mobile in ground water? (y/n/u)	Y
Does analytical or circumstantial evidence suggest ground water contamination? (y/n/u)	Y
Other criteria? (y/n) Y contamination of a nearby well with oil SUSPECTED RELEASE? (y/n)	Y

Summarize the rationale for Suspected Release:

As a result of more than 35 years of oil refinery operations, shallow ground water has been adversely affected by potentially hazardous substances at the site, as indicated by contamination of the church's well and reported contamination of another well on site.

Ref: 2; 5; 6

Ground Water Pathway Criteria List
Primary Targets

Is any drinking water well nearby? (y/n/u)	Y
Has any nearby drinking water well been closed? (y/n/u)	Y
Has any nearby drinking water well user reported foul-testing or foul-smelling water? (y/n/u)	Y
Does any nearby well have a large drawdown/high production rate? (y/n/u)	U
Is any drinking water well located between the site and other wells that are suspected to be exposed to a hazardous substance? (y/n/u)	U
Does analytical or circumstantial evidence suggest contamination at a drinking water well? (y/n/u)	Y
Does any drinking water well warrant sampling? (y/n/u)	Y
Other criteria? (y/n) N	
PRIMARY TARGET(S) IDENTIFIED? (y/n)	N

Summarize the rationale for Primary Targets:

GROUND WATER PATHWAY SCORESHEETS

Pathway Characteristics			Ref.
Do you suspect a release? (y/n)		Yes	
Is the site located in karst terrain? (y/n)		No	11
Depth to aquifer (feet):		25	11
Distance to the nearest drinking water well (feet):		1000	2

LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References
1. SUSPECTED RELEASE	550		
2. NO SUSPECTED RELEASE		0	
LR =	550	0	

Targets TARGETS	Suspected Release	No Suspected Release	References
3. PRIMARY TARGET POPULATION			
0 person(s)	0		
4. SECONDARY TARGET POPULATION	102	0	
Are any wells part of a			
blended system? (y/n) Y			
5. NEAREST WELL	20	0	
6. WELLHEAD PROTECTION AREA	0	0	
None within 4 Miles			
7. RESOURCES	5	0	
T =	127	0	

WASTE CHARACTERISTICS		
WC =	100	0

GROUND WATER PATHWAY SCORE: 85

Ground Water Target Populations

Primary Target Population Drinking Water Well ID	Dist. (miles)	Population Served	Reference	Value
None				
*** Note : Maximum of 5 Wells Are Printed ***			Total	

Secondary Target Population Distance Categories	Population Served	Reference	Value
0 to 1/4 mile	3	12,13	1
Greater than 1/4 to 1/2 mile	0	12,13	0
Greater than 1/2 to 1 mile	176	12,13	5
Greater than 1 to 2 miles	4368	12,13	94
Greater than 2 to 3 miles	54	12,13	1
Greater than 3 to 4 miles	78	12,13	1
		Total	102

Apportionment Documentation for a Blended System

There are 8 wells connected to 4 water storage towers that make up Bristow's water system. There are no surface water intakes. This is a blended system in which water from the wells is pumped to the storage towers then distributed to the 4,300 people of Bristow and the 116 people in Slick, Oklahoma. There are taps before the towers. One of the wells is located in the 1/2 to 1 mile zone and the others are located in the 1 to 2 mile radius. Annual production amounts are unknown. Apportionment is based on estimated annual production derived from daily capacity. 165 people are apportioned to the well located in the 1/2 to 1 mile radius and 4251 people are apportioned to the well located in the 1 to 2 mile radius.

Ref: 13

Surface Water Pathway Criteria List Suspected Release	
Is surface water nearby? (y/n/u)	Y
Is waste quantity particularly large? (y/n/u)	Y
Is the drainage area large? (y/n/u)	U
Is rainfall heavy? (y/n/u)	Y
Is the infiltration rate low? (y/n/u)	N
Are sources poorly contained or prone to runoff or flooding? (y/n/u)	Y
Is a runoff route well defined(e.g.ditch/channel to surf.water)? (y/n/u)	Y
Is vegetation stressed along the probable runoff path? (y/n/u)	Y
Are sediments or water unnaturally discolored? (y/n/u)	Y
Is wildlife unnaturally absent? (y/n/u)	U
Has deposition of waste into surface water been observed? (y/n/u)	Y
Is ground water discharge to surface water likely? (y/n/u)	Y
Does analytical/circumstantial evidence suggest S.W. contam? (y/n/u)	Y
Other criteria? (y/n) N	
SUSPECTED RELEASE? (y/n)	Y

Summarize the rationale for Suspected Release:

During the site reconnaissance oily sludge was observed flowing out of surface impoundments following surface drainage towards Sand Creek. Also, a seep in Sand Creek was reported west of the church.

Ref: 2

Surface Water Pathway Criteria List
Primary Targets

Is any target nearby? (y/n/u)	If yes:	Y
N	Drinking water intake	
Y	Fishery	
Y	Sensitive environment	
Has any intake, fishery, or recreational area been closed? (y/n/u)		N
Does analytical or circumstantial evidence suggest surface water contamination at or downstream of a target? (y/n/u)		Y
Does any target warrant sampling? (y/n/u)	If yes:	Y
N	Drinking water intake	
N	Fishery	
Y	Sensitive environment	
Other criteria? (y/n)	N	
PRIMARY INTAKE(S) IDENTIFIED? (y/n)		N

Summarize the rationale for Primary Intakes:

continued -------

continued -------

Other criteria? (y/n) N

PRIMARY FISHERY(IES) IDENTIFIED? (y/n) N

Summarize the rationale for Primary Fisheries:

Other criteria? (y/n) N

PRIMARY SENSITIVE ENVIRONMENT(S) IDENTIFIED? (y/n) Y

Summarize the rationale for Primary Sensitive Environments:

Wetlands were observed on site within the boundaries of one of the tank berms. The owner of the property indicated that the berm contains sludge. The wetlands associated with the segment of Sand Creek which runs through the site may also be contaminated from surface runoff.

Ref: 2

SURFACE WATER PATHWAY SCORESHEETS

Pathway Characteristics		Ref.
Do you suspect a release? (y/n)	Yes	
Distance to surface water (feet):	0	2
Flood frequency (years):	100	18
What is the downstream distance (miles) to:		
a. the nearest drinking water intake?	N.A.	15
b. the nearest fishery?	3.5	19
c. the nearest sensitive environment?	0.0	21

LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References
1. SUSPECTED RELEASE	550		
2. NO SUSPECTED RELEASE		0	
LR =	550	0	

Drinking Water Threat Targets

TARGETS	Suspected Release	No Suspected Release	References
3. Determine the water body type, flow (if applicable), and number of people served by each drinking water intake.	_____	_____	_____
4. PRIMARY TARGET POPULATION 0 person(s)	0	_____	_____
5. SECONDARY TARGET POPULATION Are any intakes part of a blended system? (y/n): N	0	0	_____
6. NEAREST INTAKE	0	0	_____
7. RESOURCES	5	0	_____
T =	5	0	_____

Drinking Water Threat Target Populations

Intake Name	Primary (y/n)	Water Body Type/Flow	Population Served	Ref.	Value
None					

Total Primary Target Population Value	0
Total Secondary Target Population Value	0

*** Note : Maximum of 6 Intakes Are Printed ***

Apportionment Documentation for a Blended System

No intakes within the 15 mile target distance.

Ref: 15

Human Food Chain Threat Targets

TARGETS	Suspected Release	No Suspected Release	References
8. Determine the water body type and flow for each fishery within the target limit.	_____	_____	_____
9. PRIMARY FISHERIES	0	_____	_____
10. SECONDARY FISHERIES	210	0	_____
T =	210	0	_____

Human Food Chain Threat Targets

Fishery Name	Primary (y/n)	Water Body Type/Flow	Ref.	Value
1 Little Deep Fork Creek	N	>100-1000 cfs		12

Total Primary Fisheries Value	0
Total Secondary Fisheries Value	210

*** Note : Maximum of 6 Fisheries Are Printed ***

Environmental Threat Targets

TARGETS	Suspected Release	No Suspected Release	References
11. Determine the water body type and flow (if applicable) for each sensitive environment.			
12. PRIMARY SENSITIVE ENVIRONMENTS	300		
13. SECONDARY SENSITIVE ENVIRONS.	0	0	
T =	300	0	

Environmental Threat Targets

Sensitive Environment Name	Primary (y/n)	Water Body Type/Flow	Ref.	Value
1 wetlands	Y	primary sens. envir.		300

Total Primary Sensitive Environments Value	300
Total Secondary Sensitive Environments Value	0

*** Note: Maximum of 6 Sensitive Environments Are Printed ***

Surface Water Pathway Threat Scores

Threat	Likelihood of Release(LR) Score	Targets(T) Score	Pathway Waste Characteristics (WC) Score	Threat Score LR x T x WC / 82,500
Drinking Water	550	5	100	3
Human Food Chain	550	210	100	100
Environmental	550	300	100	60

SURFACE WATER PATHWAY SCORE: 100

Soil Exposure Pathway Criteria List Resident Population	
Is any residence, school, or daycare facility on or within 200 feet of an area of suspected contamination? (y/n/u)	Y
Is any residence, school, or daycare facility located on adjacent land previously owned or leased by the site owner/operator? (y/n/u)	Y
Is there a migration route that might spread hazardous substances near residences, schools, or daycare facilities? (y/n/u)	Y
Have onsite or adjacent residents or students reported adverse health effects, exclusive of apparent drinking water or air contamination problems? (y/n/u)	U
Does any neighboring property warrant sampling? (y/n/u)	Y
Other criteria? (y/n) N	
RESIDENT POPULATION IDENTIFIED? (y/n)	Y

Summarize the rationale for Resident Population:

There are approximately 8 residents on site and approximately 11 residents living within 200 feet of the site. Only a peortion of the site is fenced with controlled access. Much of the waste on site is exposed at the surface. There are no schools or day care centers within 200 feet of the site.

Ref: 2

SOIL EXPOSURE PATHWAY SCORESHEETS

Pathway Characteristics		Ref.
Do any people live on or within 200 ft of areas of suspected contamination? (y/n)	Yes	2
Do any people attend school or daycare on or within 200 ft of areas of suspected contamination? (y/n)	No	2
Is the facility active? (y/n):	No	2

LIKELIHOOD OF EXPOSURE	Suspected Contamination	References
1. SUSPECTED CONTAMINATION LE =	550	

Targets

2. RESIDENT POPULATION	80		
8 resident(s)		2	
0 school/daycare student(s)		2	
3. RESIDENT INDIVIDUAL	50		
4. WORKERS	0	2	
None			
5. TERRES. SENSITIVE ENVIRONMENTS	0		
6. RESOURCES	5		
T =	135		

WASTE CHARACTERISTICS

WC = 100

RESIDENT POPULATION THREAT SCORE: 90

NEARBY POPULATION THREAT SCORE: 1

Population Within 1 Mile: 1 - 10,000

SOIL EXPOSURE PATHWAY SCORE: 91

Soil Exposure Pathway Terrestrial Sensitive Environments

Terrestrial Sensitive Environment Name	Reference	Value
None		
Total Terrestrial Sensitive Environments Value		

*** Note : Maximum of 7 Sensitive Environments Are Printed ***

Air Pathway Criteria List Suspected Release	
Are odors currently reported? (y/n/u)	Y
Has release of a hazardous substance to the air been directly observed? (y/n/u)	N
Are there reports of adverse health effects (e.g., headaches, nausea, dizziness) potentially resulting from migration of hazardous substances through the air? (y/n/u)	U
Does analytical/circumstantial evidence suggest release to air? (y/n/u)	Y
Other criteria? (y/n) N	
SUSPECTED RELEASE? (y/n)	Y

Summarize the rationale for Suspected Release:

Odors were detected during the site reconnaissance that were believed to be sulfur dioxide. Petroleum odors were also noticed.

Ref: 2

AIR PATHWAY SCORESHEETS

Pathway Characteristics			Ref.
Do you suspect a release? (y/n)		Yes	
Distance to the nearest individual (feet):		0	2

LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References
1. SUSPECTED RELEASE	550		
2. NO SUSPECTED RELEASE		0	
LR =	550	0	

Targets

TARGETS	Suspected Release	No Suspected Release	References
3. PRIMARY TARGET POPULATION	620		
62 person(s)			
4. SECONDARY TARGET POPULATION	8	0	
5. NEAREST INDIVIDUAL	50	0	
6. PRIMARY SENSITIVE ENVIRONS.	25		
7. SECONDARY SENSITIVE ENVIRONS.	0	0	
8. RESOURCES	5	0	
T =	708	0	

WASTE CHARACTERISTICS		
WC =	100	0

AIR PATHWAY SCORE:	100

Air Pathway Secondary Target Populations

Distance Categories	Population	References	Value
Onsite	N.A.		0
Greater than 0 to 1/4 mile	N.A.		0
Greater than 1/4 to 1/2 mile	495	2,14	3
Greater than 1/2 to 1 mile	1836	22	3
Greater than 1 to 2 miles	2691	22	1
Greater than 2 to 3 miles	1017	22	1
Greater than 3 to 4 miles	517	22	0
	Total Secondary Population Value		8

Air Pathway Primary Sensitive Environments

Sensitive Environment Name	Reference	Value
1 Wetlands	2,24	25
Total Primary Sensitive Environments Value		25

*** Note : Maximum of 7 Sensitive Environments Are Printed***

Air Pathway Secondary Sensitive Environments

Sensitive Environment Name	Distance	Reference	Value
1 Wetlands	>1/4-1/2	24	0.1
Total Secondary Sensitive Environments Value			0

SITE SCORE CALCULATION	SCORE
GROUND WATER PATHWAY SCORE:	85
SURFACE WATER PATHWAY SCORE:	100
SOIL EXPOSURE PATHWAY SCORE:	91
AIR PATHWAY SCORE:	100
SITE SCORE:	94

SUMMARY

1. Is there a high possibility of a threat to any nearby drinking water well(s) by migration of a hazardous substance in ground water? Yes

   If yes, identify the well(s).
   An on site well and the chruch's well have petroleum contamination. There is a domestic well located approx. 1000 ft. north of the site.

   If yes, how many people are served by the threatened well(s)? 8

2. Is there a high possibility of a threat to any of the following by hazardous substance migration in surface water?
   A. Drinking water intake — No
   B. Fishery — Yes
   C. Sensitive environment (wetland, critical habitat, others) — Yes

   If yes, identity the target(s).
   Little Deep Fork Creek fishery
   Wetlands on site
   Wetlands associated with the 15 mile target distance

3. Is there a high possibility of an area of surficial contamination within 200 feet of any residence, school, or daycare facility? Yes

   If yes, identify the properties and estimate the associated population(s)
   There are 8 residents on site and 11 residents within 200 ft.

4. Are there public health concerns at this site that are not addressed by PA scoring considerations? No

   If yes, explain:

REFERENCE LIST

1. USEPA. *Potential Hazardous Waste Site Identification.* Wilcox Oil Co. Bristow, Oklahoma. June 7, 1994.

2. Cates, D. A., DEQ. *Memorandum: On-site Reconnaissance of the Wilcox Oil Company Refinery site, Creek County, OK.* December 16, 1994.

3. U.S. Environmental Protection Agency. *Standard Operating Procedure to Determine Site Latitude and Longitude Coordinates. 1991.* Calculation Worksheet for the Wilcox Oil Co, Creek County, Oklahoma.

4. Reid, G., *Wilcox Has Modern Installation in Bristow Plant.* The Refiner and Natural Gasoline Manufacturer. Vol. 9, No. 9. September 1930.

5. Cates, D. A., DEQ. *Memorandum: Records of Communication.* Wilcox Oil Company refinery site. November - December, 1994.

6. Cates, D. A., DEQ. *Memorandum: Potentially Responsible Parties (PRP) at the Wilcox Oil Company site.* December 12, 1994.

7. Sanborn Map Company. *Fire Insurance Map for Bristow, Creek County, Oklahoma.* December 28, 1923.

8. Cates, D. A., DEQ. *Letter of Request:* [redacted] *co-owners of the Wilcox Oil Co. Site Property.* November 30, 1994.

9. USEPA. *Guidance for Performing Preliminary Assessments Under CERCLA.* EPA/540/G-91/013. Pub. 9345.0-01A. September 1991. Pages 19 - 20.

10. U.S. Department of Agriculture. *Soil Survey of Creek County, Oklahoma.* May 1959.

11. Cates, D. A., DEQ. *Memorandum: Hydrogeology and Ground Water Use, Wilcox Oil Company Refinery Site, Creek County, Oklahoma.* November 8, 1994.

12. Stegmann, S., DEQ. *Letter of Request: Gary Glover, Oklahoma Water Resources Board.* August 5, 1994. (Response attached).

13. Cates, D. A., DEQ. *Memorandum: Public Water Supply near Bristow, Oklahoma.* December 12, 1994.

14. U.S. Department of the Commerce, Census Bureau. *Selected Population and Housing Characteristics: 1990.* Creek County, Oklahoma. 1990.

15. Stegmann, S., DEQ. *Letter of Request: Gene Dousett, Oklahoma Water Resources Board.* August 5, 1994. (Response attached).

16. U. S. Department of the Interior, Geological Survey. *7.5 Minute Topographic Quadrangle Maps.* Bristow (1973); Slick (1973); Lake Herburn (1971); Bellvue (1971, photorevised 1981).

17. Heimann, D. C. and Tortorelli, R. L. *Statistical Summaries of Streamflow Records in Oklahoma and Parts of Arkansas, Missouri, and Texas Through 1984.* U.S Geological Survey Water-Resources Investigations Report 87-4205. 1988. Pages 3, 226, & 227.

18. Federal Emergency Management Agency. *National Flood Insurance Rate Map for the City of Bristow, Creek County, Oklahoma.* Community-Panel No.400490-0007 B. June 1. 1987.

19. Oklahoma Water Resources Board. *Oklahoma's Water Quality Standards.* June 13, 1994.

20. U.S. Fish and Wildlife Service. *Oklahoma Federal Listed, Proposed, and Candidate Threatened and Endangered Species.* Creek County. January 1994.

21. U. S. Department of the Interior, Fish and Wildlife Service. *National Wetlands Inventory Maps (7.5 minute quadrangles).* Bristow; Slick; Lake Heyburn; Bellvue.

22. Geographical Exposure Modeling System (GEMS) - *1983 Census Data Wilcox Oil Company site.* Compiled by Hal Cantwell, DEQ. December 14, 1994.

23. Butler, I. H., *Oklahoma Natural Heritage Inventory.* Response letter: Possible Endangered Species for the Wilcox Oil Company site. September 7, 1994.

24. Khalafian, K. J., DEQ. *Wetland Acreage Worksheet for the Wilcox Oil Company Refinery Site.* August 8, 1994.

References

Reference 1

POTENTIAL HAZARDOUS WASTE SITE IDENTIFICATION

EPA

REGION	SITE NUMBER
VI	

NOTE: The initial identification of a potential site or incident should not be interpreted as a finding of illegal activity or confirmation that an actual health or environmental threat exists. All identified sites will be assessed under the EPA's Hazardous Waste Site Enforcement and Response System to determine if a hazardous waste problem actually exists.

A. SITE NAME	B. STREET (or other identifier)		
Wilcox Oil Co.	North of Bristow		
C. CITY	**D. STATE**	**E. ZIP CODE**	**F. COUNTY NAME**
Bristow	OK		Creek

G. OWNER/OPERATOR (if known)

1. NAME	2. TELEPHONE NUMBER
unknown	

H. TYPE OF OWNERSHIP (if known)

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☐ 5. PRIVATE ☒ 6. UNKNOWN

I. SITE DESCRIPTION

The site is located in a mostly rural area and is bordered by a residential area to the east and the south, an active railroad track to the west, and a county road to the north. The site appears as a fenced, inactive oil-related facility containing tanks and oil-related equipment in various states of disrepair. There are some barren spots on the site, and several waste piles were visible.

J. HOW IDENTIFIED (i.e., citizen's complaints, OSHA citations, etc.)	K. DATE IDENTIFIED (mo., day, & yr.)
State Program	6-7-94

L. SUMMARY OF POTENTIAL OR KNOWN PROBLEM

Wilcox Oil Co. operated an oil-related facility at this site, and refinery related wastes may be on site. Currently, the contents of the on-site containers are unknown. Integrity of these containers is uncertain. As a result, a potential for release of hazardous substances may exists on the site.

M. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE (mo., day, & yr.)
Karen Khalafian, Environmental Specialist	(405)271-7137	6/7/94

EPA Form 2070-8 (5-80)

Reference 2

MEMORANDUM

December 18. 1994.

To: Wilcox Oil Company Preliminary Assessment (PA) file.

From: David Cates, Environmental Specialist, DEQ, Superfund (Site Assessment Unit).

Re: Site Reconnaissance.

The PA site reconnaissance of the abandoned refinery operated by Wilcox Oil Company was conducted on Friday December 16, 1994, between 11:00 and 2:30. The Oklahoma Department of Environmental Quality (DEQ) personnel were David Cates and Karen Khalafian. At the beginning of the site reconnaissance the weather was cloudy/overcast with temperatures around 50° F and the wind was blowing from the north and northwest at about 5 to 10 mph. In the afternoon it cleared off and warmed up to around 60° F. The ground was still wet from a rain shower which occurred the previous night. Run off water in the creeks was high and flowing rapidly.

The site reconnaissance was conducted in three phases. The first phase involved visiting the original refinery site located inside the fenced property just east of the railroad right of way. (b) (6), a co-owner of this property, was present and opened the locked gate. The next phase involved visiting the church located just west of the railroad. The Pastor, (b) (b), and his wife, (b) (6) were present and conveyed that the church did not have a day care center. The third phase involved visiting the abandoned storage tank farm located in the NE/4 NW/4 and NW/4 NE/4 of Section 29, east of the (b) (6) property. The current owner of this property, (b) (6), was present.

The (b) (6) property is completely fenced on all sides with an entrance and locked gate on the north side. An east-west section line road marks the north boundary of the property. The west side borders the St. Louis and San Francisco Railroad right of way. On the east side is a private drive extending south from the section line road. About 400 feet south of the section line road the fence angles southwest from the private drive then turns south after crossing the small creek and extends to Sand Creek. The southern border of the property is marked by the fence's position along the north bank of Sand Creek. The total area is about 18 acres which is larger than what is described on their deed (13 acres, more or less) due to the fact that the fence extends all the way to Sand Creek.

Upon entering the (b) (6) property four storage tanks and an abundant number of pipe pieces and scrap iron were observed. There are several brick structures remaining on the west side near the railroad right of way. One of the old facility structures located on the north side, next to the section line road, is being used as a residence by (b) (6) younger brother and wife. Concrete tank, tower, and facility foundations were observed at numerous places. A small south trending creek, which had flowing water at the time of the site reconnaissance, is located along the east side of the property. Surface drainage is to the east and south. Trees and dense vegetation are present along banks of the creeks and on

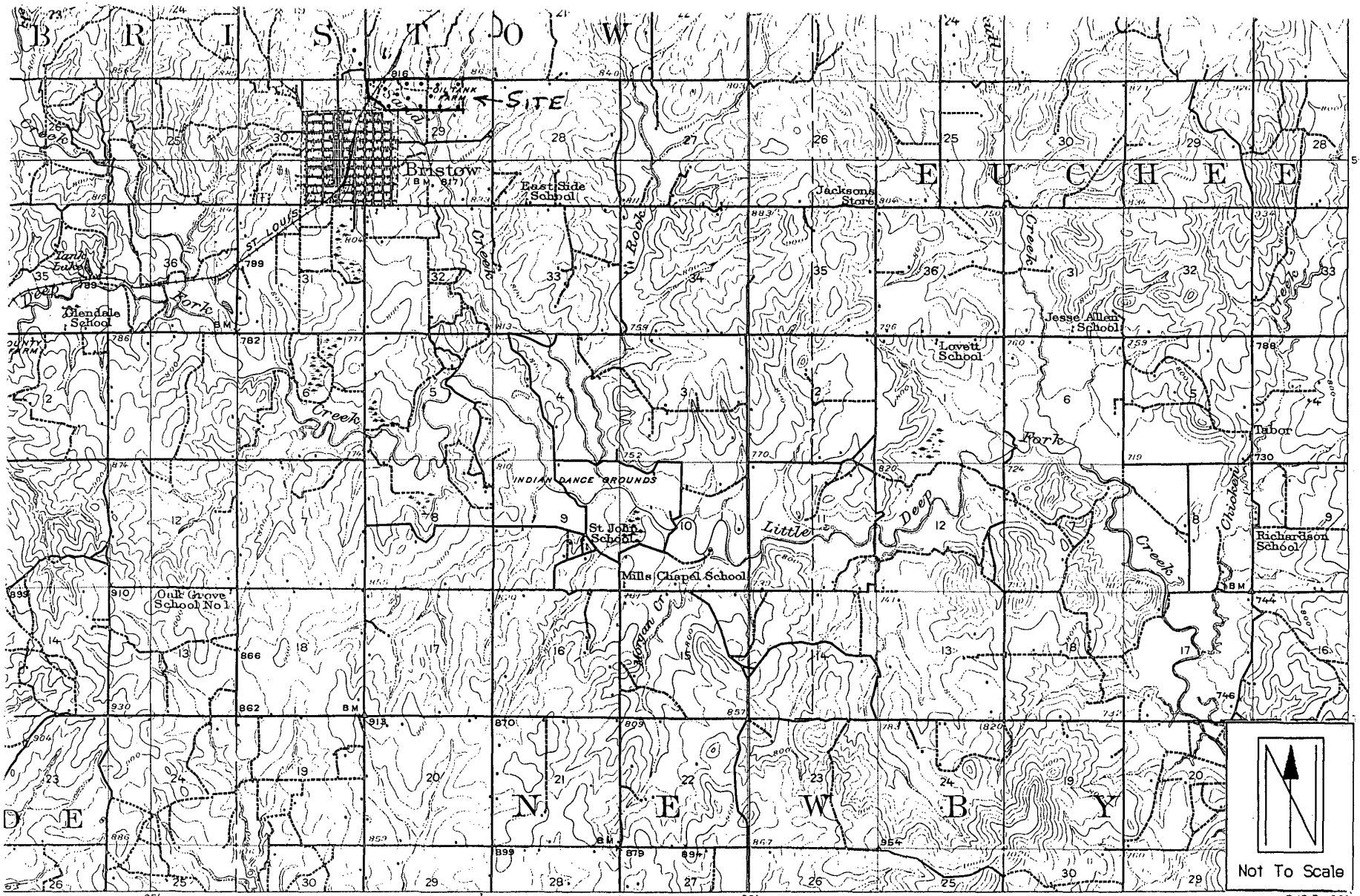
the west side of the property. The remnants of several tanks which had been salvaged for scrap iron were observed. Sludge was present in the bottom of one of these salvaged tanks which was located just south of the residence. It is believed that tank bottom sludge is present in the remaining tanks, as well as, in several bermed areas. Coke, asphalt-like waste and what appears to be elemental sulfur covers the ground in many areas, especially in two areas about 200 feet by 200 feet each located in the central and northeast parts of the property (which is about two acres total). A barren area about 200 feet by 400 feet (about 2 acres) in size is located in the south central portion of the property. This area, which is believed to be soil contaminated by acid or caustic waste, lacks vegetation. A slight acrid odor (possibly SO2) was detected down wind of the area and some small white colored rocks believed to be precipitated carbonates were present on the ground around the perimeter.

The property of the Bristow First Assembly of God church lies just west of the railroad right of way which forms the eastern property boundary. The southern boundary is Sand Creek. The western and northern boundaries are believed to be the section lines. There are no fences. A gravel drive enters the property from the northeast corner to a gravel parking lot north of the church building itself. The building west of the church is the home of (b) and (b) (6) South of the church is a mobile home which will be used as a residence for the new pastor. Two storage sheds are also near the mobile home. The ground is covered with mown grass except for the parking lot and for trees located along the bank of Sand Creek. Several areas of barren to sparse vegetation totaling about 5,000 square feet (100' by 50'), or about 0.1 acres, were observed just southwest of the church. (b) (6) indicated that grass would not grow on these areas. He pointed out the contaminated water well which is housed in the small shed just southwest of the church building. He also indicated a place just west of the church where he had seen a seep on top of a sandstone outcrop in the bottom of Sand Creek. The seep was not observed due to high water, but rust colored staining was noted. Sand Creek flows to the south at this location. The church property drains to the west and south. He pointed out an open 6 inch iron pipe descending vertically from ground level. It is located in the middle of the grassy area south of the church. This could be casing of a well or riser pipe for an underground storage tank (UST) or possibly part of a piping network. No odors were detected when a iron plate covering the top of the pipe was lifted off.

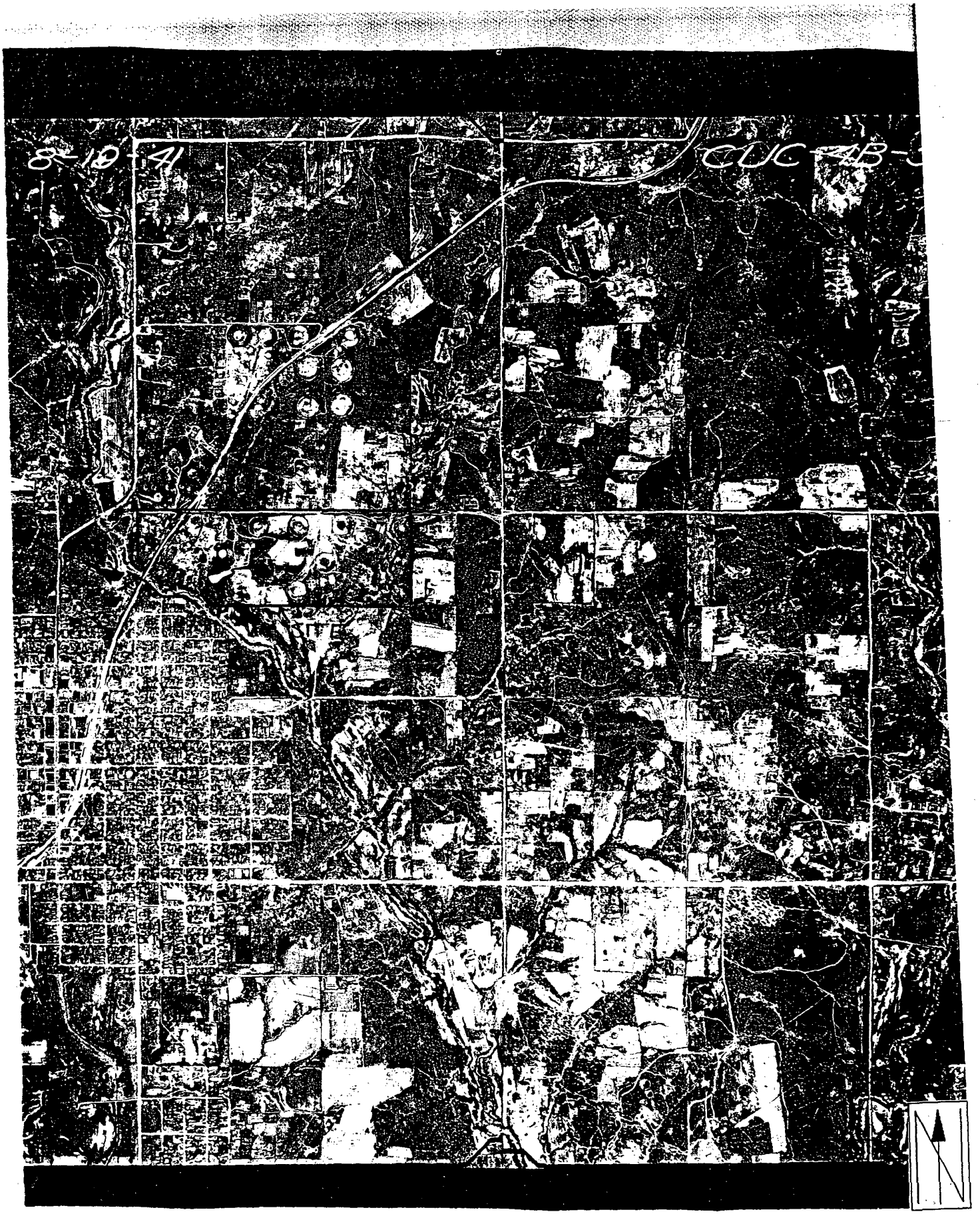
The (b) property was visited around 1:00 pm. Entrance was gained along the west side where a lease road extends southeast from the private drive bounding the east side of the (b) property. An area of about 2.5 acres in the northwest corner of the property is fenced off. (b) (6) indicated that he thought this was a gas pipeline compressor station. A pipeline easement extends to the southeast from here. It is marked with flagging and identifiable as a cleared path about twenty five wide. The north boundary is fenced and the east-west section line road extends about 3/4 of the length of the property to the east. A gate without a lock is located near the north quarter corner where another lease road enters the property following a southerly route along a topographic high. A south trending creek is located along the eastern portion of the property, and water was flowing at the time of the site visit. The eastern part of the property drains to the south and southeast while surface drainage in the west is to the southwest and south. The eastern 1/4 of the property

is heavily wooded. While trees are present along the southern fenced property boundary and randomly scattered elsewhere, most of the remaining areas of the property are covered with grasses and brush. The land to the south is cleared of trees and probably farmed or used for grazing cattle. No structures or tanks were observed on the property. Asphalt-like waste believed to be tank bottom sediment from the 50,000 barrel storage tanks once present was observed in four of the bermed areas (T1, T5, T6 & T7) shown on the site sketch map (PA - Figure 2). It is believed that the remaining bermed areas contain this asphaltic material as well (T2, T3, T4). Two areas on the east side of the north-south creek appear as tank batteries on the 1948 15 minute topographic map (Attachment A). These areas (T8 & T9 of the site sketch) are inside the wooded area and are probably eroded flat. The T8 area was investigated but was not found during the site reconnaissance. The total area of waste is calculated to be 282,743 square feet or 6.49 acres ($3.14 \times 100^2 \times 9$). Aerial photos taken in 1941 (Attachment B) show that five 50,000 barrel tanks were present in T2, T3, T4, T5, & T6 locations and two 5,000 barrel tanks were present at the T1 location. The pit in the west central part of the property (P2) contains sludge as does the pit (P4) in the central part of the property. Both pits were devoid of plant life. A section of the berm on the southwest side of the west central pit had been cut by a bulldozer allowing the sludge to drain out over the ground surface towards the southwest to Sand Creek. The pit is about 45,000 square feet in area. An acrid (possibly SO2) petroleum odor was detected on the down wind (south) side of the pit. The central pit which had been leveled by a bulldozer covers about 28,000 square feet. (b) (6) indicated that he was responsible for these modifications to the land for the purposes of cleaning up the place for sale. The southwest pit (P1) which covers an area of about 96,000 square feet contains a pond with cattails. (b) (b) indicated that sludge was present in this pit as well, but it was not observed. All three pits were identified on the 1941, 1950, 1969, and 1991 aerial photos (Attachments B; C; D; E); thus, the surface impoundments have held waste for more than 30 years. The north central pit (P3) was not observed but is suspected of containing waste. It is about 31,415 square feet in area which was determined from aerial photos. No animal life was observed except a field mouse. (b) (6) said that many hunters use the land for hunting and shooting since it has no controlled access.

There are no schools or daycare centers located within 200 feet of the site. The number of residences within 1/4 mile and between 1/4 and 1/2 mile were determined by a windshield survey. Three residences are considered to be on site; 20 residences are within 1/4 mile; and 185 are between 1/4 and 1/2 mile. A residential area of Bristow is located just south of the (b) property across Sand Creek. Four residences are located just north of the east-west section line road which marks the northern extent of the refinery site.


BRISTOW
EUCHEE
DEWEY
SITE
Bristow
(B.M. 817)
East Side School
Jackson's Store
Jesse Allen School
Lovett School
Tabor
Richardson School
Glendale School
Oak Grove School No 1
St. John's School
Mills Chapel School
INDIAN DANCE GROUNDS
St. Louis
Deep Fork
Little Deep Creek
Chicken Creek
Rock Creek
Not To Scale
R.9 E.
R.10 E.
Scale 62500
4 Miles
5 Kilometers
Contour interval 25 feet
APPROXIMATE MEAN DECLINATION, 1915
Edition of 1916, reprintod 1948.
Polyconic projection. North American datum
BRISTOW, OKLA.
N3545-W9615/15

000189



"B"

1949

CREEK COUNTY, OKLAHOMA

R. 9 E.



0 ½ 1 Mile Scale 1:20000 0

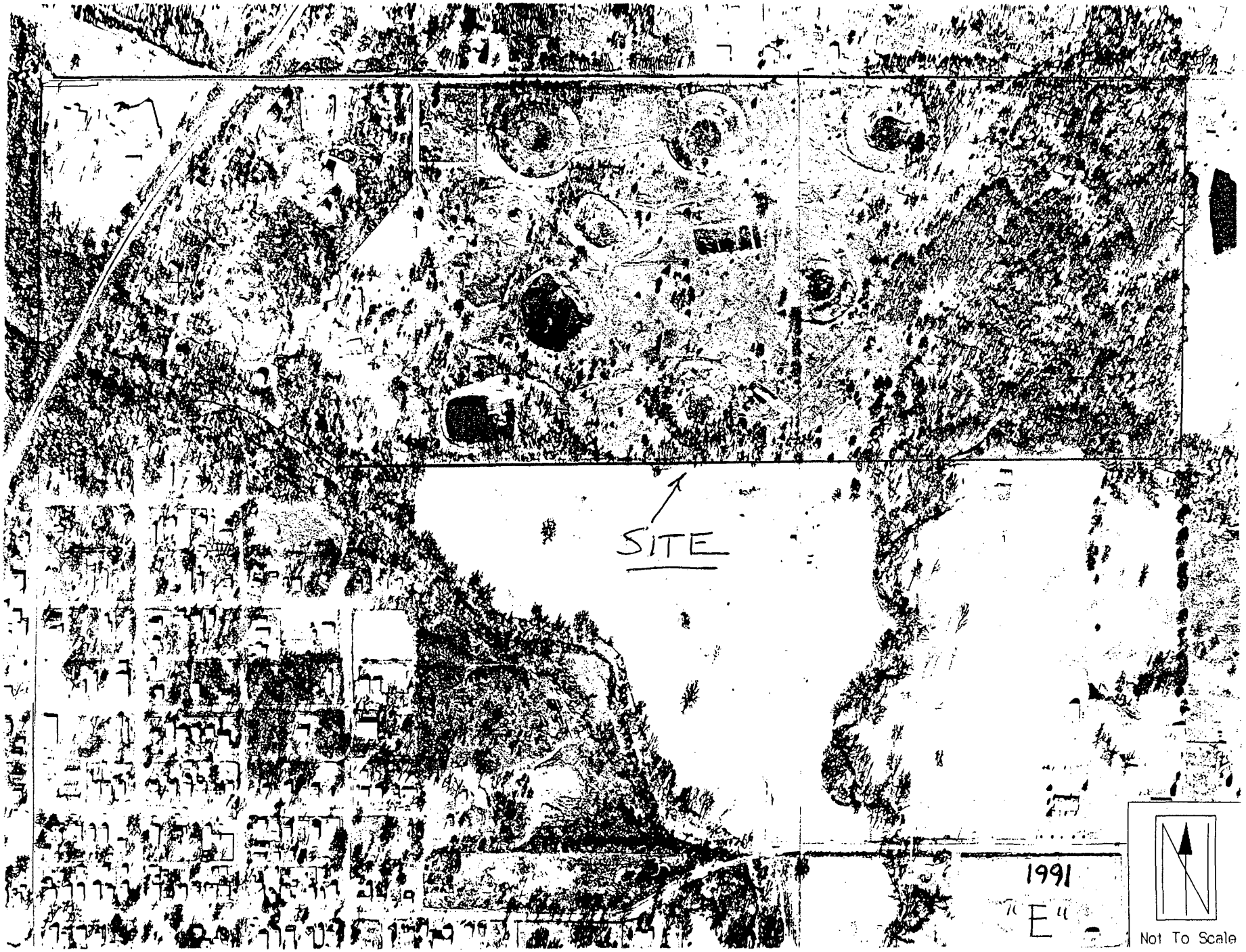
"C"

000191



D

Not To Scale


SITE
1991
"E"
Not To Scale

Reference 3

APPENDIX E

STANDARD OPERATING PROCEDURE
TO DETERMINE SITE
LATITUDE AND LONGITUDE COORDINATES

HAZARDOUS SITE EVALUATION DIVISION
SITE ASSESSMENT BRANCH
U.S ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C.

September 1991

000195

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #2
LI USING ENGINEER'S SCALE (1/60)

SITE NAME: Wilcox Oil Co. CERCLIS #:

AKA: SSID:

ADDRESS: North of Bristow

CITY: Bristow STATE: Ok ZIP CODE:

SITE REFERENCE POINT: center of site

USGS QUAD MAP NAME: Bristow TOWNSHIP: 16 (N)/S RANGE: 9 (E)/W

SCALE: (1:24,000) MAP DATE: 1973 SECTION: 29 NE 1/4 NW 1/4 NW 1/4

MAP DATUM: (1927) 1983 (CIRCLE ONE) MERIDIAN: Indian

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy):

LONGITUDE: 96 ° 22 · 30 " LATITUDE: 35 ° 45 · 00 "

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: 96 ° 22 · 30 " LATITUDE: 35 ° 50 · 00 "

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM LATITUDE GRID LINE TO SITE REF POINT: 95

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 31 . 39 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 0 · 31 . 39 "

D) ADD TO STARTING LATITUDE: 35 ° 50 · 00 . 00 " + 0 · 31 . 39 =

SITE LATITUDE: 35 ° 50 · 31 . 39 "

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM RIGHT LONGITUDE LINE TO SITE REF POINT: 97

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 32 . 05 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 0 · 32 . 05 "

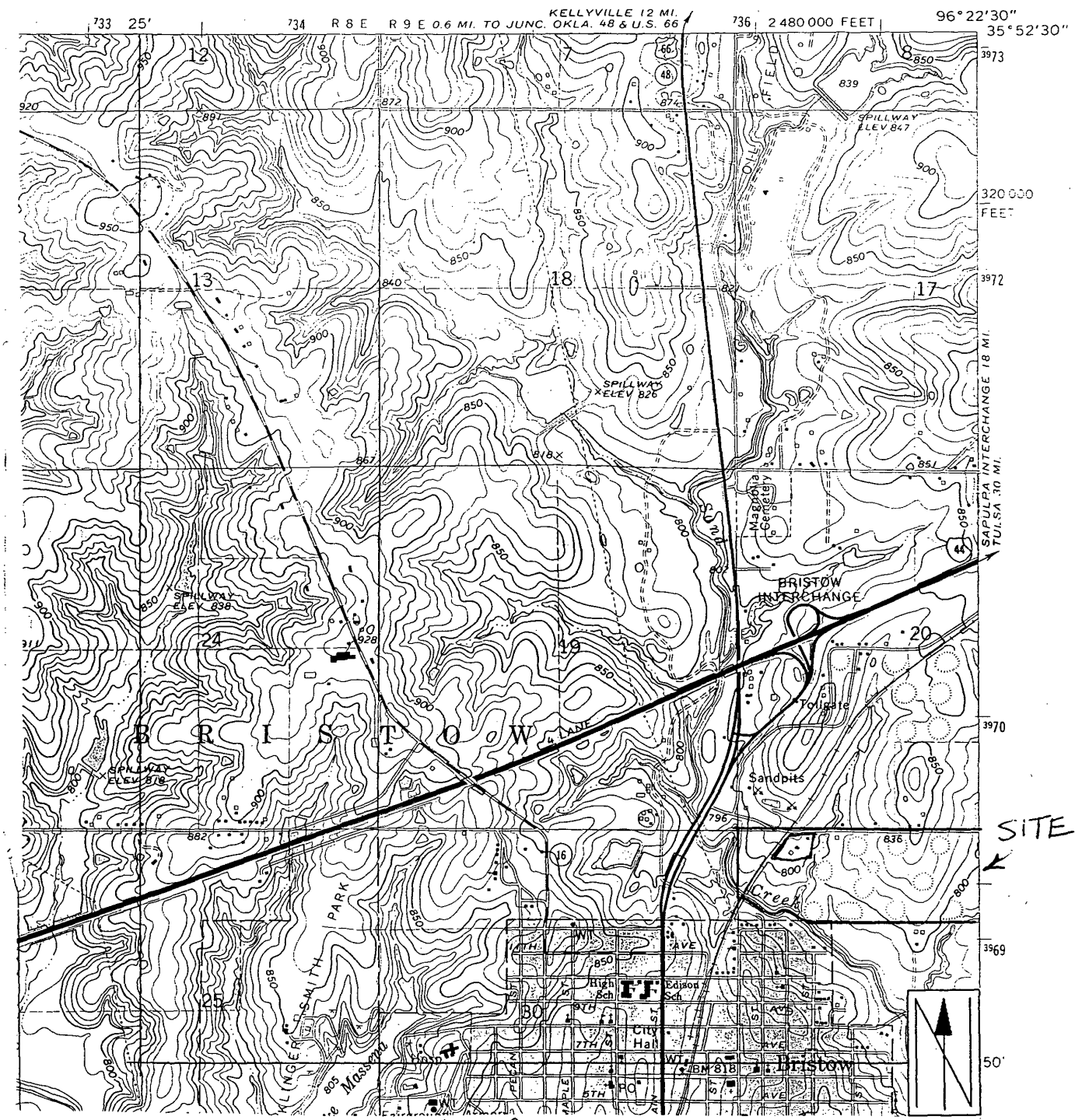
D) ADD TO STARTING LONGITUDE: 96 ° 22 · 30 . 00 " + 0 · 32 . 05 =

SITE LONGITUDE: 96 ° 23 · 02 . 05 "

INVESTIGATOR: Charles Cornell DATE: 6-16-94

000196

SITE NAME: Wilcox Oil Co NUMBER: _____



TOPOGRAPHIC MAP QUADRANGLE NAME: Bristow SCALE: 1:24,000

COORDINATES OF LOWER RIGHT-HAND CORNER OF 2.5-MINUTE GRID:

LATITUDE: 35 ° 50 ' 00 " LONGITUDE: 96 ° 22 ' 30 "

*U.S. GOVERNMENT PRINTING OFFICE: 1991-548-187/40505

E-11

000197



INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1976

IXL 16 MI.
25 MI. TO INTERSTATE 40

1 MILE
7000 FEET
KILOMETRE

ROAD CLASSIFICATION

Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route
U. S. Route
State Route

OKLAHOMA
QUADRANGLE LOCATION

(NEWBY) 6755 III NE

BRISTOW, OKLA.

SW/4 BRISTOW 15' QUADRANGLE
N3545—W9622.5/7.5

1973

AMS 6755 IV SW—SERIES V883

VIRGINIA 22092
73069
EQUEST

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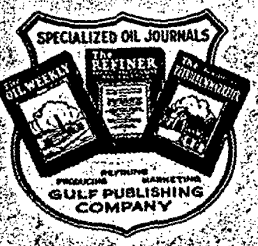
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THE REFINER
and Natural Gasoline Manufacturer

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VOL. 9, No. 9 — SEPTEMBER, 1930



GRADY TRIPLETT, *Editor*

GEORGE REID, *Associate Editor*

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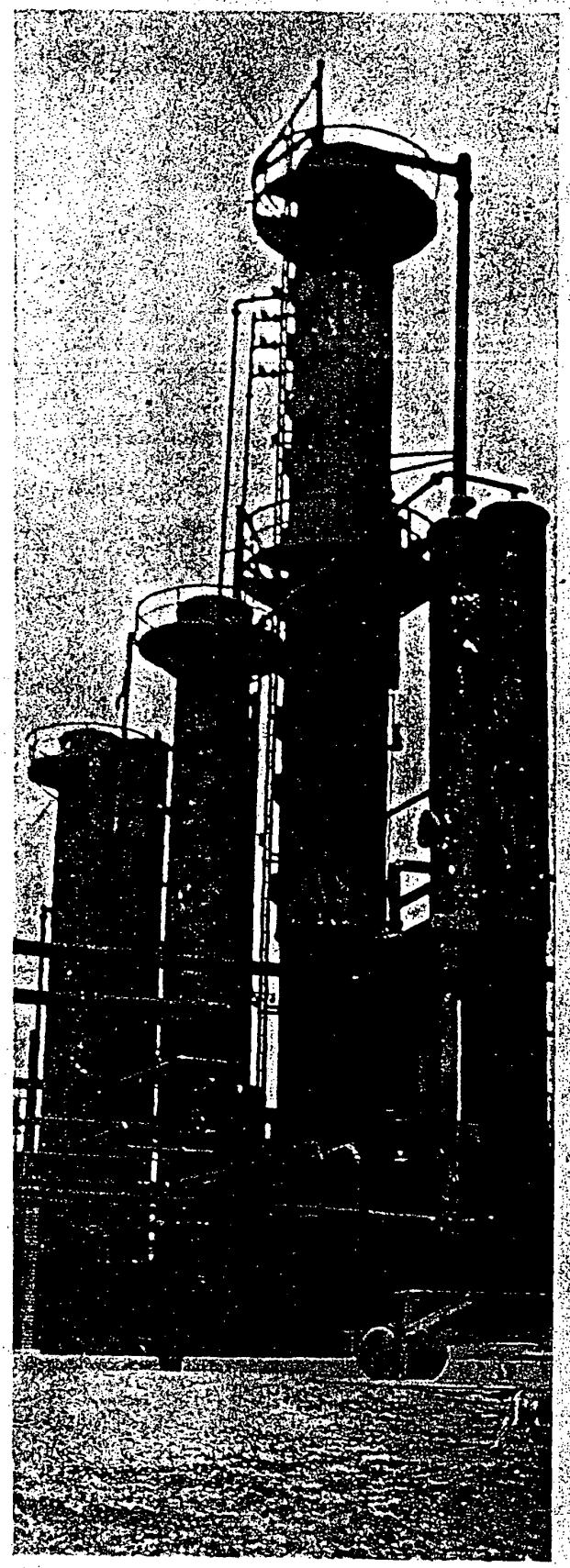
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000200

Wilcox Has N Installation Plant



WILCOX OIL & GAS COMPANY has [illegible] operating its new refinery at Bristow, Okla., a little more than a year, during which [illegible] certain additions and changes have been made to secure products not originally required and to generally improve efficiency. The refinery is on the same site as the original 1000-barrel Wilcox experimental plant erected 10 years ago, which was operated under lease by Riley Petroleum Company until 1928, and which was completely dismantled to permit erection of the new 4000-barrel modern skimming and cracking plant. Decision to erect and operate a refinery follows entry of the company into wholesale and retail marketing and subsequent expansion of these facilities in territory within a radius of [illegible] miles of the refinery. Like most modern installations of the type this plant consists of skimming plant, cracking unit, and redistillation battery, with vapor recovery system and continuous treating equipment.

The greater portion of the 4000-barrel crude requirements of the refinery is produced locally by the company, and as soon as it is practical the crude is brought direct to the plant from the field, thus eliminating expensive storage and handling facilities. However, this practice is conducive to relatively high percentages of b. s. & w. in the crude, which must be settled out before actual processing at high temperature. This is accomplished by means of preheating the fresh crude in a series of Cloverleaf

Fractionating equipment in connection with crude topping unit and pressure distillate re-run stills.

000201

Modern Bristow

By GEORGE REID
Associate Editor

placed
in the uppermost section of the skimming unit
fractionating column where the oil is preheated to
200° F.

this point the crude passes into one end of
ght by 24 foot horizontal settling drum (for-
having seen years of service as a shell still)
the settling time is sufficient to let the foreign
materials
als drop out of the oil. Clean crude is drawn
continuously from the front and top of the drum, and
k w. is continuously removed from the front
bottom of the settler.

crude is then further preheated through coun-
through a series of exchangers, absorbing
from the residum leaving the base of the sepa-
before
column. The temperature is raised to about
F. before it enters the pipe still. This Winkler-
distillation unit consists of 124 tubes 3½
I. D. and 22 feet long, arranged in two con-
banks and one roof bank. As the oil leaves
tubes it has been heated to about 520° F. and
temperature it enters the bottom of the large
fractionating
ating column.

column was designed by the same engineering
and is six feet in diameter by 75 feet high.
tains 17 bubble decks and two blank decks,
which is approximately half way up the height
tower from which point a kerosene side stream
is removed; the other blank deck being just
the top three bubble trays where a side stream
oline is removed. Former design called for



By means of this conveyor coke dropping from reaction chamber is loaded directly into cars for shipment.

000202

removal of a kerosene side stream into a flashing or stripper tower, and withdrawal of residuum through a similar flash tower, flashing both with superheated steam, and returning flashed vapors to the original column. Under the present practice the upper auxiliary tower or side stream produces a stream of 437 e. p. naphtha, and a 375 e. p. gasoline stream is taken off over head. Gas oil may be removed from the lower withdrawal equipment, and fuel oil is taken from the bottom. Condensed 375 e. p. gasoline is taken from a large water separator device and returned over the top of the column as a means of temperature control. This control is also aided by passing the incoming crude through the coils in the top of the tower. Residue is pumped from the tower by liquid level control into raw oil tanks for the Dubbs unit.

This change in design and in the number and type of products fractionated through the large bubble column is an example of the flexibility of modern rectifying equipment. With slight mechanical changes the operation of the tower may at any time be converted back to the original system or to meet some other requirements. The two grades of gasoline produced in this operation are given sodium plumbite treatment in a continuous treating system to meet Doctor and corrosion specifications.

CRACKING OPERATION

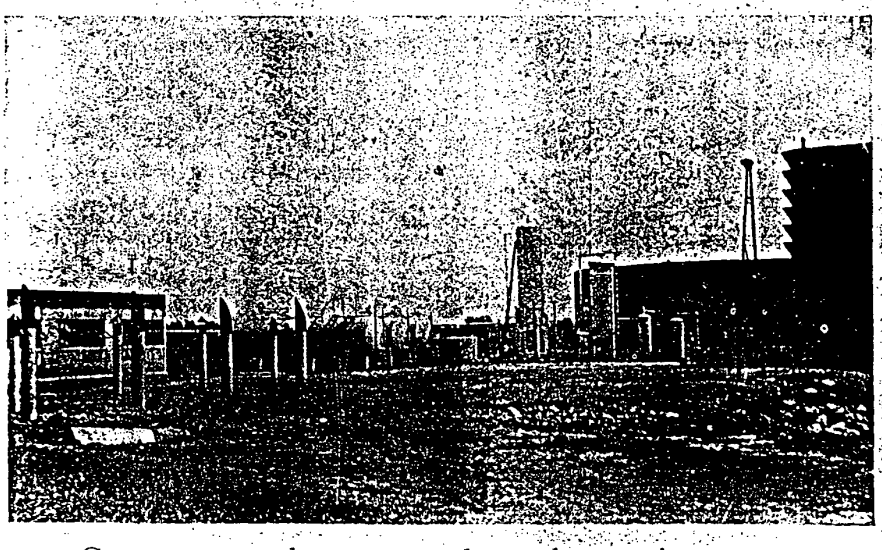
The Dubbs cracking unit is equipped with a 10 by 40 foot reaction chamber and late type modified Alcorn radiant heat furnace. Several changes in design were effected in this furnace and its operation. Special alloy beams have been installed to support the radiant shield getting the weight off of the tubes, the arch was removed, the number of tubes was reduced to 64 and the flow of oil was reversed. These changes and other details were worked out by Dubbs, Alcorn and Wilcox engineers, due to the new design of the furnace. The unit is operated in three day cycle running non-residuum. At present the production of topped crude is in excess of the capacity of the single Dubbs unit, and the company is considering the installation of additional cracking equipment.

Through the use of equipment designed for direct loading of coke into cars the coke production is handled but once at this plant. A spur track was built close to the reaction chamber from the nearby railroad. A conveyor with a hopper large enough to fit under the reaction chamber, is employed to dump the coke directly into the cars. As the 4300-foot cable is pulled from the chamber by means of a steam hoist, the electrically operated conveyor removes the falling coke, free of nuts, bolts, dirt and other foreign matter, spilling it into the cars. It is estimated that this conveyor has reduced the cost of handling coke about one dollar per ton, and as seven to eight hundred tons are handled monthly and sold on contract to a large industrial concern, there is real economy effected in this method of handling the product.

Pressure distillate from the cracking operation is taken to the treating department and treated with four pounds of 66° Be. acid per barrel and neutralized with 17° Be. caustic in a continuous system. The distillate is then taken to rerun stills. This system consists of two 12 by 30 foot shell stills equipped with bubble towers. Incoming 50 gravity pressure distillate is charged through Cloverleaf sections placed in the tops of the two bubble towers. After this preheating it enters the shell stills. Through the addition of a new stripper tower in connection with the second bubble tower, the rerun system is producing a fraction of stripped furnace oil of about 34 gravity. The bottoms are marketed as 28/30 gravity fuel oil. Overhead stream from the fractionating equipment is a premium grade 400 end point anti-knock motor fuel and marketed as such. A side stream of 425 end point gasoline is removed which is blended with the straight run gasoline.

Cracked gasoline from the rerun operation is given Doctor treatment in a continuous system. The straight run gasolines are given similar treatment. Two complete continuous

(Continued on page 122)



Compression gasoline recovery plant and gas washing equipment

000203

to guard against loss of desirable fractions. Both the raw gasoline and reflux feeds is regulated by Foxboro controllers, the usual orifice arrangement being maintained.

The re-boiler and column temperatures are maintained within one-half of one degree of the desired temperature, the success of the stabilization depending largely upon this small deviation from the ideal temperature. The pressure on the stabilizing column is maintained within one-half pound of the desired pressure.

The regulator is on the water condensate from the re-boiler. Boiler pressure is maintained on the re-boiler, while the desired temperature is maintained by a half-inch regulator installed on the water condensate leaving the re-boiler. When the valve is closed, water covers the tube section, and when the valve is opened, water leaves the tower, allowing steam to cover the tube section and thereby increasing the temperature.

Liberal use of concrete for supporting such equipment as the heat exchangers and condensers add strength to the installation and reduces the fire hazard. Elimination of buckling from steel platforms is also accomplished, in addition to a more attractive appearance. The ladder leading up the main column is enclosed by a barrel of heavy wire netting—an added safety factor for workmen.

Five large DeLaval centrifugal pumps are used for circulating water and moving the gasoline, two being for the former and three for the latter. All pumps are in a pit below the surface of the ground. The pump house is equipped with blowers to prevent accumulation of dangerous fumes.

The unit was designed and built by C. F. Braun and Company; actual arrangement of the equipment being largely in the hands of company engineers. Besides handling an almost unprecedented gallonage, the unit is one of the most attractive installations yet completed.

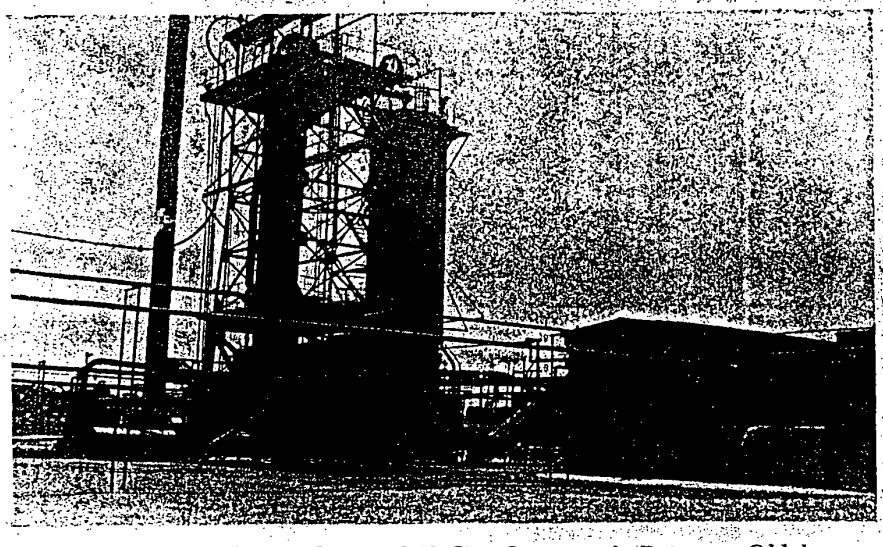
Wilcox Has Modern Installation in Bristow Plant

(*Continued from page 74*)

treating systems are provided for handling the light products, and agitators of the batch type were erected for kerosene treatment.

A recent addition at this plant is a compression type gasoline recovery installation for which gases and vapors are gathered from the skimming plant receiving house, the redistillation plant receiving house, light product storage and crude tanks. Yields from these vapors run from two to six gallons per 1000 cubic feet. The plant production ranges from 4000 to 5000 gallons per day. Gases from the Dubbs unit operation are to be processed through an absorption type recovery unit planned for early installation. Vapors from the pressure distillate rerun operation are first scrubbed through alkaline solution before they are compressed.

The compression plant consists of four 80-horsepower Bessemer machines operating at 40 pounds on the low stage side and 175 pounds on the high stage side.



Cracking equipment at Wilcox Oil & Gas Company's Bristow, Oklahoma, refinery

Early in the construction of the new refinery P. L. Tinkler joined the organization as construction engineer. He supervised the installation and design of facilities, and upon completion of the plant was made superintendent of its operation, and has directed the modifications and additions to the plant as discussed in this writing. We are indebted to Mr. Tinkler for his helpfulness and his permission to present the details of plant operations.

000204

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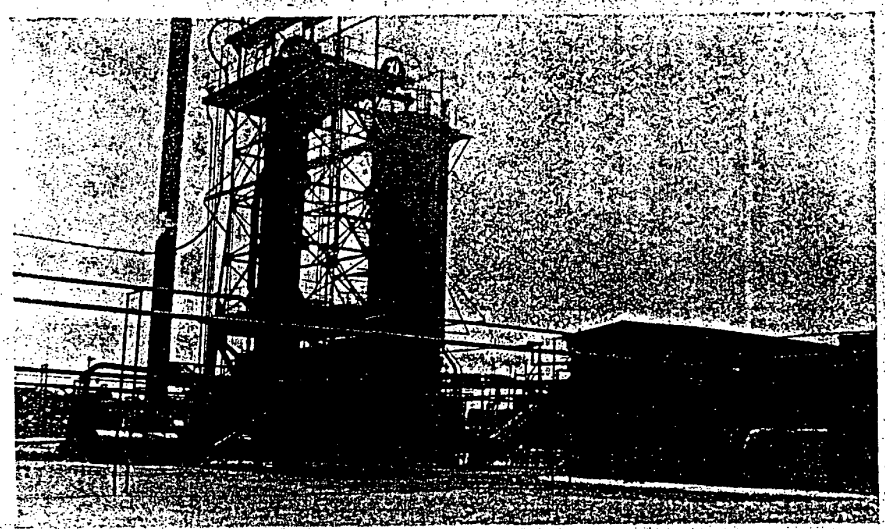
Wilcox Has Modern Installation in Bristow Plant

(*Continued from page 74*)

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000205

Reference 5

MEMORANDUM

December 28, 1994.

To: Wilcox Oil Company Preliminary Assessment (PA) file.

From: David Cates.

Re: Records of Communication.

The following messages are summaries of conversations with various people related to the Preliminary Assessment (PA) report for the Wilcox Oil Company CERCLIS site. The entries are arranged in chronological order.

A. **11/28/94 & 12/01/94:** Spoke with Danny Trout of the Bristow Public Works Department at (918) 367-5588 concerning the Bristow public water supply system. He conveyed the following information. The City of Bristow municipal water supply system has eight active wells which are connected via a distribution network to four water storage towers. The towers and wells are interconnected forming a blended system with line taps occurring before and after the towers. The system serves 4,300 people in Bristow and 116 people in Slick, Oklahoma. Water supply to the system is obtained from wells only. The water is chlorinated at the well head. Three of Bristow's eleven wells reported to be active on the public water supply database (#'s 3, 7 & 21) are no longer part of the system. Well #7 which is incorrectly located on the data base has been plugged and abandoned as a result of deactivating an underground water storage system to which it was connected. The correct location of this well was in the NE/4 SE/4 NE/4 of Section 30-T16N-R9E instead of R8E, which puts it about one quarter mile southwest of the Wilcox Oil Company refinery site. Well #3 is apparently plugged and abandoned, also. Well #21 was given to Mid-America Cafe who presumably are using it for water supply. Well #18 is incorrectly located on the public water supply data base also. It should be in the SW/4 SW/4 SE/4 of Section 25-T16N-R8E instead of in the SW/4 SW/4 SW/4 of the section. A hand dug well which has the dimensions of 30 feet in diameter by 200 feet deep was reported to be located in the NW/4 NE/4 NE/4 of Section 31-T16N-R9E. This municipal water supply well has the capability of producing but is currently shut down. An industrial well owned by McAdams Pipeline Company about 200 feet deep that supplies drinking water to workers was reported in the SE/4 SE/4 of Section 19-T16N-R9E. The company is not on city water. The well is not shown on any of the public information because apparently it was drilled in the 1950's prior to record keeping. Well #15 which was located in the SW/4 NE/4 SE/4 of Section 30-T16N-R9E, about one half mile southwest of the site, was supposedly abandoned because of diesel contamination following a train derailment. No other wells have been reported to be abandoned because of contamination. Three of Bristow's water supply wells are high capacity wells (#'s 20, 22, & 23), producing 200 gpm each. The other five wells (#'s 14, 16, 17, 18, 19) are small capacity wells which produce at rates from 50 gpm to 90 gpm. There are no annual production records.

The daily production for these wells when active is: 72,000 gallons each for #'s 14 & 16; 100,000 gallons for #17; 129,000 gallons each for #'s 18 & 19; and 288,000 gallons for #'s 20, 22 & 23. Not all of the wells are produced at once. Instead, two large capacity wells and one small capacity well are pumped together on a daily basis. Under this scheme either of the large capacity wells produces more than 40 percent of the daily water production. The specific wells in this production scheme are changed periodically. The average daily production is 400,000 gallons; the storage capacity is 1,500,000 gallons; and the total production capacity is 1,152,000 gallons. Records indicate there are two mobile home parks which have their own public water supply wells. Fogle mobile home park is currently on city water and their well is reported to be inactive. It is unknown whether or not this well has been plugged and abandoned. The church and the (b) (6) residence on site are supplied with city water via a 2 inch line installed by the (b) . The records show that a water supply well 120 feet deep serves 50 people of the Evergreen trailer park.

B. **12/02/94:** Had telephone conversation with Doug McCurley with Meyer Engineering at (405) 755-5325 concerning annual production from individual wells for the city of Bristow. He could not provide any pertinent information to resolve whether or not any of the wells provided more tan 40 percent of the annual water production. He mentioned that Bristow provided water to the Slick Rural Water Authority (RWA).

C. **12/05/94:** Had telephone conversation with Cissie Gaskins of the Slick Rural Water District at (918) 367-5558. She confirmed that Bristow supplies water to the Slick rural water Association (RWA) which serves 116 residences.

D. **12/06/04:** Had telephone conversation with Becky Simmons of the Creek County Tax Assessors office at (918) 224-4508 concerning ownership of the property in the (b) (6) (b) (6) . She informed me that (b) (6) owned 13 acres with this legal description.

E. **12/07/94:** Had telephone conversation with (b) (6) , co-owner of the original site of the Wilcox Oil Company refinery, at (b) (6) in response to our letter and access agreement. He wanted his attorney, Mike Jones, to draft another agreement which specifies a time limit for access and he wants us to sign personal injury liability waivers. He informed me that (b) (6) is the owner of about 100 acres east of his land which was the site of storage tanks and sludge pits of the tank farm of the old refinery and his son (b) could provide (b) (6) telephone number. He informed me that he had three wells on his property. Two were water wells and one was an oil well. The two water wells were drilled to about 200 feet and were abandoned because of oil contamination from upper strata in one case and because the casing collapsed after cementing in the other well. Only one of the wells has been plugged and abandoned. The oil well was contaminated down to 40 feet; it was cleaned out them plugged. The water well had gasoline and diesel from 40-60 feet. Most of the area is now supporting trees and other vegetation. For a long time trees would not grow in the yard of the house on site where his youngest son lives. There

is still an area about 100 feet by 150 feet that is barren of vegetation and contains soft knee soil. He said he would get a copy of the aerial photos from the Soil Conservation Department for me. I could pick them up from (b), his son and co-owner, at (b) (6) in Bristow. (b) his youngest son, lives on site with his wife. He bought the fenced area which has about 18 acres which is more than the deed specifies (13 acres). He has an abstract. There were three refineries in Bristow. One operated until the 1930's; one operated until the 1950's; and the Wilcox Oil Company refinery operated until the early 1960's. The land, buildings, equipment and tanks were auctioned off in 1966 or 1987; with requirements for the tanks, equipment, buildings, etc., to be removed in 90 days. Three 50,000 barrel tanks were still standing in the 1970's on the property to the east where cattle have been lost in the bermed areas and one person was injured during salvaging of the tanks. The (b) (6) are salvaging scrap steel from the tanks and pipe inside the fenced area. There are two 5,000 barrel tanks remaining and 6 or 7 have been salvaged.

F. **12/08/94:** Had telephone conversation with Mike Jones, the attorney for (b) (6) (b) (6) I informed him that we were working as contractors for the EPA; told him about the PA site reconnaissance procedure; talked about the next step beyond the PA, the SI; discussed liability issues of current land owner; and let him know about the petroleum exclusion clause. He said he would try to put together an agreement for us to sign that restricts access to the site in terms of a time limit and relinquishes the (b) from any personal injury liability resulting from an accident. He said he was very busy and would try to get to it in a week or so. I let him know that this was too long and asked him to fax it tomorrow. After one week we still had not received a fax. Barbara Rausch composed an agreement and we faxed it to Mr. Jones' office. It was reviewed by (b) (6) and met with his approval.

G. **12/09/94:** Had telephone conversation with a person at the Creek County Tax Assessors office concerning the ownership of the land in the NE/4 NW/4 and the (b) (6). I was informed that Ann Montgomery owned 78.25 acres at this legal description.

H. **12/09/94:** Met with (b) (6) p on (b) (6) in Bristow. Picked up an aerial photo his father had acquired and got a telephone number for (b) (6). Told me about two water wells they drilled on the property to around 200 feet in depth. One produced gasoline after pumping for a day from open hole below the surface casing which was set at about 40 feet. It was plugged back by adding successive volumes of sand then cement until the cement filled inside the surface casing. The casing in the other well collapsed during cementing. They tried to drill it out without success. The oil well that was mentioned by (b) (6) did not exist. He confirmed what his father had told me by recounted the history of the property. He added that INCOG had been conducting a study of Sand Creek a few years ago.

I. **12/12/94:** Had conversation with Mike Houts with the Oklahoma DEQ at (405) 271-7899 concerning Well Head Protection Areas (WHPA) around Bristow. He said there were not any around Bristow at this time.

J. **12/12/94:** Had telephone conversation with Al Coulter at (405) 271-7054 concerning any complaints that may have been reported on the Wilcox refinery site. He said according to his knowledge there were none.

K. **12/12/94:** Had telephone conversation with Lynn Moss of the Environmental complaints and local services (ECLS) of the OKDEQ at (405) 271-4468 concerning any complaints that may have been reported on the Wilcox refinery site. She has the records for the Department of Pollution Control (DPC) which was a part of the Oklahoma Department of Public Health (OSDH). She said no complaints have been reported. She indicated that the records of complaints go back to 1977 for the DPC; 1980 for the Water Board; and 1984 for the Health Department.

L. **12/12/94:** Had telephone conversation with Robert Huber with the Creek County Health Department at (918) 224-0249 and (918) 367-5588 concerning any complaints that may have been reported on the Wilcox refinery site. He was not aware of any complaints on a Wilcox Oil Company, but said he would check his files under the legal description I provided to him and get back in touch with me later.

M. **12/12/94:** Had telephone conversation with Roland Belveal with the local office of the Corporation Commission in Bristow at (918) 367-3396 concerning any complaints that may have been reported on the Wilcox refinery site. He had nothing to report.

N. **12/12/94:** Had telephone conversation with Margret Graham with OKDEQ and formerly with the OWRB at (405) 271-1400 concerning any old OWRB files on the Wilcox refinery site. She reported that no files exist on this refinery and that the earliest OWRB records would be 1969.

O. **12/13/94:** Had telephone conversation with Beth Garner of the Oklahoma Secretary of State's office at (405) 521-3911 concerning Wilcox Oil Company. She indicated that there is not a company by that name "in good standing" with the State at this time, However, a record search turned up an Oklahoma corporation called Wilcox Oil Company which operated "in good standing" from 11/17/75 to 2/28/77 when it was suspended by the Oklahoma Tax Commission. A Delaware corporation called Wilcox Oil Company operated "in good standing" from 8/28/44 through 7/24/64 when it withdrew. On the same day (7/24/64), a Delaware corporation called Wilcox Oil Company filed with the State Department to begin operations in Oklahoma. This company was involved in a merger in 9/24/65 of which the surviving company was Tenneco Oil Company, a Delaware corporation. Tenneco is operating "in good standing" in Oklahoma at this time.

P. **12/14/94:** Had a telephone conversation with Richard Smith of INCOG at (918) 584-7526 concerning a stream survey of Sand Creek. He said that INCOG conducted

a study on the Little Deep Fork 1987 and 1988 upstream and down stream of Bristow and Depew related to impacts on the creek environment waste water effluents from the two towns. He reported that no samples or measurements of stream flow were taken on Sand Creek since it was not flowing at the time of the study (summer of 1987).

Q. **12/16/94:** Met with [redacted] at about 11:30 p.m. and entered his property ([redacted]) for a site reconnaissance. He said they were in the long term process of salvaging the old storage tanks for scrap iron and pipes for fence posts. He said he plans to use the two tanks at the northwest corner of the property for storage; plans to clean out the old structures to make them useable; and plans to bury the old concrete foundations and tanks/tower pads. He said that there were only two water wells drilled on the property and that both had been plugged and abandoned.

R. **12/16/94:** Met with [redacted] at the Bristow First Assembly of God Church where he is the pastor. They live in the home just west of the church. He showed us some areas of contaminated soil where grass would not grow. He pointed out an area where he observed oil? seeping into Sand Creek just southwest of the church. The seep was not visible this day because of high water from run off of rain received the previous night. He showed us a contaminated water well in a pump house located just southwest of the church and an open cased well or riser located in the middle of the field south of the church. He said that the mobile home also located just south of the church would be the residence of the new pastor. He informed us that [redacted], a church member, at [redacted] could provide some information about the construction of the contaminated water well. He said that the church is not using the well anymore and that they and the church are on city water which is provided by a 2 inch line installed by the [redacted]. He commented that the line breaks frequently where it crosses Sand Creek.

S. **12/16/94:** Met with [redacted] on his property [redacted] at about 1:00 p.m. and viewed some of the tank farm remnants (asphalt-like tank bottom sediments and oily sludge inside the remaining retention berms for the 50,000 barrel storage tanks). Recent evidence of earth work was observed where several berms had been cut and some had been leveled off. He said that he was trying to clean up the land surface in order to sell several subdivided tracts. He said that people enter the property frequently for hunting.

T. **12/19/94:** Had telephone conversation with Noel Osborne of the Oklahoma Water Resources Board (OWRB) at (405) 231-2577 concerning date when water well drillers were first required to report drilling and completions of water wells and bore holes. She indicated that they were first required to report in 1982. Prior to that date scant information on water well locations will be available.

U. **12/20/94:** Had a telephone conversation with [redacted] at [redacted] concerning the water well of the Bristow First Assembly of God Church. He is a

member of the church and has worked on the well. The well was drilled in 1989 or 1990 to a total depth of about 110 feet. During drilling, a water zone at 40 feet and an oil zone from 20 to 40 feet were encountered. The well was cased and perforated from 40 to 110 feet. It was equipped with a activated carbon filter system for treatment of the petroleum produced with the water. Rain-soft Water Treatment Systems installed the system. The church used the well for about one year then converted back to city water because the petroleum overloaded the treatment system and produced taste and odor problems. He reported that the filter was backflushed every one to two months which would recover about 1 to 2 gallons of crude oil, but the water still had bad taste and odor. He also reported that while digging the ditches for lateral lines, oil was encountered at about 2 feet below ground level.

Reference 6

MEMORANDUM

December 12, 1994.

To: Wilcox Oil Company Site Preliminary Assessment (PA).

From: David Cates, Environmental Specialist, Superfund (Site Assessment Unit).

Re: Potentially Responsible Party (PRP) Search.

A PRP search was conducted on December 9, 1994, concerning an abandoned oil refinery near Bristow, Oklahoma, in Creek County. The refinery appears to be owned and operated by Wilcox Oil Company from the mid 1920's to early 1960's. The original refinery site covers approximately 13 acres in the [redacted] Section 2[redacted] and is located about 0.75 miles northeast of the Bristow City Hall. Records from the tax assessor's office indicate that [redacted] are the current owners of the site. The current owners of the site and surrounding properties are presented in the following table.

PROPERTY OWNERS	ADDRESS	PROPERTY LOCATION	AC	AT
[redacted]			13	A
			7	B
			78.85	C
			11.25	D
			3.60	E
			67.68	F
Falcon Oil Properties	Box 988 Bristow, OK 74010	SWSW 20-T16N-R9E	3.25	G
[redacted]			5.70	H
Bristow First Assembly of God Church	Route 9, Box 1 Bristow, OK 74010	SWSW 20-T16N-R9E	1.75	I

A detailed title search was also conducted concerning the site ownership back to October 11th, 1928, when H.F. Wilcox Oil Company acquired a general warranty deed to the site covering approximately 10 acres located in the NE/4 NW/4 NW/4 of Section 29 from [redacted] (Attachment J). Wilcox Oil Company, a Delaware Corporation, transferred title to [redacted] on November 1st, 1963, thus establishing a 35 year period of operations (Attachment K). The property went through several different owners after [redacted] until being transferred to [redacted], the current co-owner, by J[redacted] on March 27th, 1973 (Attachment L). The details of these ownership transfers are shown in the following table.

GRANTOR	GRANTEE	DOC	DATE	BK	PG
[redacted]		WD	1/22/79	69	1348
		WD	3/27/73	17	595
		WD	4/21/67	1025	197
		Cor WD	3/6/67	1022	484
		WD	3/6/67	1021	403
Bolin Oil Company	C. W. Stradley	Inden-ture	7/15/66	1007	612
Tenneco Oil Company	D. H. Bolin	Deed	6/14/66	1006	482
Wendel H. Sandlin	Tenneco Oil Company	GWD	12/16/65	994	19
Wilcox Oil Company	Wendel H. Sandlin	QCD	11/1/63	943	434
[redacted]		GWD	1/4/29	371	227

According to the Oklahoma Secretary of State's office, there are currently no companies in Oklahoma operating "in good standing" named Wilcox Oil Company. Their records showed that an Oklahoma corporation called Wilcox Oil Company, operated in Oklahoma from 11/17/75 to 2/28/77 at which time it was suspended by the Oklahoma Tax Commission. A Delaware corporation named Wilcox Oil Company operated "in good standing" in Oklahoma from 8/28/44 until it withdrew on 7/24/64. On the same day (7/24/64) a Delaware corporation named Wilcox Oil Company filed with the State Department and operated "in good standing" until 9/24/65 when it merged with another company. The surviving company was Tenneco Oil Company, a Delaware corporation, which is currently operating "in good standing" in Oklahoma.

The ownership map (Attachment M) shows that H. F Wilcox Oil Company owned more than the approximately 10 acres of land considered to be the original refinery site which was described previously as being in the NE/4 NW/4 NW/4 of Section 29. The map indicates

an additional 20 acres of land both west and east of the St. Louis and San Francisco Railway plus approximately 80 acres underlying the NE/4 NW/4 and the NW/4 NE/4 of Section 29 was owned by H. F. Wilcox Oil Company. The Quit Claim Deed dated November 1st, 1963, between Wilcox Oil Company, the grantor, and [redacted], the grantee, records the transfer of 110 acres, more or less, of land in four tracts in section 29 (Attachment K). This confirms the ownership of additional lands by Wilcox Oil Company as shown on the ownership map cited previously. The scope of the PRP search may be expanded to include the lands surrounding the original site. However, only partial research has been done on these tracts, namely the Quit Claim Deed (Attachment K) mentioned above and the tax assessors records of currents owners in the Table above.

Records at the Creek County tax assessor's office indicate [redacted] owns the 78.85 acres located in the [redacted] However, this land is currently owned by [redacted] address % Elias Oil Company is: [redacted], Bristow, OK, 74010. Since this ownership did not show up on the county tax assessors records transfer of title must have taken place fairly recently. As mentioned above, titles in the county clerk's office were not researched for this property.

The St. Louis and San Francisco Railroad should also be considered as current land owners. However, it is only assumed that they own the land within the right of way.

Contact Persons:

Betty Rentz, County Clerk, Creek County Courthouse, Sapulpa, Oklahoma: (918) 227-6304.

Creek County Tax Assessor's Office, Sapulpa, OK: (918) 224-4508 (Becky Simmons & Doreen Miller).

[redacted], partial site co-owner, [redacted] (home).

[redacted]
Bristow, OK: [redacted] (home).

Mike Jones, attorney for [redacted], (918) 367-3303, 367-5856 (Fax).

[redacted] of Bristow First Assembly of God Church & [redacted] (church), [redacted]).

[redacted] partial owner of site, % Elias Oil Company, [redacted] Bristow, OK, 74010, [redacted] (home).

Print Key Output Page 1

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:52:28

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 042776 Book: 003

(b) (6) (b) (6)

BRISTOW OK 740100003

Property Description

(b) (6)

(number)(sfx) (dir) (street name) (type)

Property Address: WE8469

	Acres	Lots	Land Value Cd	Assessed	Market	Improvement Value Cd	Assessed	Market	Status	Exemption Reg	Dbl
Tx	1300		A2	1155	9629	A2	1260	10500	I		
Un								Perm. Exempt:			

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd 03/10/89 By	Value Last Chg 03/10/89 By
02R		0019					KARLA	KARLA

FF
R

Prop# 16 0929 00 0008 100 - 000 00
READY TO UPDATE MASTER RECORD
Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

"A"

Print Key Output Page 1

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:52:02

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 012554 Book: 003

FIRST ASSEM OF GOD CHURCH (BRISTOW)
NON-TAXABLE

Property Description

#1 29-16-9 PT NW NW LYING N & W OF #2 R/W SF & SL RY CO LESS TR SOLD
#3 TO CONT REF CO #4
#5 BK 89 PG 569 #6 (69 SCHULT VIN 87516 HERE)

(number)(sfx) (dir) (street name) (type)
Property Address: FI8493

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Status	Exemption Reg	Exemption Dbl
Tx	700								N		
Un											

Perm. Exempt:

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd Value 03/06/91 By	Last Chgd By
02R		0019					DEBBIE	

FF
R

Prop# 16 0929 00 0017 100 - 000 00
READY TO UPDATE MASTER RECORD
Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

B

5738SS1 V2R3M0 931217 S1041736 12/09/94 10:51:00

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 027446 Book: 008

[redacted] (b) (6)

BRISTOW OK 740100000

Property Description

[redacted] (b) (6)

(number)(sfx) (dir) (street name) (type)

Property Address: TI8463

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Status	Exemption Reg	Exemption Dbl
Tx	7885		A1	740	6171				U		
Un									Perm. Exempt:		

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd 07/19/94 By	Value Last Chgd 03/29/91 By
02R		0019					DOREEN	EARLINE3

FF
F

Prop# 16 929 5 100 000 00
PROPERTY NUMBERS DO NOT MATCH; TRY AGAIN
Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

"C"

Print Key Output Page 1

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:53:43

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 026754 (b) (6) (b) (6) Book: 006

ROWLETT TX 75088

Property Description

(b) (6)

(number)(sfx) (dir) (street name) (type)

Property Address:

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Status	Exemption Reg	Exemption Dbl
Tx	1125		A2	630	5250				U		
Un									Perm. Exempt:		

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd 04/28/92 By	Value Last Chgd 04/28/92 By
02R		0019					ROBIN	ROBIN

Prop# 16 0929 00 0062 106 - 000 00

READY TO UPDATE MASTER RECORD

Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

D

Print Key Output Page 1

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:53:15

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 062017 Book: 008

(b) (6)

(b) (6)

BRISTOW OK 74010

(b) (6)

(number)(sfx) (dir) (street name) (type)

Property Address: 008513

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Status	Exemption Reg	Exemption Dbl
Tx	360		A2	655	5471		1200	10000	H	1000	
Un								Perm. Exempt:			

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd 02/07/94 By	Value Last Chgd 02/07/94 By
02R		0019					NANCY	NANCY

FF
E

Prop# 16 0929 00 0027 100 - 000 00
READY TO UPDATE MASTER RECORD
Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

"E"

Print Key Output Page 1

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:56:02

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 013535 (b) (6) (b) (6) Book: 008

TULSA OK 74112

Property Description

(b) (6)

(number)(sfx) (dir) (street name) (type)

Property Address: MO8049

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Sta tus	Exemption Reg	Exemption Dbl
Tx	6768		A1	590	4900				U		
Un									Perm. Exempt:		

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd Value 02/26/92 By	Last Chgd Value 04/10/90 By
02R		0019					ROBIN	SUSAN

FF

Prop# 16 0920 00 0029 100 - 000 00 R

READY TO UPDATE MASTER RECORD

Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

"F"

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:55:41

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 060313 Book: 008
FALCON OIL PROPERTIES
BOX 988
BRISTOW OK 74010

Property Description

#1 20-16-9 BEG SW COR OF SW TH S89 #2 D36'2"E 660' TH N0D4'14"W 242.85
#3 TO POB TH CONTINUING N0D4'14"W #4 235.64' TH N0D0'49"W554.87' TH
#5 N89D36'02"W 526.14' TH N25D32'16 #6 "E 184.1' TH N47D56'57"E 436.30

(number)(sfx) (dir) (street name) (type)
Property Address:

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Sta tus	Exemption Reg	Exemption Dbl
Tx	325		A2	194	1620				U		
Un									Perm. Exempt:		

Taxing Schl	Jurisdictions City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd 04/13/94 By	Value Last Chg 04/13/94	B
02R		0019	LS				DOREEN	DOREEN	
									FF
									R

Prop# 16 09Z0 00 0024 117 - 000 00
READY TO UPDATE MASTER RECORD
Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

"G"

Print Key Output Page 1

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:56:20

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 035588 Book: 008

(b) (6)

(b) (6)

TULSA OK 741064618

Property Description

(b) (6)

(number)(sfx) (dir) (street name) (type)

Property Address: NU8051

	Acres	Lots	Land Value Cd	Assessed	Market	Improvement Value Cd	Assessed	Market	Sta tus	Exemption Reg	Del
Tx	570		A2	790	6563	A2	325	2710	I		
Un								Perm. Exempt:			

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Num	Last Chgd 09/13/93 By	Value Last Chgd 03/01/89 By
02R		0019					DEBBIE	MARY

FF
R

Prop# 16 0920 00 0030 100 - 000 00

READY TO UPDATE MASTER RECORD

Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

H

Print Key Output Page 1

5738SS1 V2R3M0 931217 S1041796 12/09/94 10:56:41

Display Device . . . . . : W4
User . . . . . : VIRGINIA

Owner Id: 062163 Book: 005

BRISTOW FIRST ASSEMBLY OF GOD
ROUTE 3 BOX 1
BRISTOW OK 74010

Property Description

#1 20-16-9 TR BEG SW COR TH S89D35 #2 '48"E660'TH N74D12'47"W174.83'TH
#3 N66D48'11"W299.01'TH N70D09'35"W #4 230.85'TH S00D3'31"E239.04'TO PC
#5 B 1.75AC M/L BK 314 PG 1491 #6

(number)(sfx) (dir) (street name) (type)

Property Address:

	Acres	Lots	Land Value Cd	Land Value Assessed	Land Value Market	Improvement Value Cd	Improvement Value Assessed	Improvement Value Market	Status	Exemption Reg	Exemption Dbl
Tx	175								N		
Un											

Perm. Exempt:

Taxing Jurisdictions Schl	City	County	Misc. Codes	Mtg Co Code	Sale Yr	Sale Num	Last Chgd 11/23/93 By	Value Last Chgd 11/23/93 By
02R		0019	LS				DOREEN	DOREEN

Prop# 16 0920 00 0024 109 - 000 00
READY TO UPDATE MASTER RECORD
Cmd Keys: 1-Impr Appr 2-Res Lnd Appr 3-Agr Lnd Apr 8-Value Brkout 9-More Legal
10-Mobile Home 14-Addr Chg 19-Log Del 21-Restore 22-Abort

39825

GENERAL WARRANTY DEED NO. 371

News Dispatch Printing & Audit Co., Shawnee, Okla.

THIS INDENTURE, Made this 11th day of October A. D. 19 28 between

A. A. Rollestone, by his attorney in fact, Edwin H. Rollestone, of Bristow,

of Creek County, in the State of Oklahoma, of the first part, and

H. F. Wilcox, Oil & Gas Company of the second part,

WITNESSETH, That ~~said party of the first part~~, in consideration of the sum of

One Dollars ($1.00) and other good and valuable considerations ~~dollars~~,

said party of the first part,

the receipt whereof is hereby acknowledged/do 88 by these presents, Grant, Bargain, Sell and Convey unto said part y of the second part,

its heirs and assigns, all of the following described Real Estate, situated in the County of Creek, State of Oklahoma, to-wit:

Beginning at a point at the east interseotion of the St.Louis and San Francisco Railroad Right of way with the north line of seotion twenty-nine (29), township sixteen (16), North, Range Nine (9) East, thence east along the north line of said seotion line 452 feet, thence in a southerly direction at right angles with said section line 363 feet, thence in a westerly direction parallel with said section line 260 feet, thence in a southerly direction at right angles with said seotion line 362 feet, thence in a westerly direction parallel with said seotion line 707 feet to the east line of the St.Louis and San Francisco Railroad right of way, thence in a northeasterly direotion along the east line of the St. Louis and San Francisco Railroad Right of way 891 feet to the place of beginning and containing ten (10) acres, more or less.

TO HAVE AND TO HOLD THE SAME, Together with all and singular the tenements, hereditaments and appurtenances thereto belonging or in anywise appertaining forever.

And said A. A. Rollestone by his attorney in fact Edwin H. Rollestone, his

and ~~its~~ heirs, executors or administrators, do 88 hereby covenant, promise and agree to and with said part y

of the second part that at the delivery of these presents he is lawfully seized in his own right of an absolute and indefeasible estate of inheritance in fee simple, of and in all and singular the above granted and described premises, with the appurtenances; that the same are free, clear and discharged and unincumbered of and from all former and other grants, titles, charges, estates, judgments, taxes, assessments and incumbrances of whatsoever nature and kind: Except

and that he will warrant and forever defend the same unto said part y of the second part, its heirs and assigns, against said part y of the first part, his heirs and assigns, and all and every person or persons whomsoever, lawfully claiming or to claim the same.

IN WITNESS WHEREOF, The said part y of the first part ha s hereunto set his hand, the day and year first above written.

WITNESSES:

Alvin L. Chapman — A. A. Rollestone

Horace B. Clay — By Edwin H. Rollestone His attorney in fact.

STATE OF OKLAHOMA, County of Tulsa, ss.

Before me, Kate Dickson, a Notary Public in and for said County and State on this 12th day of October, A. D. 1928, personally appeared Edwin H. Rollestone

and as attorney in fact of A. A. Rollestone, to me known to be the identical person who executed the within and foregoing instrument and acknowledged to me that he executed the same as his free and voluntary act and deed/for the uses and purposes therein set forth.

Witness my hand and notarial seal the day and year above written.

My commission expires January 8, 1931 (Notary SEAL) Kate Dickson Notary Public.
Tulsa Co. in and for Tulsa County, Oklahoma

STATE OF OKLAHOMA, County of Creek, ss.

This instrument was filed in my office for record on Oct. 25 1928, at 8 o'clock A. M., and duly recorded in Book 371 on page 128.

Erma Morris County Clerk.

(SEAL) By Frances Pelman Deputy.

"J"

000226

434

434

Form 7—Standard Printing & Stationery Co., Tulsa, Okla.

Quit-Claim Deed

(CORPORATION FORM)

63 7320

STATE OF OKLAHOMA
COUNTY OF CREEK
NOV 4 1963
Leo Bruce, County Clerk

THIS INDENTURE, Made this 1st day of November, 1963, between Wilcox Oil Company, a corporation, organized under the laws of the State of Delaware, of the County of Tulsa, State of Oklahoma, party of the first part, and Wendell H. Sandlin, party of the second part.

WITNESSETH: That said party of the first part, in consideration of the sum of Ten and No/100 Dollars ($10.00) and O.V.C. DOLLARS to them duly paid, receipt of which is hereby acknowledged, do hereby quit-claim, grant, bargain, sell and convey unto the said party of the second part, and to his heirs and assigns forever, all their right, title, interest and estate, both at law and in equity, of, in and to the following described real estate, situate in the County of Creek and State of Oklahoma, to-wit:

110.08 acres of land, more or less, more particularly described by Tracts as follows:

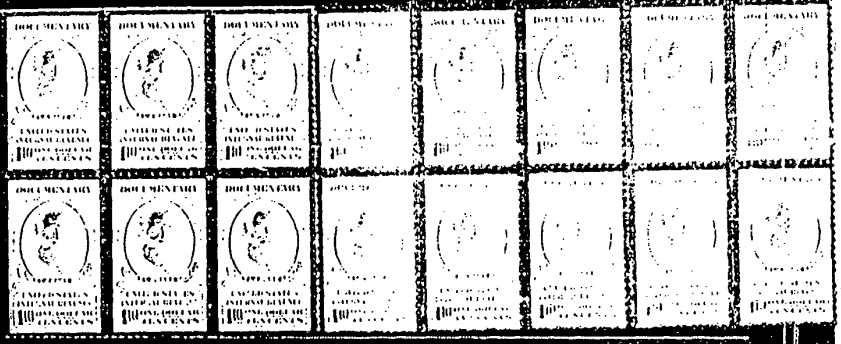
FIRST TRACT: The Northwest Quarter of the Northeast Quarter (NW/4 NE/4) Section 29-16N-9E, containing 40 acres, more or less.

SECOND TRACT: The Northeast Quarter of the Northwest Quarter (NE/4 NW/4) Section 29-16N-9E, less and except a tract of land containing 1.14 acres more particularly described by metes and bounds as follows: Commencing at the Northwest corner of NE/4 NW/4, thence East 25 feet, thence South, a distance of 33 feet to the point of beginning; thence East 200 feet; thence South 250 feet; thence West 200 feet; thence North 250 feet to the point of beginning, containing 38.86 acres more or less.

THIRD TRACT: A Tract of land containing 24.22 acres, more or less, situate in the Northwest Quarter of the Northwest Quarter (NW/4 NW/4) Section 29-16N-9E, more particularly described by metes and bounds as follows: Commencing at the Northeast Corner of the NW/4 NW/4 Section 29, thence West 516 feet to the East line of the St. Louis & San Francisco Railroad right of way, thence Southwesterly along said East line of said Right of Way to the point of intersection of said East line of said St. Louis & San Francisco Railway right of way with the center line of Sand Creek; thence meandering southeasterly with the center of said Sand Creek to the South line of the NW/4 NW/4 of said Section 29-16N-9E; thence East along the South line of the NW/4 NW/4 of said Section 29 to the Southeast corner of the NW/4 NW/4 of said Section 29; thence North along the East line of NW/4 NW/4 said Section 29 a distance of 1320 feet to the point of beginning, subject to Railroad Right of Way Easements and deeds of record.

FOURTH TRACT: That part of the Northwest Quarter of the Northwest Quarter (NW/4 NW/4) Section 29-16N-9E, lying North and West of the St. Louis & San Francisco Railway Right of Way, subject to Railroad Right of Way Easements and deeds of record, containing Seven (7) acres, more or less.

"K"



Together with all and singular the hereditaments and appurtenances thereunto belonging. To have and to hold the above granted premises unto the said party of the second part his heirs and assigns forever.

IN WITNESS WHEREOF, The said party of the first part has hereunto set its hand and caused its Corporate Seal to be affixed the day and year first above written.

CORPORATION SEAL

ATTEST:

By Clara Alsworth Asst. Secretary.

WILCOX OIL COMPANY
Name of Corporation.

By A. L. Chapman
President.

STATE OF OKLAHOMA,
County of Tulsa } ss.

CORPORATION ACKNOWLEDGMENT.

Before me, the undersigned, a Notary Public, in and for said County and State, on this 1st day of November, 19 61, personally appeared A. L. Chapman

to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its President and acknowledged to me that he executed the same as his free and voluntary act and deed and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

Given under my hand and seal the day and year last above written.

My commission expires Dec. 29, 1966

Thelma Hodge
Notary Public.

K"

9.90

73 953

STATE OF C[illegible]MA
COUNTY O[illegible]K
THIS INSTRUMENT WAS [illegible] IN
MY OFFICE FOR RECORD ON
APR 16 1973
2:10 o'clock P. M. and duly recorded in
Book 73 Page 595
LEO BRUCE, County Clerk
By [signature] Deputy

WARRANTY DEED

(Statutory Form—Individual)

KNOW ALL MEN BY THESE PRESENTS:

THAT J. M. BANKSTON and KINIS BANKSTON, husband and wife, whose post office address is Route 2, Box 319A, Okemah, Ok. 74859

, part ies of the first part, in consideration of the sum of NINE THOUSAND AND no/100 ---------- dollars, and other valuable considerations, in hand paid, the receipt of which is hereby acknowledged, do hereby grant, bargain, sell and convey unto JACK WHITE, whose address is Rt. 1, Box 51, Bristow, Ok.

, part y of the second part, the following described real property and premises situate in CREEK County, State of Oklahoma, to-wit: The so-called surface and surface rights in and to a tract of land in the Northwest Quarter of the Northwest Quarter (NW/4 NW/4) of Section 29, Township 16 North, Range 9 East, described as beginning at the Northeast corner of said Northwest Quarter of the Northwest Quarter thence South 387.3 feet; thence S 41°45'W a distance of 571 feet; thence West a distance of 695 feet, more or less, to the Easterly right of way of the railroad; thence Northeasterly along said right of way a distance of 1000 feet, more or less, to the North line of said Section 29; thence East 511.6 feet to the point of beginning, containing 13.0 acres, more or less;

Excluding herefrom all oil, gas and other minerals heretofore RESERVED or EXCEPTED by former grants of this property; together with the improvements thereon and personal property thereon and thereunder; together with all the improvements thereon and the appurtenances thereunto belonging, and warrant the title to the same. EXCEPT as against railroad right of way easements of record and other existing easements of record.

together with all the improvements thereon and the appurtenances thereunto belonging, and warrant the title to the same.

TO HAVE AND TO HOLD said described premises unto the said party of the second part, his heirs and assigns forever, free, clear and discharged of and from all former grants, charges, taxes, judgments, mortgages and other liens and incumbrances of whatsoever nature.

Signed and delivered this 27th day of March, 19 73

Kinis Bankston — J. M. Bankston

INDIVIDUAL ACKNOWLEDGMENT

STATE OF Oklahoma, County of Okfuskee, SS.

Before me, a Notary Public in and for said County and State, on this 27th day of March 19 73, personally appeared J. M. BANKSTON AND KINIS BANKSTON, husband and wife,

to me known to be the identical person s who executed the within and foregoing instrument, and acknowledged to me that they executed the same as their free and voluntary act and deed for the uses and purposes therein set forth.

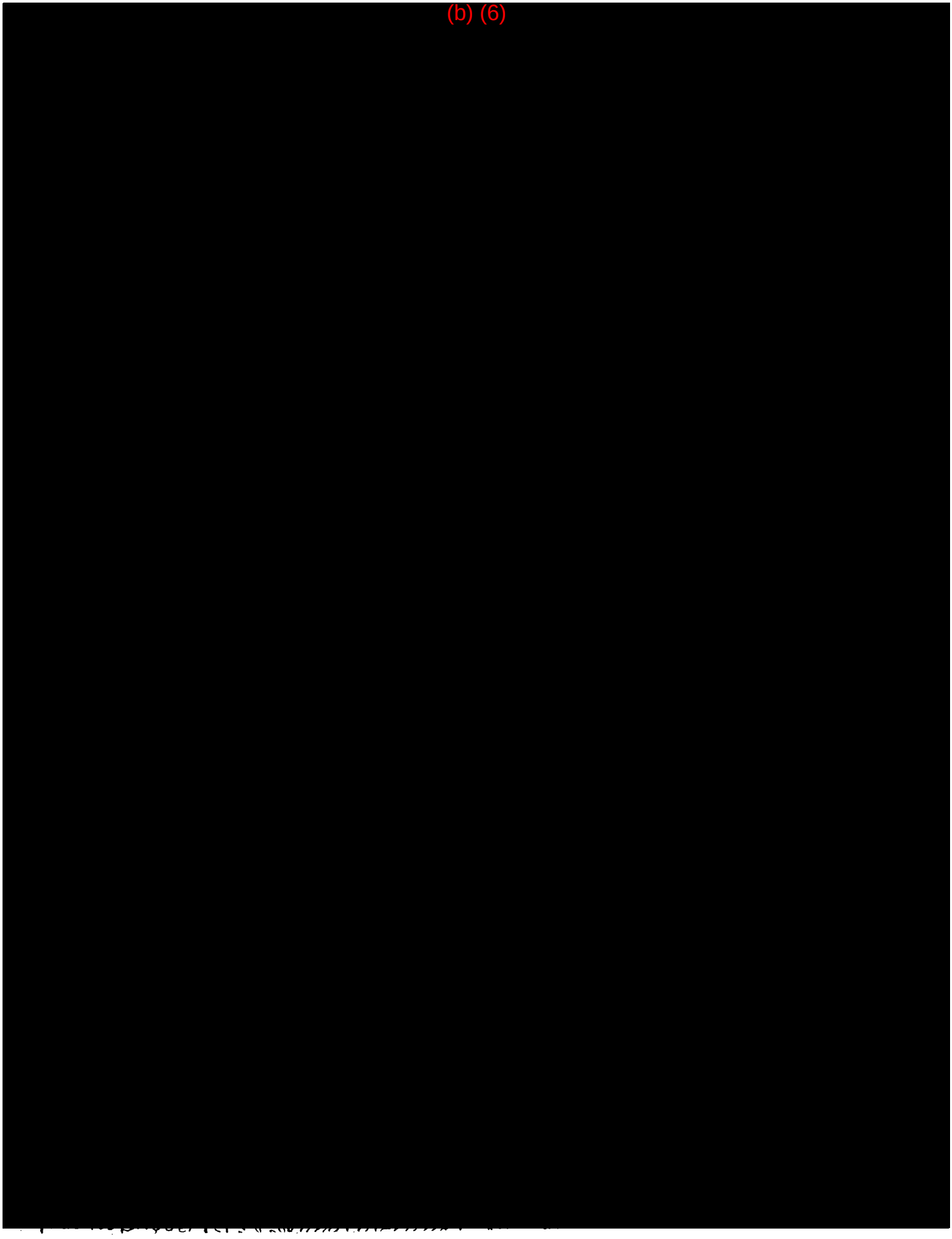
Given under my hand and seal the day and year last above written.

My commission expires July 20, 1976 — Notary Public

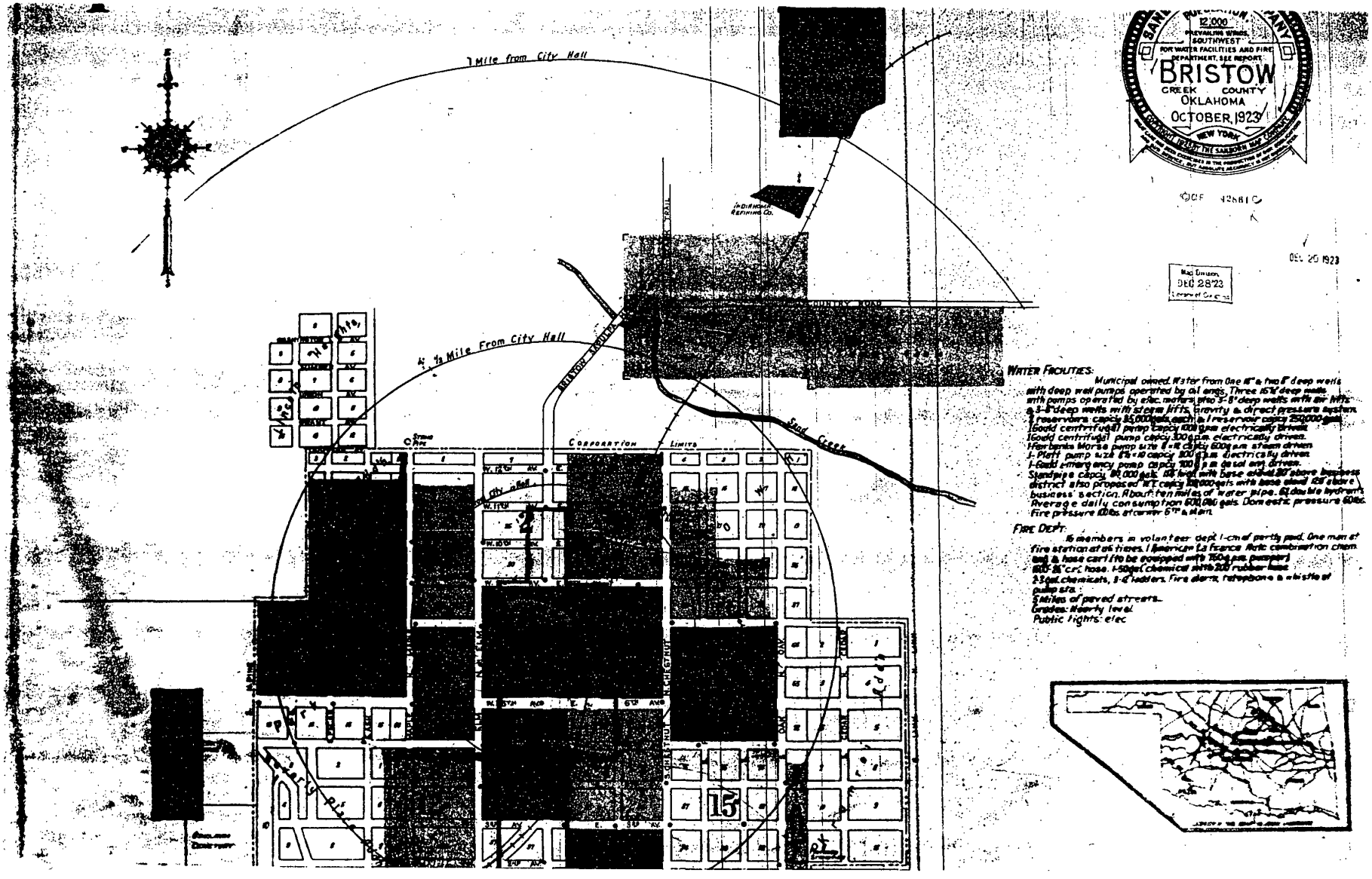
NOTE—This form supplied by TITLE GUARANTY DEPARTMENT of AMERICAN-FIRST TITLE & TRUST CO., Oklahoma City, for the convenience of ATTORNEYS. No legal instrument or form should ever be prepared by anyone other than an Attorney.

595 G44

000229


(b) (6)

Reference 7



12,000
PREVAILING WAGES
SOUTHWEST
FOR WATER FACILITIES AND FIRE DEPARTMENT, SEE REPORT
BRISTOW
CREEK COUNTY
OKLAHOMA
OCTOBER, 1923
NEW YORK

DEC 20 1923

Map Division
DEC 28'23

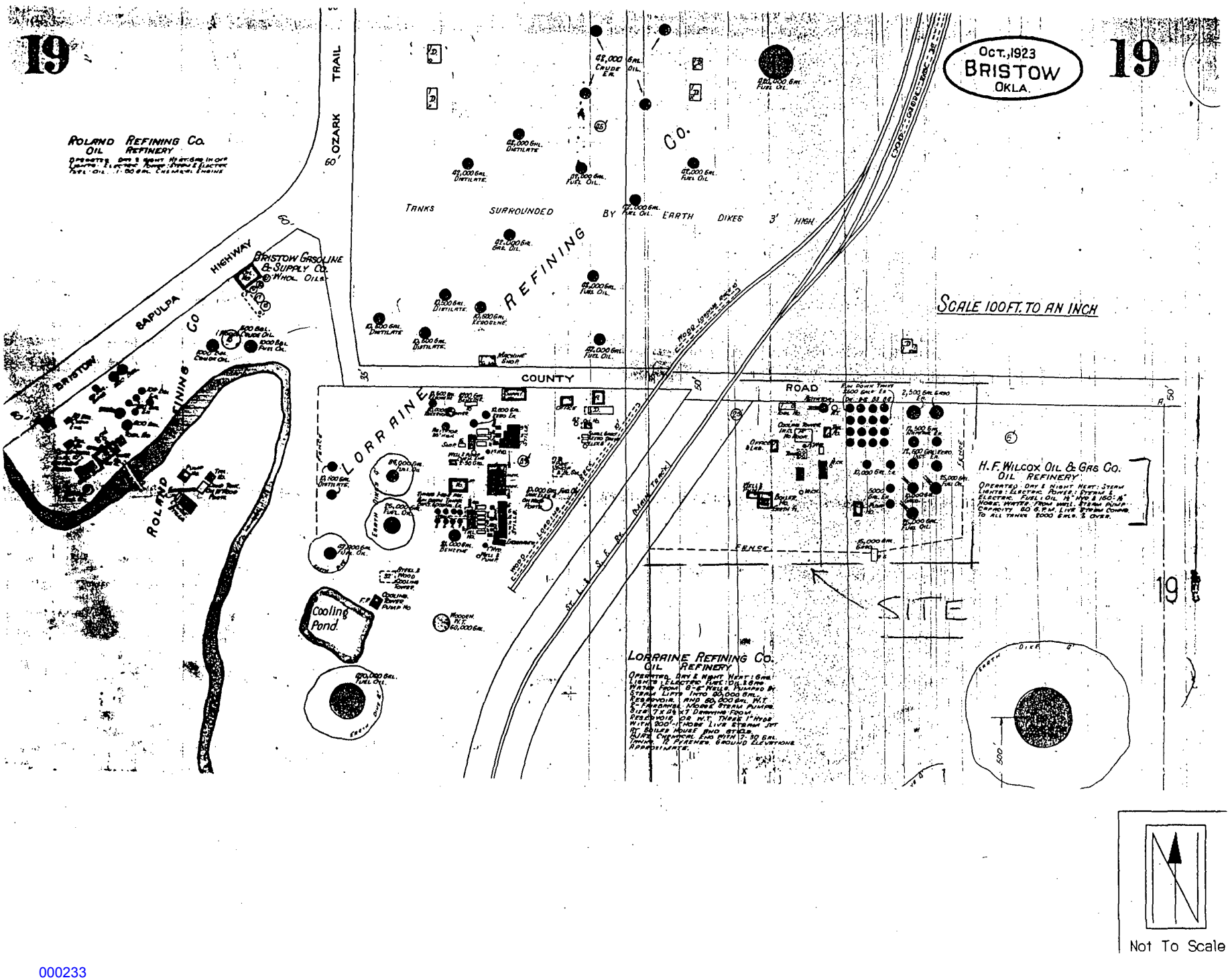
WATER FACILITIES:

Municipal owned. Water from One 16" & two 8" deep wells with deep well pumps operated by oil engs. Three 65'8" deep wells with pumps operated by elec. motors, also 1-8" deep wells with air lifts & 3-8" deep wells with storage lifts. Gravity & direct pressure system. 2 reservoirs capcity 35,000 gals. each & 1 reservoir capcity 250,000 gals. 1 Gould centrifugal pump capcity 400 gpm electrically driven. 1 Gould centrifugal pump capcity 300 gpm electrically driven. 1 Fairbanks Morse pump size 8"x10" capcity 600 gpm steam driven. 1 Platt pump size 6"x10" capcity 300 gpm electrically driven. 1 Gould emergency pump capcity 100 gpm gasoline driven. Standpipe capcity 80,000 gals. 65' high with base elevated 25' above business district also proposed 100' capcity 150,000 gals with base elevated 125' above business section. About ten miles of water pipe. 61 double hydrants. Average daily consumption 600,000 gals. Domestic pressure 60lbs. fire pressure 100lbs. at corner 6TH & Main.

FIRE DEPT:

16 members in volunteer dept. 1-one of pretty good. One man at fire station at all times. 1 American La France Auto combination chemical & hose cart to be equipped with 750 gpm pumper. 600-1½" cot. hose. 1-50gal. Chemical with 200 rubber hose. 2-30gal. chemicals, 3-40' ladders. Fire alarm, telephone & whistle at pump sta.:

5 Miles of paved streets.
Grades: Nearly level.
Public lights: elec.


19
Oct., 1923
BRISTOW
OKLA.
19
ROLAND REFINING CO.
OIL REFINERY
OZARK TRAIL
60'
BAPULPA HIGHWAY
BRISTOW GASOLINE & SUPPLY CO.
WHOL. OILS
ROLAND REFINING CO
BRISTOW
TANKS SURROUNDED BY EARTH DIKES 3' HIGH.
LORRAINE REFINING CO.
COUNTY ROAD
SCALE 100 FT. TO AN INCH
Cooling Pond
SITE
H. F. WILCOX OIL & GAS CO.
OIL REFINERY
LORRAINE REFINING CO.
OIL REFINERY
Not To Scale

000233

Reference 8

CONSENT FOR ACCESS TO PROPERTY

I, [redacted], co-owner of a portion of the premises described in Exhibit "A", consent to officers, employees and authorized representatives of the Oklahoma Department of Environmental Health (ODEQ) entering the said premises for the express purpose of conducting a site reconnaissance on the 16 day of December, 1994. I understand that the information gathered during the reconnaissance will be included in a Preliminary Assessment, which will be prepared by the ODEQ for review by the U.S. Environmental Protection Agency, under the authority of the Comprehensive Environmental Response, Compensation and Liability Act. (42 U.S.C. §9601 et seq.)

This written permission is given voluntarily and with no expectation of receiving any compensation from ODEQ.

[redacted]

12-16-94
Date

INDEMNITY CLAUSE

ODEQ agrees to indemnify, defend, and hold harmless [redacted] for any personal injuries, including death, property damage, or other loss arising out of the activities performed by ODEQ on the 16 day of December, 1994, pursuant to the Agreement executed by [redacted] on that date.

Damon D. Wingfield, Director
Waste Management Division

12-14-94
Date

EXHIBIT A

Legal Description: [redacted] Creek County, Oklahoma

MARK S. COLEMAN
Executive Director



DAVID WALTERS
Governor

State of Oklahoma

DEPARTMENT OF ENVIRONMENTAL QUALITY

November 30, 1994

(b) (6)
(b) (6)
Bristow, OK 74010

Re: Request for permission for State of Oklahoma, Department of Environmental Quality, personnel to gain access to the 13 acre property in the (b) (6) (b) (6), located about one half mile northeast of the Bristow City Hall on the east side of the St. Louis & San Francisco Railroad Main track and south of the county road.

Dear (b) (6),

The purpose of this letter is to request your voluntary consent for Oklahoma Department of Environmental Quality (DEQ) personnel to enter your property located approximately one half mile northeast of the Bristow City Hall for the purpose of conducting a Site Reconnaissance for a Preliminary Assessment (PA). Records at the Creek County Tax Assessors Office indicate that you are the current owners of the approximately 13 acres located in the (b) (6) which is believed to be the former site of the Wilcox Oil Company Refinery. DEQ is conducting a Preliminary Assessment of the Wilcox Oil Company Site under the authority of the Multi-Site Cooperative Agreement (CA # V-00645-01) with the U.S. Environmental Protection Agency (EPA), as authorized by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA).

CERCLA was passed by Congress in 1980, and reauthorized by SARA in 1986 and 1990. The purpose of this legislation is to provide a means of responding to threats to human health and the environment from uncontrolled releases of hazardous substances from old (usually pre-1980) sources. In creating CERCLA, Congress charged EPA to develop criteria which would allow sites that pose the greatest threat to be given priority for cleanup. In order to fulfill this obligation, EPA created the Hazardous Ranking System

(HRS) to evaluate sites for possible inclusion on the National Priorities List (NPL). The first stage of the site evaluation process is the Preliminary Assessment (PA). This is a cursory investigative report that distinguishes between the sites which pose little or no threat and the sites which need further investigation.

In general, a Preliminary Assessment is a report which compiles existing information concerning the site and the surrounding area. Special emphasis is given to people and resources which might be affected by a release of hazardous substances from the area. During the course of report preparation, it is important for the investigator to walk the site in order to make a more accurate assessment of the conditions at the site.

A site reconnaissance consists of a visual inspection of the property and the area around the site. Photographs of the area are taken. Samples are not generally collected; however, portable monitors (such as pH meters) are sometimes used during the visit.

The Oklahoma Department of Environmental Quality requests your permission to enter the property mentioned above to conduct a site reconnaissance, tentatively scheduled for the week of Monday, December 13, 1994. You may be present during the reconnaissance if you would like but it is not required. The site visit will last approximately one hour.

Although legal means are available to the DEQ, we prefer to gain the current landowner's or lessees' voluntary consent for DEQ personnel to enter the property and conduct a site reconnaissance. If you agree to allow DEQ personnel on your property for the purpose of a site reconnaissance please sign and date the enclosed document and mail it as soon as possible to the address below:

David Cates, Environmental Specialist
Oklahoma Department of Environmental Quality
Waste Management Division (Site Assessment Unit)
1000 N.E. 10th St.
Oklahoma City, Oklahoma 73117 - 1212

If you have any questions, please feel free to call me at (405) 271-7049 or Rita Kottke at (405) 271-7071.

Sincerely,

David Cates

cc: Robert Huber, Creek County DEQ
Enclosure: Consent For Access To Property

Name of Owner: [redacted]
Bristow, OK 74010

Site Name: Wilcox Oil Company Refinery Site

Location of Property: [redacted] Creek County, Oklahoma

I hereby consent to allow Oklahoma Department of Environmental Quality personnel to enter the property specified above for the express purpose of conducting a site reconnaissance. I understand that the information gathered during the reconnaissance will be included in a Preliminary Assessment, which will be prepared by the Oklahoma Department of Environmental Quality for review by the U.S. Environmental Protection Agency, under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act.

_____ _____

Signature Date

CONSENT FOR ACCESS TO PROPERTY

I, [redacted] co-owner of a portion of the premises described in Exhibit "A", consent to officers, employees and authorized representatives of the Oklahoma Department of Environmental Health (ODEQ) entering the said premises for the express purpose of conducting a site reconnaissance on the ____ day of December, 1994. I understand that the information gathered during the reconnaissance will be included in a Preliminary Assessment, which will be prepared by the ODEQ for review by the U.S. Environmental Protection Agency, under the authority of the Comprehensive Environmental Response, Compensation and Liability Act. (42 U.S.C. §9601 et seq.)

This written permission is given voluntarily and with no expectation of receiving any compensation from ODEQ.

_____ _____

[redacted] Date

INDEMNITY CLAUSE

We, David Cates, Alex Tabatabai, and Karen Khalafian, agree to indemnify, defend, and hold harmless [redacted] for any personal injuries, including death, property damage, or other loss arising out of the activities performed by us on the ____ day of December, 1994, pursuant to the Agreement executed by [redacted] on that date.

_____ _____

Karen Khalafian Date
Senior Environmental Specialist

_____ _____

David Cates Date
Environmental Specialist

_____ _____

Alex Tabatabai Date
Environmental Engineer

EXHIBIT A

Legal Description: [redacted], Creek County, Oklahoma

Reference 9

PA Guidance

Sites," OSWER Directive 9345.1-08). If during any stage of the PA investigation you come across information that leads you to believe the site might be eligible for RCRA Subtitle C corrective action, notify your Regional EPA site assessment contact, who will discuss the situation with representatives of the RCRA program and decide whether to proceed with CERCLA investigative activities.

Table 2-1
RCRA Eligibility Checklist

1. Has the facility treated, stored, or disposed any RCRA hazardous waste for any period of time since November 19, 1980? (If the facility or site is a known "protective filer," check no.)

   ☐ Yes ☐ No

   IF THE ANSWER TO QUESTION 1 IS "NO", **STOP**; SITE IS NOT ELIGIBLE FOR RCRA RESPONSE.
   IF YES, CONTINUE WITH CHECKLIST.

2. Does the facility currently have a RCRA Part B Operating Permit or a post-closure permit?

   ☐ Yes ☐ No

3. Did the facility file a Part A Permit Application? ☐ Yes ☐ No

   If yes,

   - Does the facility currently have interim RCRA status? ☐ Yes ☐ No
   - Did the facility convert its status from TSF to "Generator" or "Non-handler"?

     ☐ Yes ☐ No

   If no,

   - Is the facility a "Non- or Late Filer"? ☐ Yes ☐ No

IF ANSWERS TO ALL QUESTIONS IN PARTS 2 AND 3 ARE "NO," THE SITE IS NOT ELIGIBLE FOR RCRA RESPONSE. IF THE ANSWER TO ANY QUESTION IS "YES," DISCUSS THE SITE WITH YOUR EPA SITE ASSESSMENT CONTACT.

2.2.2 CERCLA Petroleum Exclusion

CERCLA authorized Federal response to releases or threatened releases of "hazardous substances" and "pollutants and contaminants." CERCLA excludes "petroleum, including crude oil or any fraction thereof" from the definition of these terms. However, CERCLA does not define the specific types of petroleum products excluded.

000241

EPA's current interpretation of the petroleum exclusion is that a release or threatened release involving solely crude oil, fractions of crude oil, or refined crude oil products (e.g., gasoline) is not eligible for CERCLA response action. However, release of a CERCLA hazardous substance (e.g., lead, polychlorinated biphenols) mixed with oil through either the addition of the hazardous substance to the oil (e.g., oil-based paint, transformer coolant), or as a result of the use of the oil (e.g., waste oil containing lead as a result of combustion) is subject to CERCLA. In addition, if a CERCLA hazardous substance and oil are commingled to the extent that they cannot be practicably separated, the entire mixture is subject to CERCLA. Be aware that EPA's interpretation of the petroleum exclusion is currently under review and the policy may change in the future.

If the only type of release or threatened release involves materials that fall under the petroleum exclusion, notify your Regional EPA site assessment contact. EPA will decide whether the investigation should continue or the site should be dropped from CERCLA consideration. Some sites may have several waste sources, some eligible, others ineligible due to the petroleum exclusion. Determining which sources are eligible and ineligible for CERCLA consideration will facilitate an accurate evaluation of targets and waste quantity (discussed in Section 3).

2.2.3 Other Environmental Statutes

CERCLA precludes Superfund response actions at particular sites that fall under the jurisdiction of the Atomic Energy Act (AEA) and the Uranium Mill Tailings Radiation Control Act (UMTRCA).

Releases of source, by-product, or special nuclear material defined in AEA Section 68, Statute 923 (e.g., process ore for fresh uranium fuel) from a nuclear incident subject to the financial protection requirements of AEA are excluded from CERCLA response. Typically, this means releases from nuclear power plants licensed by the Nuclear Regulatory Commission (NRC) are the responsibility of NRC (not including facilities licensed by States or other Federal agencies that have been granted licensing authority by NRC).

Releases of source, by-product, or special nuclear material from the 22 processing sites specifically designated in UMTRCA are excluded from CERCLA response.

Also, CERCLA notification and cost recovery provisions may not be applicable to releases associated with the legal application of certain substances regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

If you conclude after reviewing available background information that response at the site might appropriately occur under any of these statutes, discuss the situation with your Regional EPA site assessment contact.

2.2.4 Sites With No Hazardous Substances

Occasionally your review of available file information will yield no evidence or indication that hazardous substances, pollutants, or contaminants were ever handled or disposed at the site. These types of sites pose no CERCLA threat to human health or the environment because they have not released, nor can they release, hazardous substances to the environment.

You must be certain that CERCLA hazardous substances are not now, or have never been, at the site before "no further action" could be recommended on this basis. Many sites have extremely limited information concerning waste sources. Simple lack of information cannot be interpreted to indicate that no hazardous waste is present or has ever been deposited at the site. Such a determination must be supported by convincing evidence, like documentation of a complete removal of all hazardous substances. In addition, you should perform a reconnaissance of the site (Section 2.5) to visually verify the lack of hazardous waste sources.

000242

Reference 10

Series 1950, No. 5 Issued May 1959

SOIL SURVEY

Creek County Oklahoma



UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with the
OKLAHOMA AGRICULTURAL EXPERIMENT STATION

000244

SOIL SURVEY OF CREEK COUNTY, OKLAHOMA

By HARVEY OAKES, Soil Survey;[1] soils surveyed by O. H. BRENSING, in charge, DALE SCRIVEN, and E. C. TALLEY, Oklahoma Agricultural Experiment Station; H. P. MIKLES, Soil Conservation Service; H. M. GALLOWAY, Soil Survey and Oklahoma Agricultural Experiment Station

Correlation by JAMES THORP, Soil Survey, United States Department of Agriculture

United States Department of Agriculture in Cooperation with the Oklahoma Agricultural Experiment Station

Geography of Creek County

Creek County is in the northeastern quarter of Oklahoma (fig. 1). It is about 72 miles south of the Oklahoma-Kansas boundary and about 96 miles west of the Oklahoma-Arkansas boundary. Sapulpa, the county seat, is in the northeastern corner of the county. It is 15 miles southwest of Tulsa and 87 miles northeast of Oklahoma City.

The county is 36 miles long from north to south and 33 miles across at the central and widest part. It is 24 miles across at the south end. All boundaries of the county are artificial. Most of the county lies between the Cimarron River on the north and the Deep Fork of the North Canadian River on the south. Small parts lie north and south of these rivers. The approximate land area of Creek County is 972 square miles, or 622,080 acres.

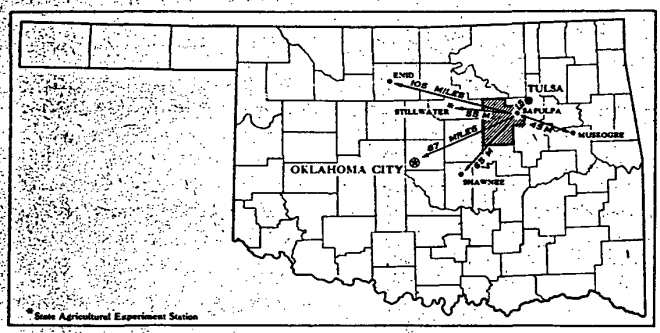


Figure 1.—Location of Creek County in Oklahoma.

Physiography, Relief, and Drainage

Creek County lies in the Osage Plains section of the Central Lowlands physiographic province. The Osage Plains, now a region of well-dissected sandstone hills, was formerly a gently sloping plain. Shallow narrow valleys separated by stony ridges are characteristic. The ridges lie roughly parallel in a northeast-southwest direction. Many of them have rather steep east-facing escarpments.

Creek County is underlain by interbedded sandstones and shales; each layer outcrops at its eastern edge. The shales, which erode more rapidly than the sandstones, occupy the shallow valleys. The ridges are capped by the more resistant sandstones.

The western part of the county is underlain mostly by sandstones. Streams have cut narrow V-shaped valleys. Much of this part of the county is rolling or sloping. The eastern and southeastern parts are underlain mostly by shales. The few beds of sandstone outcrop on ridges between the shallow, gently sloping or nearly level, shaly valleys.

The elevation is highest in the western part of the county. The altitude near Drumright, at the western edge, is about 1,100 feet. The altitude is lowest—about 600 feet—where the Deep Fork River leaves the southeastern corner.

The Cimarron River cuts across the north end of Creek County. Polecat Creek lies south of that river. These two streams drain the northern half of the county. Both are tributaries of the Arkansas River, which flows just northeast of Creek County. The Deep Fork of the North Canadian River, locally called the Deep Fork River, flows generally along the southern edge of the county and crosses the boundary a number of times. Together with Little Deep Fork Creek, which rises in the west-central part of the county, this river drains the southern half of the area. These two streams join just outside the county and flow into the North Canadian River about 50 miles to the southeast.

The county is well dissected by small streams, most of which have narrow valleys. The larger streams have rather wide, shallow valleys composed of narrow flood plains and nearly level terraces of old alluvium. All of the uplands and most of the bottom lands and terraces are well enough drained to be suitable for the common crops of the area. Only the flood plain of the Deep Fork River is so frequently flooded and so poorly drained as to prevent cultivation.

Climate

The climate of Creek County is continental and has pronounced seasonal changes in temperature and, to a lesser extent, in precipitation. It is generally warm to temperate and humid. There is a difference of about 40° F. between the average summer and the average winter temperatures. The prevailing winds are from the north from December to February and from the south during the rest of the year.

[1] Fieldwork for this survey was done while Soil Survey was part of the former Bureau of Plant Industry, Soils, and Agricultural Engineering. Soil Survey was transferred to the Soil Conservation Service on November 15, 1952.

000245

Summers are long and hot. The highest temperatures are usually accompanied by clear skies, a moderately low humidity, southern breezes, and cooler nights. Winters are short and comparatively mild. They are characterized by periods of warm, pleasant weather followed by frequent but short spells of freezing temperatures accompanied by north winds. The ground sometimes is frozen to a depth of a few inches for several days. A few light snowfalls each winter total about 6 inches, but snow seldom remains more than a few days. Spring and fall are cool and usually windy. Tornadoes and hailstorms are rare.

The average growing season is about 219 days. The average date of the last frost in spring is March 27, but frosts have occurred as late as April 18. The average date of the first frost in the fall is November 1, but frosts have occurred as early as October 9. During normal years the growing season is long enough for all common field crops to mature. Some orchard crops, especially peaches, may be damaged by frosts late in spring. Planting of cotton or cowpeas is delayed in some years by late frosts and wet cool weather.

The average annual precipitation at Bristow, near the center of the county, is 37.19 inches. This amount of moisture is usually adequate for crops. The eastern edge of the county receives about 2 inches more rainfall than the extreme western part. The precipitation is fairly well distributed during the year. About 60 percent of it comes during the planting and growing season, or between March 1 and September 1. April, May, and June have the highest rainfall. Dry spells lasting several weeks, accompanied by drying winds and a high evaporation rate, are common in July and August. These droughts may damage late crops, especially corn. September and October have more rain, but not so much as the spring months.

Fieldwork can go on throughout the winter, except for the short periods when the ground is frozen. Sometimes spring planting is delayed by cool wet weather. Heavy-textured soils, especially, may be too wet for planting early in spring.

The normal temperature and precipitation at Bristow are fairly representative for Creek County. These figures are given in table 1.

TABLE 1.—*Normal temperature and precipitation at Bristow Station, Creek County, Okla.*

[Elevation, 818 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1936)	Wettest year (1941)	Average snowfall
	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*	*Inches*
December	41.3	82	1	1.64	1.65	1.74	0.6
January	38.5	81	−13	1.91	.11	1.79	2.6
February	42.5	84	−7	1.43	.51	2.49	1.6
Winter	40.8	84	−13	4.98	2.27	6.02	4.8
March	51.0	94	−11	2.49	.44	.75	1.1
April	61.0	93	18	4.04	.30	8.62	[3]
May	69.0	98	33	4.23	3.66	6.15	[3]
Spring	60.3	98	−11	10.76	4.40	15.52	1.1
June	77.6	109	47	4.71	.90	8.04	[3]
July	82.6	114	54	3.10	.86	2.07	0
August	82.3	115	50	3.11	.25	4.18	0
Summer	80.8	115	47	10.92	2.01	14.29	[3]
September	73.9	108	33	3.87	9.62	7.36	[3]
October	63.5	98	21	4.09	3.02	16.00	0
November	49.7	88	8	2.57	1.31	2.40	.3
Fall	62.4	108	8	10.53	13.95	25.76	.3
Year	61.1	115	−13	37.19	22.63	61.59	6.2

[1] Average temperature based on a 38-year record, through 1954; highest temperature on a 21-year record, and lowest temperature on a 20-year record, through 1952.

[2] Average precipitation based on a 39-year record, through 1955; wettest and driest years based on a 26-year record, in the period 1916–55; snowfall based on a 21-year record, through 1952.

[3] Trace.

Vegetation

Most of Creek County had a forest-savanna vegetation known as the Cross Timbers.[2] Open stands of post oak, blackjack oak, and hickory grew among tall grasses. Many grassy openings were on the more clayey soils and along the foot slopes above the drainageways. Since this area became settled, the blackjack oak has spread considerably and occupied many areas that were formerly open. Much of this newer growth is small and brushy and nearly crowds out the grass.

Open prairies of bluestems, Indiangrass, and switchgrass occupy the deeper loams and clay loams and many of the shallow stony clay loams on steep slopes over interbedded clay shales and sandstones. The largest prairies occur in the eastern part of the county. The prairies were originally covered with a thick growth of coarse bunchgrasses, buffalograss (*Buchloe dactyloides*), and grama grasses. Scattered oak and sumac shrubs grew on the shallower soils. The bunchgrasses were mainly little bluestem (*Andropogon scoparius*), big bluestem (*A. gerardi*), broomsedge (*A. virginicus*), silver beardgrass (*A. saccharoides*), switchgrass (*Panicum virgatum*), and Indiangrass (*Sorghastrum nutans*). The grama grasses were mostly side-oats grama (*Bouteloua curtipendula*), hairy grama (*B. hirsuta*), and blue grama (*B. gracilis*).

All of the prairies in this county are excellent rangeland, but the deeper gently sloping soils are superior to the shallow or sloping soils. Native prairie meadows that are in excellent condition produce moderate yields of nutritious hay if the grass is cut at the right stage of growth. Many native prairie pastures and meadows have been poorly managed and now contain a high proportion of three-awn grass (*Aristida oligantha*) and weeds. The grazing is poor on such fields and the hay is of inferior quality.

The trees of the Cross Timbers consisted mainly of blackjack oak (*Quercus marilandica*), post oak (*Q. stellata*), elm (*Ulmus* sp.), and hickory (*Hicoria alba*) on the sandy soils of the uplands. On the terraces the forest was red oak (*Q. rubra*), pecan (*Carya pecan*), black oak (*Q. velutina*), elm, hickory, post oak, and blackjack oak. The bottom lands supported a fairly thick cover of elm, hack-

[2] FENNEMAN, N. M. PHYSIOGRAPHY OF EASTERN UNITED STATES. 691 pp., illus. New York and London. 1938.

000246

berry (*Celtis occidentalis*), pecan, white oak or overcup oak (*Q. lyrata*), cottonwood (*Populus deltoides virginiana*), ash (*Fraxinus* sp.), and willow (*Salix* sp.). The uplands and the higher, sandier terraces had a thin ground cover of scattered coarse grasses, mainly broomsedge and little bluestem, and various shrubs. The low stream terraces and bottoms had a thick ground cover of bluestem grasses, shrubs, and vines, especially wild grape (*Vitis* sp.), in open areas or in places where the tree stand was thin.

Most of the bottom lands and terraces have been cleared of forest. Many areas along the stream channels, in narrow bottoms that are frequently flooded, and on the flood plain of the Deep Fork River have not yet been cleared. The better trees of the terraces and bottom lands, such as red oak, black oak, cottonwood, and ash, are used for lumber. Most of the shallow and stony soils of the uplands still have a cover of scrubby forest. These trees are unsuitable for most commercial uses. They are used for fence posts, firewood, and rough lumber.

Water Supply

In the central and western parts of the county, a few farm ponds and perennial creeks supply water for livestock, but most of the water for livestock and for household use comes from wells. In areas underlain by sandstones or interbedded sandstones and shales, a moderate supply of good water is normally available at depths of 30 to 60 feet. In a few places the depth to water ranges from 60 to 100 feet.

In the eastern part of the county, where the prairie is underlain by shales, the water from shallow wells contains considerable gypsum and sodium and consequently is not well suited to household use. Late in summer and during droughts, the supply is likely to be inadequate. Good water is normally available in sufficient quantity from wells 60 to 150 feet deep. Water for towns and villages comes from deep wells or surface reservoirs.

In the prairie areas, surface reservoirs, commonly called farm ponds or tanks, furnish water for livestock. These reservoirs are made by constructing earth dams across natural drainageways. Most of these reservoirs are between $\frac{1}{10}$ of an acre and 1 acre in size and have a storage capacity of ½ to 3 acre-feet of water. They lose very little water by seepage, but the loss by evaporation is high late in summer.

Settlement and Development

Creek County was part of the Indian Territory, which included most of what is now eastern Oklahoma. The Creek and Cherokee tribes lived in this area. Hunting and fishing were the Indians' chief means of subsistence, but some agriculture was practiced before 1860. After about 1865, a few white squatters began grazing cattle in the area, by agreement with the Indians.

In 1889 the Indian land was divided and allotted to individuals. After 1904 some of this land was purchased by white settlers. By the time Oklahoma was admitted as a State in 1907, Creek County had been organized and was becoming fairly well settled. The early settlers came from the southeastern States and nearby States. The population of the county in 1910 was 26,223. Only 2,914 of these inhabitants lived on farms. Cattle raising was the principal kind of farming. Corn and cotton were the main crops grown.

Population

In 1950, the total population of the county was 43,143. Of this, 23,638 or 54.8 percent, was urban; and 19,505 or 45.2 percent, was rural. The population is fairly evenly distributed over the county. The most thickly populated sections are the prairies in the north central and eastern parts of the county. The most sparsely settled sections are the shallow and stony dissected areas in the center of the county.

Sapulpa, the county seat, is located in the northeast corner of the county. It had a population of 13,031 in 1950. Other towns, and their population in 1950, are: Bristow, 5,400; Drumright, 5,028; Oilton, 1,109; Depew, 719; Mounds, 560; Kellyville, 528; Mannford, 426; Kiefer, 275; Shamrock, 263; and Slick, 151.

There was a reduction of 13.4 percent in the total population of the county in the 10 years between 1930 and 1940. A further decline of 22.3 percent occurred between 1940 and 1950. This decline in population has taken place in the rural sections of the county. Urban population has increased slightly.

Industries

The principal industry in Creek County is the production of crude petroleum and gas. Producing oilfields are near Drumright, Bristow, Slick, and Sapulpa. Isolated wells or small groups of wells are scattered throughout the county.

The first oil well in the county was completed in December 1905. In 1906 the famous Glenn pool in the northeastern corner of the county was discovered. The Cushing field near Drumright was opened in 1912, and the Slick pool in the southeastern corner of the county was developed in 1919 and 1920. The Continental or Bristow pool was opened in 1921 and 1922. In 1945 there were 2,152 producing oil wells in the county.[3] Many new wells are drilled in the county each year, and some old shallow wells are producing again from deeper sands.

Small "cracking plants" or oil refineries are located near Drumright and at Sapulpa. Several natural-gas pumping stations or plants are located in the county. The number employed in the production of crude oil and gas and allied industries has declined steadily during the last 20 years, because the oil production is diminishing.

In Sapulpa are a small food-processing and food-canning plant, a small pottery plant, and a glass works. Creameries, bottling works, monument and tombstone plants, cotton gins, and warehouses are located at Sapulpa and Bristow.

Transportation and Markets

The St. Louis-San Francisco Railway's main line between Oklahoma City and Tulsa crosses the county through Depew, Bristow, and Sapulpa. A branch line runs southeast from Sapulpa through Kiefer and Mounds. Another branch line runs northwest from Depew through Shamrock to Drumright. The Santa Fe Railroad enters

[3] National Industrial Conference Board. THE PETROLEUM ALMANAC. 420 pp. New York, N. Y. 1946.

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Soil Associations

The soils of Creek County are in three broad, general associations. Each association is dominated by soils that developed from similar or related parent materials, support similar kinds of vegetation, and have some characteristics in common. The associations differ considerably in their suitability for different systems of farming.

Figure 2 shows the general areas occupied by each of the three soil associations of the county. Sandy soils of forested areas occupy more than half the area, dark soils of the prairies about one-fourth, and soils of the bottom lands only one-fifth. These associations are mapped very broadly, and each contains many small areas of soils that belong to one of the other two associations.

Dark Soils of the Prairies

The soils in this association belong to the Dennis, Okemah, Bates, Collinsville, Woodson, Talihina, Choteau, Teller, Vanoss, and Neosho series. The association occurs mainly in two fairly distinct areas, one along the eastern side of the county and one in the northwestern corner. The area in the northwestern corner is divided by the Cimarron River. In the area on the east side of the county, strips of woodland separate tracts of prairie. Besides these two large areas, several areas too small to be shown on the soil association map are scattered throughout the county.

The pattern of geographic distribution within this association is not well defined. As a rule, the Okemah and Woodson soils occupy the nearly level floors of shallow valleys. The Dennis and Bates soils occur on the gently sloping to moderately sloping sides of valleys above the Okemah and Woodson soils. The shallow and stony Collinsville and Talihina soils are on the ridgetops and on the highest and most strongly sloping parts of the valley walls. The Vanoss, Teller, and Choteau soils occupy high, fairly distinct benches or terraces along the major streams. The Neosho soils lie in small level or slightly depressed areas within large, nearly level areas of Choteau soils.

The areas of this association are among the most important agricultural sections of Creek County. They total about 165,700 acres, or 26.6 percent of the county area. The association consists of both shallow, nonarable soils and deep, arable soils. In some places they are intermixed and in other places they occur in fairly large separate areas. Soils that are well suited to crops comprise 42 percent of the association; soils that are moderately well suited to crops comprise another 16 percent. Marginal land and soils unsuitable for crops make up the remaining 42 percent of the association.

The deep and moderately deep soils of this association have moderate to high natural fertility. Under common management they produce moderate yields of cultivated crops or native pastures. They are well suited to cotton, sorghums, small grains, corn, and native grass for hay or pasture. If properly managed, these soils will also produce moderate to high yields of sweetclover and alfalfa. The shallow soils of the association are unsuitable for crops, but they produce moderate yields of pasture and are well suited to grazing.

The arable soils occur in relatively large areas on nearly level to moderately sloping topography that is favorable for large-scale farming operations and the use of power-operated equipment. The more strongly sloping areas of these soils are very susceptible to erosion and need careful management to reduce runoff and to prevent erosion.

The system of farming in the prairie sections depends on the proportion of arable and nonarable soils on each farm. Some farms or ranches are composed almost entirely of arable soils and some almost entirely of nonarable soils. Farms consisting of deep, arable soils are used for row crops. On farms that consist of both shallow and deep soils, crop and livestock farming are combined. Cattle ranches are located on the shallow, nonarable soils. The system most common is the combination of row-crop and livestock farming.

Sandy Soils of Forested Areas

The dominant soil series in this association are the Darnell, Pottsville, Stephenville, Cleburne, Dougherty, Stidham, and Eufaula series. Talihina soils occur in the many small prairie openings and as bands on the steep slopes next to Darnell soils. Some areas of Broken or gullied sandy upland are included.

This association occurs all through the county; the largest single area includes nearly all the uplands of the central part. The pattern of distribution is fairly distinct. The Darnell and Pottsville soils and the areas of Broken or gullied sandy upland occupy sloping valley walls, dissected areas, ridgetops, and rolling to hilly areas. The Cleburne and Stephenville soils, as a rule, are on gently sloping ridgetops and the foot slopes along valley sides. The Dougherty, Stidham, and Eufaula series occur on dissected high terraces, mainly above the Deep Fork and Cimarron Rivers in the southern and northern ends of the county.

This is the most extensive soil association in the county, but the least important for agriculture. It occupies 330,600 acres, or 53.2 percent of the county. Three-fourths of the acreage consists of shallow, sloping, and nonarable soils. The rest consists of moderately deep to deep, arable soils. Most of these are only moderately well suited to crops; less than 4 percent of the association is well suited to crops. In most places the shallow and the deep soils are closely associated, but in some parts of the association the shallow soils and the deep soils occur in separate, fairly distinct areas.

These soils are low in natural fertility, and they deteriorate rapidly under cultivation. Only the Dougherty and Stidham soils, which occur along the south edge of the county, are well suited to crops. The gently sloping Cleburne and Stephenville soils are moderately well suited to crops but they do not occur in areas large enough to be important agriculturally.

These soils are very susceptible to leaching, which further depletes their fertility. The moderately deep soils of this association are easily damaged by sheet and gully erosion when cultivated and rapidly become unsuitable for crops and of low value for pasture.

Most of this soil association is scrubby woodland in which there are small prairie openings. It is used mainly for grazing. Small farms are scattered on the deeper and less strongly sloping soils. Small, irregular, cultivated fields are located among areas of woodland or abandoned fields. Crops occupy less than 6 percent of this soil association; most of the cropped areas are on the Dougherty and Stidham soils.

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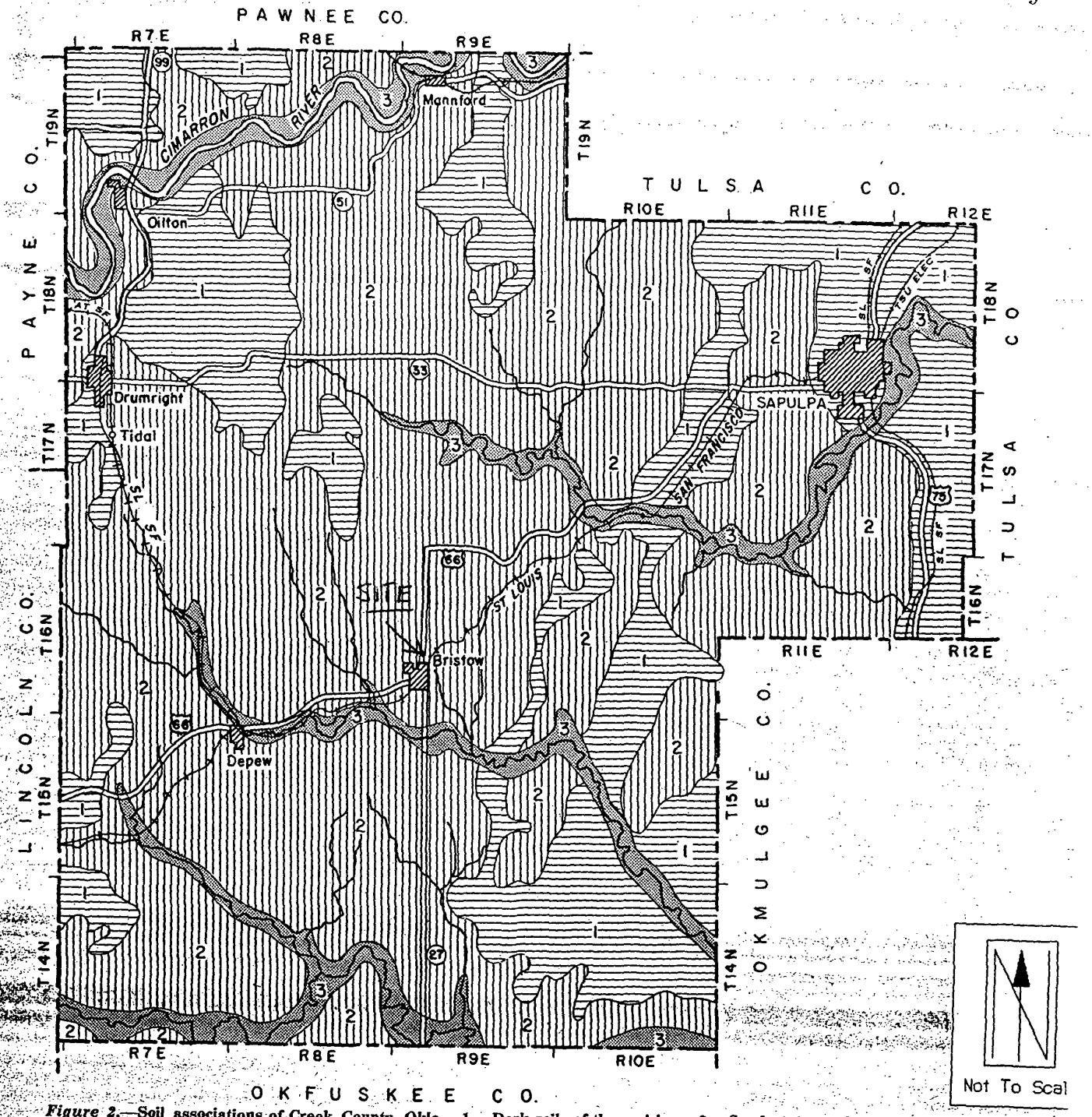


Figure 2.—Soil associations of Creek County, Okla. 1.—Dark soils of the prairies. 2.—Sandy soils of the forested areas. 3.—Soils of the bottom lands.

None of the soils of this association provide good grazing. Pastures support a thin stand of annual weeds and three-awn grasses, which are of low nutritive value. Pastures of moderate carrying capacity can be developed on the moderately deep and deep soils if they are heavily fertilized. The forest on the shallow and moderately deep soils that overlie sandstone is scrubby blackjack and post oaks. It has little economic value. Under good management, trees for fence posts or other commercial uses can be grown on the deep soils.

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Cotton, peanuts, corn, cowpeas, and sorghums are the principal crops. Yields are low to very low. Many of the farms are operated by persons who obtain most of their income from other sources.

Soils of the Bottom Lands

This association consists of soils of the Port, Yahola, Verdigris, Pulaski, Mason, Roebuck, and Reinach series and of Gullied bottom land. It occurs in the valleys of streams throughout the county. The largest areas are along the Cimarron and Deep Fork Rivers, and along Little Deep Fork and Polecat Creeks. The Mason and Reinach soils lie on low terraces. The other soils are on the flood plains.

This association is made up of the most fertile and productive soils in this county. It is very important agriculturally. It occupies about 121,200 acres, or 19.5 percent of the county. Fifty-four percent of the acreage is well suited to crops, and another 12 percent is moderately well suited to crops. Only about 34 percent, which includes all of the Gullied bottom land, is not suitable for crops. Nearly all the 34 percent that is not suited to crops is well suited to forest or pasture. Gullied bottom land, except for a few small areas, is suitable only for growing trees.

These soils are higher in natural fertility and more productive than the soils of the uplands. The fertility can be maintained or increased easily by using legumes, lime, and phosphate. Crops on these soils withstand droughts much better than crops on the higher lying soils.

Erosion is no problem on these nearly level soils, but runoff and overwash from higher areas may damage crops. Protection from floods is the most serious management problem. Soils on the flood plains of the smaller streams and the Deep Fork River are covered with water so frequently that they are not suitable for crops. Woodland is the best use for these soils. A few areas are well suited to pasture and johnsongrass hay. Other soils of the flood plains and low terraces are flooded, but less frequently, and usually early enough in the spring so that a crop can be planted later.

Few farms are composed entirely of bottom-land soils and, as a rule, these soils are used and managed along with nearby upland soils. Corn, cotton, and sorghums are the principal crops. Soils that are flooded too often to be used for crops are suitable for pastures, pecan orchards, or commercial forests.

Soil Series and Their Relations

A total of 24 soil series and 3 miscellaneous land types were mapped in Creek County. Each series differs from the others in some characteristic that affects its suitability for agriculture.

The soils of the Bates and Dennis series developed over interbedded sandstones, fine-grained sandy shales, and shales. They occupy gently sloping to moderately sloping relief. They have a dark grayish-brown, friable, acid surface soil and a dark yellowish-brown to brown, friable, slightly acid sandy clay loam to sandy clay subsoil. The Dennis soils are deeper than the Bates soils, and they have more clay in the lower subsoil. Runoff is medium to rapid, and internal drainage is medium. These are moderately productive, easily worked soils that are well suited to crops, pasture, or native hay.

The Okemah and Woodson soils are the darkest, most clayey soils of the uplands. They developed over neutral to weakly alkaline shales and clays. They are nearly level to gently sloping. They have a very dark grayish-brown, friable, slightly acid surface soil. The Okemah soils have a crumbly clay subsoil, but the Woodson soils have a heavy, compact claypan subsoil; both are slightly acid to neutral in the subsoil. Runoff is slow to medium, and internal drainage is very slow. Drainage is adequate for all of the commonly grown crops, including alfalfa, but planting may be delayed if the weather is very wet in the spring. These are among the most productive soils of the county. They are very good for crops, pasture, or native hay.

The Teller and Vanoss soils developed on moderately high, nearly level to gently sloping stream terraces. Their parent materials were sediments, mainly from the prairies and plains to the west. The Teller soils have a brown friable surface soil and a reddish-brown friable clay loam subsoil over reddish silty and sandy parent materials. They have some characteristics of the light-colored soils of the area, but they more nearly resemble the dark-colored soils. The Vanoss soils have a very dark grayish-brown friable surface soil. Their subsoil is grayish-brown sandy clay loam to friable sandy clay. It overlies dark loamy to clayey parent materials. Soils of these two series are very productive. They are friable, well drained, and easily worked. The reaction ranges from slightly acid to neutral. They are well suited to all crops commonly grown in the county, including alfalfa.

The Choteau and Neosho soils are somewhat lighter colored, less well drained, and less productive than the Teller and Vanoss soils. The Choteau soils are nearly level to gently sloping. The Neosho soils occupy level to slightly depressed spots within areas of Choteau soils. The parent materials are sandy and clayey acid sediments from both dark-colored and light-colored soils. Both series have grayish-brown, friable, acid surface soils. The Choteau soils have a mottled sandy clay subsoil that is moderately friable and permeable. The Neosho soils have a heavy, compact, mottled claypan subsoil. The Choteau soils are moderately well drained and are well suited to crops. The Neosho soils have very slow internal drainage and are not so well suited to crops.

The Collinsville and Talihina soils are shallow and stony nonarable soils of the prairies. They developed from sandstone or interbedded sandstone and shale. These areas are gently sloping to strongly sloping. They have a dark grayish-brown, friable, thin surface soil. Bedrock is about 5 to 18 inches below the surface. In most areas the soils range from slightly acid to neutral, but some spots are alkaline because of underlying limestone or calcareous shales and clays. Runoff is medium to rapid.

The soils of these two series are unsuitable for crops because they are shallow, stony, and sloping. Outcrops of bedrock and loose stones on the surface are common. These soils are well suited to grazing. They produce moderate amounts of nutritious grasses.

A few small areas of Bates soils within the mapping units are the only soils suitable for crops. Small grains and sorghums can be grown on them. However, they

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are generally surrounded by nonarable soils and might as well be used for pasture.

The Stephenville, Cleburne, Dougherty, Stidham, and Eufaula series are the moderately deep and deep soils of the forested uplands. These are all light-colored acid soils. They have low natural fertility, but they are very responsive to management and are easily worked.

The Stephenville and Cleburne soils developed over sandstones. They are of medium depth. Slopes are gentle to moderate. Both series have pale-brown sandy surface soils. The friable sandy clay loam subsoil is reddish in the Stephenville series and yellowish in the Cleburne series. Drainage is moderate to rapid. These soils are somewhat droughty. When they are well managed, they are moderately well suited to special crops and some field crops. Small areas of Darnell fine sandy loam are closely associated with Stephenville soils and are mapped in the same units.

The Dougherty and Stidham soils are deep soils that developed in old sandy alluvial sediments. They are nearly level to gently sloping. They have a pale-brown to light-brown sandy surface soil and a friable sandy clay loam subsoil. The subsoil is red in the Dougherty soils and yellowish in the Stidham soils. Both soils absorb rainfall readily and have fairly good moisture-holding capacity. They are moderately well drained to well drained. If well managed, they are well suited to special and vegetable crops, fruits, and general field crops.

The Eufaula soils are pale-brown deep sands that have no loamy material within 3 feet of the surface. These soils are too sandy and loose for most field crops. They produce fair yields of special crops if heavily fertilized.

The Darnell and Pottsville soils, along with strongly sloping or eroded nonarable soils of other series, are the shallow and stony sandy soils of forested areas. They occur in large and small areas among the deeper forested soils. They have a pale-brown, very friable, acid, sandy surface soil only a few inches thick over sandstone or interbedded sandstones and shales. Many loose stones occur on the surface. Bedrock outcrops are common on the sloping areas. These soils are too shallow, stony, or sloping for crops. They have little value for grazing; nevertheless, nearly all areas are used for woodland pasture. They support thin to moderately thick native forests of scrubby post oak and blackjack oak.

The bottom-land soils in Creek County are the Port, Pulaski, Roebuck, Verdigris, and Yahola soils of the flood plains and the Mason and Reinach soils of the low terraces.

The Port soils occur mainly on the flood plains of the Cimarron River. They developed in alluvial sediments that originated west of Creek County from grasslands overlying redbeds. They are alkaline to calcareous soils, reddish brown in color. They are deep, well drained, and highly productive.

The Pulaski soils developed from alluvial sediments washed from prairies and forested areas, both underlain by reddish sandstones. They are brown or reddish brown, slightly acid, well drained, and more or less sandy. Areas that are not flooded too often to be suitable for crops are moderately productive.

The Roebuck soil occurs mostly on the flood plain of the Deep Fork River. Soils of this series developed from reddish-brown, clayey, alluvial sediments. Most of these sediments were washed from grasslands that developed over the clays and shales of the redbeds west of Creek County. Roebuck soils are poorly drained and most areas are flooded too frequently to be suitable for crops.

Verdigris soils occur on the flood plains of streams that drain the dark-colored soils of the prairies. They have a dark grayish-brown surface layer over a slightly lighter colored silty and clayey subsoil. They are moderately well drained. Areas that are not flooded too frequently are very productive.

The Yahola soils are similar to the Port soils in surface appearance, but they have a sandier subsoil, and they are less productive. They have moderate natural fertility, but some areas are flooded too often to be used successfully for crops.

The Mason and Reinach soils occupy low terraces next to the wider flood plains. Ordinary floods do not cover these soils. During exceptionally high floods some areas are under water. The Mason soils are similar to Verdigris soils in profile characteristics, but they are better drained and are very productive. Mason soils are about the most productive soils in the county.

The Reinach soils occur mainly in the valley of the Cimarron River. They resemble the Yahola soils, with which they are usually associated. They are very productive and are easily worked. Most of their area is cultivated.

Descriptions of Mapping Units

In this section are descriptions of the soils and land types mapped in Creek County. The exact location of each area of each mapping unit is shown on the detailed soil map at the back of this report. The approximate acreage and proportionate extent of each mapping unit are listed in table 4. Table 4 also shows what percentage of each mapping unit was used for stated purposes at the time of this survey.

Bates series

Soils of the Bates series developed over noncalcareous sandstone or sandstone interbedded with sandy and silty shale. The native vegetation was grass. These soils are medium acid to slightly acid. The surface soil is dark grayish brown and friable. The subsoil is friable yellowish-brown sandy clay loam, slightly mottled with reddish brown and yellow in the lower part. The soils are of medium depth.

Bates soils are more sandy and friable in the lower subsoil than soils of the Dennis series, and they are deeper than soils of the Collinsville series. In Creek County, Bates soils are associated with Dennis soils and Collinsville soils. A shallow soil of the Bates series is mapped in a unit with Collinsville soils, and is described under the Collinsville series.

Bates fine sandy loam, gently sloping (2 to 4 percent slopes) (Ba).—This is a dark grayish-brown, friable, slightly acid soil of medium depth, developed over sandstone and sandy shale in small prairie areas. These areas are scattered through the county; most of them are in transition zones between forests and prairies. Prairie grasses were the native vegetation, but areas next to woodlands have been invaded by scrubby post oak, mesquite, and elm trees. Internal drainage is moderate,

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control cutting along streambanks. Light grazing to reduce the underbrush, protection from burning, and selective cutting of timber are good management practices for this land type.

Mason series

Soils of this series developed in slightly acid to neutral silty and clayey alluvium, slightly stratified with fine sandy loams, on low terraces along the larger streams of the county. These are dark, friable, slightly acid soils. They are moderately well drained. They are very productive and easily worked.

The profile characteristics of the Mason soils are about midway between those of the Verdigris series and those of the Vanoss series. The Verdigris soils are more frequently flooded, and they show less profile development. The Vanoss soils lie on higher terraces than the Mason soils; they are better drained and better developed and have less mottling in the lower subsoil.

Mason silt loam (0 to 2 percent slopes) (Mb).—This soil developed from silty alluvium, somewhat stratified with fine sandy loams and clays, ranging from slightly acid to weakly alkaline in reaction. It lies on nearly level low terraces along the larger creeks, about 3 to 10 feet above the present flood plains. Runoff is slow, but internal drainage is moderate. The native vegetation was a thin stand of hardwood trees and a ground cover of bluestem, Indiangrass, and switchgrass. A few small areas of Verdigris silt loam are included in this unit; these are flooded almost every year.

Profile of Mason silt loam about 2 miles southwest of Kellyville in the SE¼NE¼ sec. 27, T. 17 N., R. 10 E.:

0 to 15 inches, dark grayish-brown silt loam; the plow layer is grayish brown; moderate medium granular structure; crumbly and friable; slightly acid.
15 to 35 inches, dark grayish-brown clay loam; medium granular structure; crumbly and friable when moist, slightly sticky when wet; porous and permeable; slightly acid.
35 to 45 inches +, grayish-brown silty clay loam, coarsely mottled with strong brown and yellowish brown; sticky and plastic when wet, very hard when dry; moderately permeable; slightly acid.

Small areas have a very fine sandy loam or loam plow layer that ranges from grayish brown to pale brown in color. A few narrow areas of Verdigris silt loam comprise about 5 percent of this unit. The Verdigris soil is similar to the Mason soils, but it is on high flood plains that are flooded almost every year.

Use and management (Capability unit I–1).—This is a very productive soil, excellent for either crops or pasture. It is easy to work and is not susceptible to erosion.

About three-fourths of this soil is used for crops, mainly corn, cotton, oats, sorghums, and alfalfa. Most of the rest is in pasture but some is woodland. It is in the Loamy bottom-land range site.

Mason clay loam (0 to 2 percent slopes) (Ma).—This soil developed on nearly level, low terraces from silty to clayey old alluvium that was somewhat stratified in places with fine sandy loams. It ranged from slightly acid to weakly alkaline. The native vegetation was a thin stand of hardwood trees and a thick ground cover of bluestem grasses. Runoff is slow, and internal drainage is moderate. This soil is associated with Mason silt loam and with the lower lying soils of the Verdigris series. Mason clay loam is similar to Mason silt loam, but it is slightly darker colored throughout and has somewhat slower internal drainage.

Profile of Mason clay loam on a low terrace of Polecat Creek about 2½ miles southwest of Kellyville in the SE¼ sec. 28, T. 17 N., R. 10 E.:

0 to 14 inches, dark grayish-brown clay loam; strong medium granular structure; crumbly and friable when moist, hard when dry; slightly acid.
14 to 30 inches, dark grayish-brown silty clay loam; crumbly and friable when moist, hard when dry; moderately permeable and porous; slightly acid.
30 to 45 inches +, dark grayish-brown silty clay loam, mottled with strong brown and yellowish brown; contains a few thin lenses of silt loam or very fine sandy loam in the lower part; sticky and plastic when wet; moderately permeable; slightly acid.

The plow layer ranges in texture from clay loam to loam and in color from grayish brown to very dark grayish brown. The subsoil below about 30 inches is weakly alkaline to slightly acid in reaction. The texture ranges from clay loam to sandy clay. A few small areas of Brewer clay loam are included in this unit along Polecat Creek. These inclusions have a dark-gray surface soil and a subsoil of dark-gray to black crumbly clay.

Use and management (Capability unit I–1).—This is excellent soil for crops or pasture. It is not susceptible to erosion. It is moderately heavy but friable. More than half of this soil is used for crops, chiefly corn, cotton, oats, sorghums, and alfalfa. Most of the remainder is in pasture. A few acres are still in native woodland that is used for pasture. It is in the Loamy bottom-land range site.

Neosho series

The soils of this series developed on nearly level or depressed areas on old stream terraces. The parent materials were clayey old alluvial sediments, somewhat stratified with silts and sands. Most of these sediments were washed from soils developed over shales and fine-grained sandstones, and some were from soils developed over limestone.

These soils have a light brownish-gray acid surface soil and a mottled claypan subsoil. Drainage is poor and natural fertility is low. Neosho soils are associated with soils of the Choteau series and the Vanoss series. The Choteau soils are somewhat darker colored and better drained than the Neosho soils, and they do not have a claypan subsoil. The Vanoss soils are much darker than the Neosho soils, and they have a thick, friable, permeable surface soil and subsoil.

Only one soil of the Neosho series is mapped in Creek County.

Neosho silt loam (0 to 1 percent slopes) (Na).—This soil developed from slightly acid to weakly alkaline stratified sandy and clayey old alluvial sediments, on level to slightly depressed parts of old high terraces. The principal areas are along Little Deep Fork Creek. The native vegetation was coarse grasses and scattered post oak and elm trees. Runoff is slow or nonexistent, and internal drainage is very slow. This soil is associated with the better drained, somewhat darker colored Choteau soils.

Profile of Neosho silt loam about 3 miles southeast of Slick in the SW¼SE¼ sec. 27, T. 15 N., R. 10 E.:

0 to 15 inches, light brownish-gray silt loam, slightly mottled with brown; surface crusts on drying in cultivated fields;

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massive to weakly granular structure; friable when moist, very hard and compact when dry; slightly acid.
15 to 24 inches, grayish-brown heavy clay, mottled with yellowish red and yellowish brown; weak blocky structure; very compact and very sticky when moist, extremely hard when dry; very slowly permeable; medium acid.
24 to 42 inches+, mottled gray and light olive-brown heavy clay; very sticky and stiff when wet; very slowly permeable; slightly acid in upper part, neutral in lower part.

The thickness of the surface soil ranges from about 10 to 18 inches, and the texture ranges from very fine sandy loam to loam. On a few low sandy mounds the surface soil is fine sandy loam 18 to 30 inches thick. The third layer ranges from dense clay to compact, slowly permeable sandy clay; in places it contains pockets and lenses of sandy loam.

Use and management (Capability unit IIs–1).—This soil is not susceptible to erosion. Fertility is low to moderate. The soil remains wet and cold late in the spring, and when it dries the surface soil crusts and bakes. If the soil is not worked at exactly the right moisture content, large clods form that make it very difficult to maintain a good seedbed.

This soil is not well suited to most common field crops, but it is moderately well suited to native hay or pasture. Most of it is now used for pasture. About one-third of the soil is used for crops, mostly cotton, corn, and sorghums. This soil is in the Claypan prairie range site.

Oil-waste land

Oil-waste land (Oa).—The areas mapped in this miscellaneous land type have been practically ruined for agricultural use by oil and salt-water waste from oil wells. They are more or less gullied and eroded and are almost bare of vegetation. They range in size from about one acre to several acres.

Use and management (Capability unit VIII).—This land is of no value for crops or pasture in its present condition. Some of the less strongly sloping and less severely gullied areas may eventually be revegetated by natural means if no more oil or salt-water waste is dumped on them.

Okemah series

These soils have developed from weakly alkaline shales and clays under a cover of grass in nearly level to gently sloping shallow valleys. They are moderately well drained, dark colored, and slightly acid. They have a dark-colored, crumbly and granular surface soil and upper subsoil. Their lower subsoil is mottled olive-yellow and gray compact clay.

Okemah soils are not mapped separately in Creek County. They are closely associated with soils of the Dennis series in some places and with soils of the Woodson series in others, and are mapped in units with soils of one or the other of these series. The Woodson soils differ from the Okemah soils in being dark gray and having a claypan. The Dennis soils, where they are associated with the Okemah soils, lie in slightly higher positions and have developed from less clayey materials. The Dennis soils are browner than the Okemah soils, and they have more rapid runoff and internal drainage.

A profile of an Okemah soil as mapped with the Woodson soils is described under Okemah and Woodson clay loams, and a profile of an Okemah soil as mapped with Dennis soils is described under Dennis and Okemah loams, gently sloping.

Okemah and Woodson clay loams (0 to 1 percent slopes) (Ob).—These two soils occur intermixed in small areas or separately in areas of several acres. Woodson clay loam occupies the nearly level, usually lower-lying parts of shallow valleys, and Okemah clay loam the gently sloping, slightly higher surrounding areas, but the two soils are so closely associated that it is not practical to map them separately. They merge with little or no difference in surface appearance. The parent materials of both soils are olive or olive and yellow weakly alkaline clays and shales. The mapping unit occurs mostly in shallow valleys near Kiefer, Mounds, and Edna. Runoff is slow to moderate, and internal drainage is very slow. The native vegetation was tall grasses, mainly big bluestem, little bluestem, side-oats grama, and Indiangrass.

Profile of Okemah clay loam near Mounds in the SW¼SW¼ sec. 17, T. 16 N., R. 12 E.:

0 to 15 inches, dark-gray clay loam, lower part slightly mottled with brown; granular and friable when moist, very hard when dry; surface crusts in cultivated fields on drying; slightly acid.
15 to 20 inches, dark grayish-brown silty clay loam, slightly mottled with brownish yellow and strong brown; crumbly and friable when moist, sticky and plastic when wet; moderately permeable; slightly acid.
20 to 35 inches, mottled grayish-brown and light olive-brown heavy clay; very sticky and stiff when wet, extremely hard when dry; compact and very slowly permeable; neutral.
35 to 48 inches+, mottled light-gray and olive-yellow clay; very compact; very slowly permeable; weakly alkaline.

The texture of Okemah clay loam ranges from loam to clay loam. The depth to the heavy clay layer ranges from 18 to 25 inches. A few shotlike concretions of iron oxide occur in the two clay layers.

Profile of Woodson clay loam about 1 mile south of Kiefer in the SW¼SW¼ sec. 28, T. 17 N., R. 12 E.:

0 to 12 inches, dark-gray clay loam; the 6-inch plow layer is slightly lighter in color; crumbly and friable when moist, very hard when dry; surface crusts on drying; slightly acid.
12 to 22 inches, dark-gray heavy clay, faintly mottled with brown; very compact claypan; very sticky and stiff when wet; very slowly permeable; slightly acid to neutral.
22 to 38 inches, dark grayish-brown clay, mottled with yellowish brown; very compact; extremely hard when dry; very slowly permeable; weakly alkaline.
38 to 46 inches+, mottled gray, olive-brown, and yellowish-brown clay or shaly clay; contains a few crystals of gypsum and small shotlike concretions of iron oxide; alkaline but not calcareous.

The thickness of the surface soil ranges from 10 to 14 inches. Considerable mottling occurs in the upper subsoil in the areas that grade toward the Okemah soil.

Some small areas of Parsons silt loam near Kiefer are included in this mapping unit. These areas have a dark grayish-brown silt loam surface soil 12 inches thick, which rests on a mottled grayish-brown, strong-brown, and pale-yellow claypan subsoil. The Parsons soils are not extensive enough in Creek County to be mapped separately and are not described in this report.

Use and management (Capability unit I–4).—The two soils in this mapping unit are the darkest colored and finest textured soils of the prairies. They are the most fertile and productive soils for common field crops that occur in the uplands of this county. Okemah clay loam is slightly more productive than Woodson clay loam. Both soils have a moderately high water-holding capacity

000253

These inclusions consist of 10 to 18 inches of light-brown fine sandy loam over dark grayish-brown silt loam or clay loam, overlain by recent deposits of lighter colored, sandier soil materials.

Use and management (Capability unit IIIw–1).—This soil is moderately productive. It is easily worked and fairly resistant to drought. It is not susceptible to erosion, but some material may be deposited on the surface by flood waters. Cropping is hazardous because most areas are flooded several times a year.

This soil is moderately well suited to crops and, in spite of the flood hazard, about one-fifth of the area is cropped. Cotton, corn, and sorghums are the chief crops. This soil is well suited to pasture, and about one-third is used for this purpose. Nearly half has been left in native forest. The soil is in the Loamy bottom-land range site.

Reinach series

Soils of the Reinach series developed from alkaline to calcareous, reddish, silty to moderately sandy alluvium on low, nearly level stream terraces. They are moderately productive soils and easily worked. They are well suited to all general crops of this area, including alfalfa.

The Reinach soils have a brown to reddish-brown friable surface soil and a silty to moderately sandy subsoil. They are similar to the Yahola soils that occur on the present flood plains, but the Reinach soils lie a little higher and are above ordinary overflow. Their surface soil is darker than the Yahola surface soil, and is alkaline, though usually noncalcareous. Only one Reinach soil is mapped in Creek County.

Reinach very fine sandy loam (0 to 1 percent slopes) (Ra).—This soil occurs on low terraces or benches a few feet higher than the flood plains of the Cimarron River. It developed from reddish, silty to moderately sandy, alkaline, calcareous alluvial sediments. Prairie grasses and scattered elm, hackberry, pecan, and oak trees were the native vegetation. Runoff is slow, and internal drainage is moderate to rapid.

Profile of Reinach very fine sandy loam about 3½ miles north of Drumright on a low terrace of the Cimarron River:

0 to 14 inches, reddish-brown very fine sandy loam; the 6-inch plow layer is light reddish brown; weak granular structure; very friable; neutral.
14 to 46 inches+, light reddish-brown very fine sandy loam that contains thin strata of reddish-brown and brown silt loam in lower part; friable; very permeable; neutral.

The surface soil ranges from brown to light reddish brown in color and from fine sandy loam to silt loam in texture. Some small areas next to more strongly sloping Teller soils have an overwash of light-brown, slightly acid fine sandy loam, 4 to 10 inches thick.

Use and management (Capability unit I–1).—This soil is well suited to crops and pasture. Most of it is cultivated. Corn, cotton, sorghums, and alfalfa are the principal crops. This soil is easily worked and is not susceptible to erosion. It is in the Loamy bottom-land range site.

Roebuck series

Soils of this series consist of only slightly modified clayey alluvium washed from prairie soils that developed over redbeds. The alluvial deposits are alkaline to weakly calcareous. The native vegetation was forest. Both runoff and internal drainage are slow to very slow. Most areas are too poorly drained or too frequently flooded to be suitable for cropping unless artificially drained and protected from floods.

The surface soil is reddish brown. The subsoil is reddish clay, slightly mottled with brown and grayish brown. Roebuck clay is the only soil of this series that is mapped in Creek County.

Roebuck clay (0 to 1 percent slopes) (Rb).—This soil occupies parts of the flood plain of the Deep Fork River, where the channel is choked or partly filled by silting. It developed from clayey and silty, alkaline or calcareous, reddish alluvium. A native forest of elm, hackberry, oak, willow, pecan, and cottonwood covers these areas.

This is a poorly drained soil. Both runoff and internal drainage are very slow. The level flood plains are subject to frequent floods. This soil is not susceptible to erosion, but most areas are rapidly being covered with silt.

Profile of Roebuck clay:

0 to 20 inches, reddish-brown clay; moderately crumbly when moist, very sticky and plastic when wet; weakly alkaline.
20 to 45 inches+, reddish-brown heavy clay, slightly mottled with other shades of brown and some grayish brown; very sticky and stiff when wet, very hard when dry; slowly permeable; weakly calcareous.

Small areas have recent deposits of reddish-brown or brown, alkaline or calcareous, somewhat stratified clay loam and clay, 5 to 15 inches thick. In some places the subsoil below about 30 inches is stratified with brown clay loam and dark-gray calcareous clay.

Use and management (Capability unit Vw–1).—Nearly all of this soil is still in woodland. It is very fertile and would be highly productive if it were drained and protected from flooding, but drainage and flood protection are so difficult as to be almost impossible. Clearing underbrush and culling trees to allow native pecan orchards and bermudagrass pastures to develop may be practical. This soil is in the Heavy bottom-land range site.

Stephenville series

Soils of this series are of medium depth over the parent materials of soft reddish sandstone or interbedded sandstone and sandy shale. They developed under a scrubby forest of mixed blackjack oak and post oak. Scattered coarse grasses grew in open areas.

These soils are slightly acid. They have a light-colored friable sandy surface layer and a yellowish-red or red friable sandy clay loam subsoil. The subsoil grades into the parent material, usually at a depth of less than 3 feet.

The Stephenville soils occupy nearly level to moderately sloping areas and are closely associated with the very shallow Darnell soils. The two soils are similar in surface appearance, but the Stephenville soils are 20 to 36 inches deep and the Darnell soils are 5 to 20 inches deep over sandstone. Sandstone outcrops are common in both.

In this county, the Stephenville soils are mapped only in units with the Darnell soils. The two series have similar uses and are about equal in productivity.

Stephenville and Darnell fine sandy loams, gently sloping (2 to 4 percent slopes) (Sa).—Stephenville fine sandy loam occupies about 70 percent of this mapping unit. Small areas of Darnell fine sandy loam make up the other 30 percent. This unit is very extensive in the central, southern, and western parts of the county.

000254

These shallow to moderately deep upland soils developed over reddish-yellow to red sandstone or interbedded sandstone and sandy shale. The parent materials were slightly acid to neutral. The native vegetation was a thin to moderately thick forest of scrubby blackjack oak and post oak, and a thin ground cover of bluestem grasses. Both soils are well drained. Runoff is slow to moderate, but internal drainage is moderate to rapid.

Profile of Stephenville fine sandy loam, gently sloping, under a moderately thick cover of scrubby post oak and blackjack oak and bluestem grasses, about 2 miles east of Depew in the SW¼SW¼ sec. 9, T. 15 N., R. 8 E.:

0 to 4 inches, grayish-brown fine sandy loam; in plowed fields this layer is pale brown; weak granular structure; very friable; slightly acid.
4 to 12 inches, pale-brown light fine sandy loam; very friable when moist, nearly loose when dry; slightly acid.
12 to 28 inches, yellowish-red sandy clay loam; massive structure; crumbly and friable when moist, slightly sticky when wet; porous and permeable; medium acid.
28 to 35 inches, yellowish-red sandy clay loam, mottled with red; friable; permeable; contains small soft fragments of partly weathered sandstone; medium to slightly acid.
35 inches +, yellowish-red sandstone bedrock; slightly acid to neutral.

The depth to bedrock ranges from about 20 to 40 inches; normally it is less than 30 inches. A few small outcrops of the sandstone bedrock occur.

Profile of Darnell fine sandy loam in a cultivated field of about 2 percent slope, in the NW¼NW¼ sec. 16, T. 15 N., R. 8 E.:

0 to 10 inches, pale-brown light fine sandy loam; structureless; very friable when moist, nearly loose when dry; slightly acid.
10 to 16 inches, reddish-yellow fine sandy loam, slightly heavier in lower part; structureless; friable; lower part contains small fragments of partly weathered sandstone; medium acid.
16 inches +, reddish-yellow sandstone bedrock; neutral.

The depth of the Darnell soil ranges from about 5 to 20 inches. Most areas are between 8 and 15 inches deep. Small outcrops of sandstone bedrock occur here and there. The transition between the deeper Stephenville soil and the shallower Darnell soil is hardly noticeable; there is no change in slope or in color of the surface soil. Another profile of Darnell soil, as it typically occurs when associated with soils of the Pottsville series, is described under Darnell and Pottsville soils, sloping.

Use and management (Capability unit IIIe–2).—These soils are droughty and low in fertility. They are slightly to moderately susceptible to erosion if cultivated. Most of the cleared acreage has lost up to 20 percent of its surface soil through erosion. Some shallow gullies occur on the more strongly sloping cleared areas.

These soils are moderately well suited to crops and pasture. Yields are moderate under good management. Intensive management is needed to maintain or increase productivity.

About half of this mapping unit is cleared. Most of the cleared acreage has been abandoned for cropping, and it is now used for pasture. Cotton, peanuts, sorghums, corn, cowpeas, and sweetpotatoes are the principal crops. The pastures have a thin cover of three-awn grasses, bluestem grasses, and weeds. This unit is in the Sandy savanna range site. Nearly half of it is native woodland.

Stephenville and Darnell fine sandy loams, sloping (4 to 7 percent slopes) (Sb).—These soils are like Stephenville and Darnell fine sandy loams, gently sloping, except that the surface soil is somewhat thinner, the bedrock is nearer the surface, and outcrops of sandstone are more common. About 60 percent of the acreage consists of Stephenville soils and about 40 percent of Darnell soils.

Use and management (Capability unit VIe–1).—This land is not well suited to crops. It is droughty, low in natural productivity, and highly erodible if cultivated. Moderate yields of common field crops are produced when the soils are first cultivated, but yields decline rapidly.

More than half of this mapping unit is still in woodland. The remainder has been cleared, but little is still used for crops. Cotton, corn, sorghums, peanuts, and cowpeas are grown. Yields are about three-fourths as much as on the gently sloping soils. Most of the acreage that was cleared, cultivated, and abandoned is now in pasture. The vegetation is three-awn grass and weeds. This unit is in the Sandy savanna range site.

If these soils are cultivated, very careful management is needed. They should be terraced, stripcropped, and contour-cultivated, and erosion-resistant crops should be planted. Areas where the soils are too shallow to be terraced should be used for pasture.

Stephenville and Darnell fine sandy loams, sloping, severely eroded (4 to 7 percent slopes) (Sc).—The soils in this mapping unit have been so severely eroded that they are worthless for crops. Originally, they were like Stephenville and Darnell fine sandy loams, sloping, but erosion has removed much of the surface soil. Numerous gullies are now active; some cannot be crossed with tillage implements.

Use and management (Capability unit VIIe–2).—These soils were never well suited to crops, and now they are of no value for crops. All of the acreage has been cultivated, but most of it is now idle or in pasture. A thin stand of annual grasses and weeds furnishes poor grazing. It would take careful management to establish even moderately good pastures. Cotton, corn, sorghums, cowpeas, and peanuts are still grown on a few acres, but yields are low. This mapping unit is in the Eroded savanna range site.

Stidham series

The Stidham soils developed from acid sandy old alluvium on stream terraces under a mixed hardwood forest. They are low in natural fertility, but they are very responsive to management. They are well suited to fruits, special crops, and field crops.

Soils of this series have a light brownish-gray to pale-brown, friable, acid surface soil. The subsoil is yellowish-brown friable sandy clay loam, mottled with light gray and strong brown in the lower part.

Stidham soils are closely associated with Dougherty soils, which have a reddish subsoil, and with Eufaula soils, which have no loamy subsoil within 4 feet of the surface. In Creek County, the Stidham soils are not mapped separately. They are mapped in units with soils of the Dougherty series. A profile of a Stidham soil is described under Dougherty and Stidham fine sandy loams, nearly level.

Talihina series

The Talihina soils developed from beds of slightly acid to neutral, gray, brown, and olive shale that included a little sandstone. They are very shallow, slightly acid

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grasses and scattered elm, hackberry, and mesquite trees grew on these soils. Runoff is slow, and internal drainage is moderate. This soil is closely associated with Teller silt loam, nearly level, but it has a darker colored surface soil and a brown or yellowish-brown, instead of a red, subsoil.

Profile of Vanoss silt loam, nearly level, in a cultivated field about 3 miles east of Oilton in the NE¼ sec. 34, T. 19 N., R. 7 E.:

0 to 16 inches, dark grayish-brown silt loam; the 6-inch plow layer is slightly lighter in color; moderate granular structure; friable when moist, hard when dry; neutral.
16 to 28 inches, dark-brown clay loam; medium granular structure; crumbly and friable when moist, hard when dry; permeable; neutral.
28 to 38 inches, brown clay loam, faintly mottled with strong brown; crumbly and friable; permeable; neutral.
38 to 48 inches +, yellowish-brown clay loam; slightly more friable and noticeably more sandy than layer above; neutral to weakly alkaline.

The surface soil ranges in color from very dark grayish brown in undisturbed areas to grayish brown in cultivated fields, and in texture from very fine sandy loam to heavy silt loam. In areas where this soil grades toward the Teller soils, the upper subsoil is brown and the lower subsoil is strong brown to reddish brown.

A few small level areas of Brewer silt loam are included in this mapping unit. These areas have a dark-gray silt loam surface soil 14 inches thick over a dark-gray crumbly clay subsoil. Brewer soils are not mapped separately in Creek County, and they are not described in this report.

Use and management (Capability unit I–3).—This is a moderately productive, easily worked soil. It responds well to good management, and it is not susceptible to erosion.

This soil is excellent for crops and well suited to pasture. About three-fourths of it is cultivated. The principal crops are cotton, corn, sorghums, and oats. The rest is used for pasture. This soil is in the Loamy prairie range site.

Vanoss silt loam, gently sloping (2 to 4 percent slopes) (Va).—This soil is similar to Vanoss silt loam, nearly level, but its slope makes it slightly susceptible to erosion if cultivated. It occurs in small areas in association with nearly level Vanoss and Teller soils.

Use and management (Capability unit IIe–1).—More than half of this soil is used for crops. The same crops are grown as on Vanoss silt loam, nearly level, but yields are slightly lower. Eroded areas are 10 to 20 percent less productive than the normal soil. Good management would restore the original productivity in 2 or 3 years. This soil is in the Loamy prairie range site.

Verdigris series

These soils occupy the flood plains of streams. The alluvium from which they developed came mostly from dark soils of the prairies; some came from light-colored soils. Soils of this series are moderately well drained, but they are flooded occasionally to frequently. The periodic floods do not prevent successful cultivation except in the narrow flood plains of small streams.

These soils have a dark grayish-brown, friable, slightly acid surface soil and a dark grayish-brown clay loam subsoil. The subsoil is slightly mottled and somewhat finer textured in the lower part. Verdigris soils are darker colored than the Pulaski soils and have more retentive, less sandy subsoils. They are similar to the Mason soils, which lie slightly higher and are above ordinary overflow.

Verdigris fine sandy loam (0 to 1 percent slopes) (Vd).—This soil occupies parts of narrow flood plains, mainly in the central and western parts of the county. The parent materials were slightly acid to weakly alkaline alluvial sediments, most of which were washed from dark soils of the prairie; some were derived from light-colored soils of forested areas. Runoff is slow, and internal drainage is moderate. These soils are flooded for short periods several times a year. Fresh alluvial sediments are deposited on most areas during floods. Native forests of elm, hackberry, oak, pecan, and cottonwood grew on these soils, and some coarse grasses and shrubs covered the ground.

Profile of Verdigris fine sandy loam:

0 to 14 inches, grayish-brown fine sandy loam, weakly stratified in lower part with dark grayish-brown silt loam; very friable when moist; slightly acid.
14 to 32 inches, dark grayish-brown clay loam; crumbly and friable when moist, moderately sticky when wet; slightly acid to neutral.
32 to 50 inches +, dark grayish-brown clay loam, mottled or splotched with light brown; contains thin seams or lenses of light-brown fine sandy loam below about 40 inches; neutral.

Most areas of this soil are covered by recent alluvium, 5 to 15 inches thick. This alluvium ranges from brown to dark grayish brown in color. The texture is fine sandy loam. It is somewhat stratified below plow depth. The clay loam subsoil is dark gray or dark grayish brown in most places.

Use and management (Capability unit I–2).—This is a moderately productive soil. It is likely to be flooded late in spring; consequently, cropping is uncertain. This soil does not erode, but a considerable amount of soil material is deposited by floodwater. Areas where floods are least frequent are well suited to crops. Corn, cotton, and sorghums are the most common crops. The soil is also well suited to pasture. Two-thirds of the acreage has been cleared for crops and pasture, and one-third is still under native forest. This soil is in the Loamy bottom-land range site.

Verdigris silt loam (0 to 1 percent slopes) (Ve).—This soil is mapped on flood plains of streams throughout the county. The parent material consisted of slightly acid to weakly alkaline alluvial sediments washed from dark soils of the prairies. The native vegetation was a hardwood forest of elm, oak, hackberry, cottonwood, and pecan trees, and scattered coarse grasses. Runoff is slow, and internal drainage is moderate. This soil is flooded one to three times a year; nevertheless, most of it can be successfully cropped.

Profile of Verdigris silt loam in a cultivated field about 4 miles west of Bristow in the SW¼SW¼ sec. 34, T. 16 N., R. 8 E.:

0 to 16 inches, dark grayish-brown silt loam; friable and easily worked when moist, hard when dry; slightly acid.
16 to 36 inches, dark grayish-brown clay loam, faintly mottled with brown in the lower part; crumbly and friable when moist, hard when dry; porous and permeable; slightly acid to neutral.
36 to 46 inches +, dark grayish-brown clay loam, splotched or mottled with brown and gray; friable; permeable; weakly alkaline.

000256

The surface layer is 10 to 20 inches thick. In some places the lower part of this layer is weakly stratified with fine sandy loam and clay loam. The subsoil is slightly acid to weakly alkaline. Stratified darker colored and lighter colored sediments may occur in the lowest layer.

Use and management (Capability unit I–2).—This soil is well suited to crops or pasture. It is somewhat more productive than Verdigris fine sandy loam. It is not susceptible to erosion, but soil material may be deposited on the surface by floods. The flood-deposited material replenishes the supply of plant nutrients. About one-fourth of this soil is still under native forest. Half of the remainder is cropped, mostly to corn, cotton, sorghums, and alfalfa. Yields range from almost complete failures to very high yields. Some of the soil is in pasture. This soil is in the Loamy bottom-land range site.

Verdigris clay loam (0 to 1 percent slopes) (Vc).—This soil occurs on the wider flood plains of the larger creeks of the county. The alluvial sediments from which it developed are slightly acid to weakly alkaline. They were washed from dark-colored soils of the prairies. Runoff is slow, and internal drainage is moderate. The native vegetation was a forest of elm, hackberry, ash, oak, pecan, and cottonwood, and coarse grasses.

Profile of Verdigris clay loam about ½ mile southeast of Sapulpa in the NW¼SW¼ sec. 6, T. 17 N., R. 12 E.:

0 to 20 inches, dark grayish-brown clay loam; moderately granular structure; crumbly and friable when moist, hard when dry; porous; slightly acid.
20 to 38 inches, grayish-brown clay loam, slightly mottled with brown and some pale brown; friable; permeable; slightly acid.
38 to 46 inches +, grayish-brown clay loam, mottled with other shades of brown; contains pockets and thin seams of brown fine sandy loam; slightly acid.

The color of the surface layer ranges from very dark brown in undisturbed areas to dark grayish brown or dark brown where cultivated. Small areas have a 3- to 5-inch layer of grayish-brown loam that has been deposited on the surface by floodwaters.

Use and management (Capability unit I–2).—This is a highly productive soil. Most of the areas are flooded one to three times a year, but this does not prevent their use for cultivated crops. This soil is not susceptible to erosion, but on most areas soil material is deposited during floods.

About one-third of this soil is cultivated. Corn, cotton, and sorghums are the principal crops. About one-fourth is in woodland. The rest is idle or used for pasture. This soil is in the Loamy bottom-land range site.

Woodson series

These are claypan soils that developed from alkaline or weakly calcareous shales and clays on nearly level to gently sloping prairies. They occupy small nearly level areas in gently sloping shallow valleys. These soils are dark grayish brown to dark gray. They are slightly acid.

Woodson soils are closely associated with soils of the Okemah series. The two series differ little in surface appearance. The Woodson soils have a thinner and more granular surface soil than the Okemah soils, and they have a dark-gray claypan subsoil. Woodson soils are not mapped separately in this county. Areas of Woodson clay loam are included in Okemah and Woodson clay loams, and a profile of the Woodson soil is described under that unit.

Yahola series

These soils occur on the flood plains of the Deep Fork and Cimarron Rivers and other large streams. The parent material was alluvium derived from grassland soils underlain by redbeds. Soils of the Yahola series have a reddish-brown alkaline or calcareous surface soil and a moderately sandy subsoil.

These soils are moderately to highly productive. Areas that are not flooded too often are well suited to general field crops. Yahola soils are similar to Port soils in surface appearance, but they have a sandier subsoil. They are more alkaline than Pulaski soils. Yahola soils have a sandier subsoil and more rapid internal drainage than the Roebuck soils.

Yahola very fine sandy loam (0 to 1 percent slopes) (Yb).—This soil occurs on the flood plains of the Cimarron and Deep Fork Rivers. It developed from calcareous or alkaline sandy alluvial sediments washed from prairies underlain by redbeds. Runoff is slow to moderate, and internal drainage is moderate to rapid. All areas of this soil are periodically flooded. Those on the flood plain of the Deep Fork River are too frequently flooded to be suitable for crops, and they have been left in native hardwood forest. The native vegetation was a forest of elm, ash, oak, cottonwood, and pecan trees. Coarse grasses grew where the forest was thin.

Profile of Yahola very fine sandy loam about ½ mile north of Oilton in the NW¼SW¼ sec. 28, T. 19 N., R. 7 E.:

0 to 16 inches, reddish-brown very fine sandy loam; structureless; very friable; alkaline but not calcareous.
16 to 46 inches+, reddish-yellow light fine sandy loam, weakly stratified in the lower part with loamy fine sand; very friable and freely permeable; alkaline but not calcareous.

The surface soil is alkaline or calcareous. In color it ranges from light brown to reddish brown and in texture from fine sandy loam to silt loam. Small areas where floodwaters have recently deposited sediments may be weakly stratified.

Use and management (Capability unit I–2).—This soil is easily worked and moderately productive. Areas that are not flooded too often are well suited to crops. The soil is not susceptible to erosion. It receives fresh deposits of soil material during floods.

All of the cropland is on the flood plain of the Cimarron River. Cotton, corn, and sorghums are the principal crops. This soil is in the Loamy bottom-land range site.

Yahola clay loam (0 to 1 percent slopes) (Ya).—This soil developed from reddish, calcareous, sandy alluvium on the flood plains of the Deep Fork and Cimarron Rivers. The native vegetation was a forest of elm, hackberry, oak, pecan, cottonwood, and ash. Coarse grasses grew where the forest was thin. Runoff is slow, but internal drainage is rapid through the sandy substratum.

This soil is associated with Yahola very fine sandy loam. It is like that soil except for having a finer textured surface soil.

Profile of Yahola clay loam:

0 to 14 inches, reddish-brown clay loam; crumbly and friable when moist, moderately sticky when wet; alkaline or weakly calcareous.
14 to 45 inches +, reddish-yellow very fine sandy loam, weakly stratified in lower part with loamy sands and clay loams; very permeable; weakly calcareous.

000257

TABLE 5.—*Chemical analyses of some horizons of selected soil types*

Soil and location of sample	Depth	Soil reaction	Total phosphorus (P)	Available phosphorus (P)	Organic matter	Total nitrogen	Available potash (K)
	Inches	*pH*	*Percent*	*Lb. per acre*	*Percent*	*Percent*	*Lb. per acre*
Bates fine sandy loam.							
Virgin: SE¼SW¼ sec. 8, T. 18 N., R. 11 E.	0–6	6.4	0.020	10.6	2.73	0.1225	208
	12–25	5.7	.015	10.6	1.34	.091	184
Cropped: NE¼NW¼ sec. 17, T. 18 N., R. 11 E.	0–6	5.5	.016	5.8	1.20	.084	88
	12–25	5.5	.015	4.2	1.18	.086	100
Dennis silt loam.							
Virgin: SE¼SE¼ sec. 5, T. 19 N., R. 7 E.	0–6	5.6	.022	9.8	3.55	.149	166
Cropped: SW¼SW¼ sec. 4, T. 19 N., R. 7 E.	0–6	5.5	.019	15.4	2.22	.0965	234
	12–20	5.3	.018	19.4	2.02	.099	166
	20–26	7.1	.014	10.6	1.08	.007	162
Dennis silt loam.							
Virgin: SE¼SE¼ sec. 14, T. 17 N., R. 10 E.	0–6	5.7	.023	5.0	3.20	.141	136
	18–26	5.7	.014	14.6	1.59	.098	216
Cropped: SW¼SW¼ sec. 13, T. 17 N., R. 10 E.	0–6	5.4	.018	8.2	1.75	.0825	132
	12–18	5.5	.017	5.8	1.60	.100	128
	18–26	5.9	.019	5.8	1.18	.0185	162
Dennis silt loam.							
Virgin: SE¼SE¼ sec. 36, T. 18 N., R. 10 E.	0–6	5.9	.018	14.6	2.59	.1225	158
	12–18	5.8	.019	1.8	1.88	.105	128
	18–26	6.4	.014	1.8	.49	.0665	98
Cropped: NE¼NE¼ sec. 1, T. 17 N., R. 10 E.	0–6	5.7	.017	5.0	1.55	.092	84
	12–18	6.1	.016	5.0	.90	.065	62
	18–26	5.9	.022	8.2	1.26	.093	230
Dougherty fine sandy loam.							
Virgin: SW¼NE¼ sec. 34, T. 14 N., R. 10 E.	0–6	6.0	.023	31.4	2.37	.112	114
	15–30	5.0	.016	36.2	.57	.072	154
Cropped: SW¼NE¼ sec. 34, T. 14 N., R. 10 E.	15–30	5.1	.015	2.6	.57	.065	200
Dougherty loamy fine sand.							
Virgin: SW¼SW¼ sec. 29, T. 14 N., R. 9 E.	0–8	5.8	.018	23.4	1.12	.078	110
	8–26	6.2	.012	4.2	.29	.063	96
	26–40	5.2	.015	1.0	.47	.0465	356
Cropped: SW¼SW¼ sec. 29, T. 14 N., R. 9 E.	0–8	6.1	.025	4.2	.20	.063	110
	8–26	6.6	.018	1.0	.43	.043	84
	26–40	5.1	.015	1.0	.37	.043	240
Mason clay loam.							
Virgin: NW¼SE¼ sec. 22, T. 18 N., R. 11 E.	0–6	6.3	.044	33.0	4.11	.1805	320
	12–26	5.5	.025	7.4	1.69	.098	186
Cropped: NW¼SE¼ sec. 22, T. 18 N., R. 11 E.	0–6	5.6	.031	5.8	2.60	.1245	154
	12–26	5.7	.025	5.8	1.69	.098	172
Mason silt loam.							
Virgin: SE¼NE¼ sec. 27, T. 17 N., R. 10 E.	0–6	6.2	.025	5.8	2.14	.1155	172
	12–26	6.0	.020	1.8	1.57	.0965	184
Cropped: NW¼SW¼ sec. 26, T. 17 N., R. 10 E.	0–6	6.2	.032	8.2	1.88	.1335	233
	12–26	5.7	.025	6.7	1.63	.1015	196
Mason silt loam.							
Virgin: SW¼SW¼ sec. 22, T. 18 N., R. 11 E.	0–6	5.8	.032	29.0	2.94	.135	128
Cropped: SE¼SE¼ sec. 21, T. 18 N., R. 11 E.	0–6	5.8	.024	14.6	2.06	.1155	188
	12–26	5.9	.025	4.2	1.29	.0955	188

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TABLE 5.—*Chemical analyses of some horizons of selected soil types*—Continued

Soil and location of sample	Depth	Soil reaction	Total phosphorus (P)	Available phosphorus (P)	Organic matter	Total nitrogen	Available potash (K)
	Inches	*pH*	*Percent*	*Lb. per acre*	*Percent*	*Percent*	*Lb. per acre*
Okemah silt loam.							
Virgin: SW¼SE¼ sec. 17, T. 16 N., R. 12 E.	0–6	6.0	0.021	7.4	3.12	0.127	144
	12–18	6.0	.019	10.6	1.98	.1085	128
Cropped: SE¼SW¼ sec. 17, T. 16 N., R. 12 E.	0–6	6.0	.023	5.0	2.04	.072	172
	12–18	5.8	.023	13.8	1.77	.1025	160
Okemah clay loam.							
Virgin: SE¼SE¼ sec. 29, T. 17 N., R. 12 E.	0–6	6.0	.026	5.0	3.43	.140	208
Cropped: NE¼NE¼ sec. 32, T. 17 N., R. 12 E.	0–6	6.4	.022	19.4	2.41	.113	130
	18–26	7.1	.017	17.0	1.59	.0615	184
Reinach very fine sandy loam.							
Virgin: SE¼SW¼ sec. 18 T. 19 N., R. 8 E.	0–6	6.5	.033	62.0	2.67	.1175	236
	15–30	6.6	.024	18.6	.82	.0735	162
Cropped: SE¼SW¼ sec. 18, T. 19 N., R. 8 E.	0–6	6.5	.028	49.4	.90	.070	144
	15–30	6.7	.025	57.0	.63	.0685	110
Stephenville fine sandy loam.							
Virgin: SE¼SE¼ sec. 23, T. 15 N., R. 8 E.	0–6	6.1	.017	5.0	1.26	.085	220
	12–20	5.3	.018	5.0	.55	.072	114
Cropped: NE¼NE¼ sec. 26, T. 15 N., R. 8 E.	0–6	6.5	.021	19.4	1.18	.091	178
	12–20	5.3	.016	4.2	.55	.0735	260
Teller silt loam.							
Virgin: SW¼SE¼ sec. 25, T. 19 N., R. 7 E.	0–6	6.4	.025	18.6	2.42	.1095	320
	12–26	5.3	.016	8.2	.89	.0815	316
Cropped: SW¼SE¼ sec. 25, T. 19, N., R. 7 E.	0–6	6.4	.015	10.6	1.08	.0825	232
	12–26	5.3	.015	3.4	.73	.0805	188
Vanoss silt loam.							
Virgin: NE¼NE¼ sec. 34, T. 19 N., R. 7 E.	0–6	6.0	.038	19.4	3.86	.1585	312
	15–25	6.0	.023	13.8	1.49	.100	292
Cropped: SW¼SW¼ sec. 26, T. 19 N., R. 7 E.	0–6	6.5	.022	10.6	1.90	.1085	340
Verdigris silt loam.							
Cropped: NE¼NE¼ sec. 16, T. 14 N., R. 9 E.	0–6	6.5	.029	14.6	1.62	.0945	252
	12–26	6.4	.022	6.6	1.25	.0885	226
Woodson clay loam.							
Virgin: NW¼NW¼ sec. 28, T. 17 N., R. 12 E.	0–6	5.8	.035	6.6	4.24	.163	178
	12–24	5.6	.025	5.0	2.71	.119	204
Cropped: NE¼NE¼ sec. 28, T. 17 N., R. 12 E.	0–6	6.1	.037	13.8	3.26	.133	260
	12–18	6.3	.027	11.4	2.18	.1035	222

The next broader grouping, the capability subclass, is used to indicate the dominant kind of limitation. The letter symbol "e" indicates that the main limiting factor is the hazard of erosion if a plant cover is not maintained; "w" means that excess water interferes with cultivation; and "s" shows that the soils are shallow, droughty, or unusually low in fertility.

The broadest grouping, the capability class, is identified by Roman numerals. All eight classes are represented in Creek County. All soils in one class have limitations of about the same degree but not necessarily of the same kind.

In classes I, II, and III are soils that are suitable for annual or periodic cultivation for annual or short-lived crops. Class I soils are those that have the widest range of use and the least risk of damage. They are level or nearly level, productive, well drained, and easy to work. They can be cultivated with almost no risk of erosion and will remain productive if managed with normal care. Class II soils can be cultivated regularly but do not have so wide a range of suitability as class I soils, or they need more protection. Some class II soils are gently sloping and consequently need moderate care to prevent erosion; others may be slightly droughty or slightly wet, or somewhat limited in depth. Class III soils can be cropped regularly but have a narrower range of use and need still more careful management.

In class IV are soils that should be cultivated only

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Woodlands.—Remove undesirable species and poor-quality trees. Thin stands to allow better tree growth. Harvest selectively to obtain the best saw logs. Protect seedlings from fire and grazing, so forests can reproduce naturally. Replant open areas where necessary. The forests of the uplands consist mainly of blackjack oak, post oak, elm, and hickory. These trees are unsuitable for most commercial uses, but they produce some fence posts, firewood, and rough lumber.

The bottom lands produce better lumber. Trees of commercial value suited to the lowlands include red oak, black oak, cottonwood, hackberry, white oak, ash, and pecan.

Native grassland.—The management of native grassland is discussed under Range Management.

Wildlife habitats.—Even though used for other purposes, land that is properly used and managed will provide some food and shelter for wildlife. Turnrows and odd areas can be used for special wildlife habitats. Plant them to evergreen trees, shrubs, grasses, legumes, or aquatic plants. Protect these areas from burning and overgrazing. Information on management of wildlife habitats can be obtained from your county agent or the local representative of the Soil Conservation Service.

Management by capability units

All soils in the same capability unit are suitable for about the same crops and need about the same kind of management. Suitable crops and appropriate management for each of the capability units in Creek County are described in the following pages.

Capability unit I–1 consists of deep, medium textured and moderately heavy textured soils that occur on nearly level high bottom lands or low terraces along streams. These soils are friable and easy to work. They have a high moisture-supplying capacity, and they are highly fertile. The soils in this unit are—

Mason clay loam.
Mason silt loam.
Reinach very fine sandy loam.

These soils are suitable for irrigation. They are well suited to all crops grown in the county, especially corn, cotton, and alfalfa. A suitable rotation would be—alfalfa for 3 to 5 years; corn for 2 years; small grain. The streambanks are good sites for raising fruits and berries. These soils are well suited to pastures of bermudagrass overseeded with legumes or of bromegrass-fescue-alfalfa mixtures.

Protect these soils against runoff water from adjacent higher land. To get high yields and to improve the surface structure, maintain a high content of organic matter by proper cropping and tillage. Destroy johnsongrass if it appears on cultivated land.

These soils are in the Loamy bottom-land range site.

Capability unit I–2 consists of deep, medium-textured to heavy-textured soils. They occur on nearly level bottom lands that are occasionally flooded. These soils are moderately fertile. Although they have moderate to high water-supplying capacity, they may not hold enough moisture for crops in dry years. The soils in this unit are—

Port clay loam.
Verdigris clay loam.
Verdigris fine sandy loam.
Verdigris silt loam.
Yahola clay loam.
Yahola very fine sandy loam.

These soils are suitable for irrigation. They are well suited to crops, but the choice of crops may be somewhat limited because of occasional flooding. A suitable rotation would be—alfalfa for 3 to 5 years; corn for 2 years; small grain. This soil is well suited to pastures of bermudagrass over-seeded with legumes, and also to pastures of bromegrass-fescue-alfalfa mixtures.

Protect these soils against runoff water from adjacent higher land. Where practical, build dikes to prevent floods. Stabilize the streambanks with trees and other vegetation. Destroy johnsongrass if it appears in cultivated fields. Crops that produce large amounts of organic residues are especially needed on the fine sandy loams to maintain organic matter and structure and to protect the soil from blowing.

These soils are in the Loamy bottom-land range site.

Capability unit I–3 consists of deep, medium-textured soils on nearly level old stream terraces. These soils are easily worked and are moderate to high in natural fertility. They have moderate to high moisture-supplying capacity. The soils in this unit are—

Choteau very fine sandy loam, nearly level.
Teller silt loam, nearly level.
Vanoss silt loam, nearly level.

These soils are suitable for irrigation. They are suited to all crops grown in the county, as well as to the kinds of trees grown in windbreaks and shelterbelts and for post production. A suitable rotation would be—small grain and sweetclover; sweetclover; corn; cotton. These soils are well suited to pastures of bermudagrass overseeded with legumes. They also will grow bromegrass-fescue-alfalfa mixtures.

Terracing and contour farming may be necessary on Teller silt loam, nearly level, and Vanoss silt loam, nearly level, to control erosion. Stabilize drainageways with vegetation, or control the water mechanically. Where necessary, divert runoff water from adjacent higher lying lands.

These soils are in the Loamy prairie range site.

Capability unit I–4 consists of deep, fine-textured soils on nearly level uplands. They are high in fertility. They have high moisture-supplying capacity, but may not supply enough moisture for crops during extended dry periods. This unit consists of Okemah and Woodson clay loams.

These are productive soils for common field crops. A suitable rotation would be—small grain and sweetclover; sweetclover; wheat; wheat or cotton. These soils are well suited to bermudagrass pastures. Fescue would provide winter and spring grazing.

Plant sweetclover and other deep-rooted legumes to help loosen the subsoil and increase the water-holding capacity. Apply lime and phosphate to legumes. Use nitrogen to increase the growth of grass. Green-manure crops are likely to deplete the moisture in the subsoil; consequently, they do not usually benefit succeeding crops.

These soils are in the Claypan prairie range site.

Capability unit IIe–1 consists of deep, medium-textured soils on gently sloping old stream terraces. These soils are easily worked and have moderate natural fertility. They have moderate to high moisture-supplying capacity. The soils in this unit are—

Choteau very fine sandy loam, gently sloping.
Teller silt loam, gently sloping.
Vanoss silt loam, gently sloping.

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These soils are in the Shallow prairie range site.

Capability unit VIs–2 consists of forested upland soils that are too shallow or too steep for cultivation. The soils in this unit are—

Darnell and Pottsville soils, sloping.
Darnell and Pottsville soils, strongly sloping.

These soils are unsuitable for any agricultural use except woodland or woodland pasture.

These soils are in the Shallow savanna range site.

Capability unit VIIe–1 consists of sloping, severely eroded soils. The soils in this unit are—

Bates fine sandy loam, sloping, severely eroded.
Dennis and Okemah loams, sloping, severely eroded.

These soils are unsuitable for crops. They should be seeded or sodded to permanent grasses and managed as grazing land. They are in the Loamy prairie range site.

Capability unit VIIe–2 consists of severely eroded and gullied sandy soils. The soils in this unit are—

Broken or gullied sandy upland.
Stephenville and Darnell fine sandy loams, sloping, severely eroded.

This unit is so badly gullied or eroded that it cannot be cultivated. It is poor for grass or trees. The most practical use for it is to plant catalpa, locust, or mulberry trees to be cut for fence posts. These trees can be planted with little preparation of the land, and they help prevent erosion.

Cleared areas could be sodded or seeded to native grasses, but the cost of establishing a stand of grass would be very high because it would be necessary to fill in the gullies and to use large amounts of fertilizer and lime. Areas now in woodland should not be cleared and should be only lightly grazed.

This unit is in the Eroded savanna range site.

Capability unit VIIs–1 consists of Eufaula loamy fine sand, strongly sloping, a deep, coarse-textured soil.

This soil is moderately well suited to woodland. Grass and shrubs in woodland provide some grazing or browse. Keep all areas in woodland, and protect them from burning and overgrazing.

This soil is in the Deep sand savanna range site.

Capability unit VIII consists entirely of Oil-waste land. This is land that has been used as a disposal ground for oil and salt-water waste from oil wells. It has no value as cropland or grassland in its present condition. Some of the less strongly sloping and less severely gullied areas may become revegetated naturally if no more waste is dumped on them.

Estimated Yields

The average crop yields that can be expected from each soil over a period of years under two levels of management are presented in table 6. The yields in columns A are those obtained under the type of management now generally used in the county. The yields in columns B are those that can be expected under better management. If erosion or poor cropping practices have seriously reduced the supply of organic matter and plant nutrients, several years of good management probably will be needed to bring the yields up to the level in columns B of the table.

Range Management

More than half of Creek County consists of native range. As a rule, the soils used for grazing are not suitable for cultivation. Most of the native range is in the savanna, which is also called the Cross Timbers. The savanna is an open forest of blackjack and post oaks with native grasses between the trees. The rest of the rangeland is on the open prairie. The bottom lands originally supported very productive stands of range grasses, but nearly all of these areas have been cultivated for field crops.

Range sites and range conditions

A range site is an area of natural grazing land that because of its particular combination of climate, soil, and topography will support a certain climax vegetation. The climax vegetation is the natural plant cover that will maintain and reproduce itself so long as the environment remains unchanged. If the natural balance between the vegetation and its environment is upset by overgrazing, burning, or trampling, some species tend to die out and to be replaced by tougher plants that are likely to be less palatable.

Range condition is a measure of the present grassland as compared with the original natural cover. It is determined by comparing the kind and amount of present vegetation with the climax vegetation. If 76 to 100 percent of the present vegetation is the same as the climax vegetation, the range is in excellent condition. If 51 to 75 percent is the same as the climax vegetation, the range is in good condition. A range is in fair condition if 26 to 50 percent of the vegetation is the same as the climax vegetation. If the percentage is less than 25 percent, the range is in poor condition.

The nine range sites in Creek County are called the Loamy prairie, Claypan prairie, Shallow prairie, Deep sand savanna, Sandy savanna, Shallow savanna, Eroded savanna, Loamy bottom land, and Heavy bottom land. Table 7 shows what soils are in each range site, what plants grow on each range site when it is in excellent condition, and how many acres will probably be needed to support one cow for one year under each class of range condition.

Loamy prairie site.—This is tall-grass prairie. Big bluestem is the dominant grass when the range is in excellent condition. Several other grasses and plants are also important parts of the stand. Deep, dark-colored, highly productive soils are characteristic of this site. Moisture and plant roots penetrate deeply. Many areas of this site are used for native hay meadows.

Claypan prairie site.—The clay loam and silt loam soils that comprise this site are underlain by layers of dense clay which limits the depths of plant root development. This is considered to be very good grazing land, but its production is somewhat lower than that of the Loamy prairie range site. This site supports the taller grasses. Under grazing abuse, the dominant little bluestem and big bluestem decline rather rapidly and are replaced by the less productive buffalograss, windmillgrass, and silver bluestem.

Shallow prairie site.—This site consists of open prairie ridges and shallow stony areas. Little bluestem, side-oats grama, tall dropseed, and meadow dropseed are abundant on this range site. The shorter grasses grow on the shallow soils because there is not room for the deep roots of the tall grasses. Tall grasses such as big bluestem, switchgrass, and Indiangrass grow on the pockets of deep

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TABLE 6.—*Estimated average acre yields of principal crops on each soil under two levels of management*

[Estimates in columns "A" are based on average management, which includes contour tillage, use of suitable plant varieties, timely planting and cultivation, insect control, and efficient harvesting methods. Estimates in columns "B" are based on good management, which includes all of the common management practices, and also crop rotations with legumes and the proper use of fertilizers. Absence of a yield figure indicates the soil is commonly considered unsuited to that crop]

Soils	Corn		Wheat		Oats		Cotton		Sorghums				Alfalfa		Native hay	Peanuts	
									Grain		Forage						
	A	B	A	B	A	B	A	B	A	B	A	B	A	B		A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*
Bates fine sandy loam, gently sloping	14	22	12	18	20	32	180	240	14	20	1. 6	2. 5	------	------	1. 2	20	35
Bates fine sandy loam, sloping	12	20	10	16	18	28	160	220	14	20	1. 6	2. 5	------	------	1. 1	17	32
Bates fine sandy loam, sloping, severely eroded	----	----	----	----	----	----	------	------	------	------	------	------	------	------	------	----	----
Broken or gullied sandy upland	----	----	----	----	----	----	------	------	------	------	------	------	------	------	------	----	----
Choteau very fine sandy loam, gently sloping	20	32	14	22	22	34	220	300	16	22	2. 2	3. 3	2. 0	2. 7	1. 5	24	40
Choteau very fine sandy loam, nearly level	22	35	16	24	24	42	240	360	18	26	2. 5	4. 0	2. 0	3. 0	1. 6	26	44
Cleburne fine sandy loam	12	20	----	----	16	24	130	220	12	20	1. 5	2. 3	------	------	------	16	33
Collinsville and Bates soils, gently sloping	----	----	----	----	----	----	------	------	------	------	------	------	------	------	. 8	----	----
Collinsville and Talihina soils, sloping	----	----	----	----	----	----	------	------	------	------	------	------	------	------	. 9	----	----
Collinsville and Talihina soils, strongly sloping	----	----	----	----	----	----	------	------	------	------	------	------	------	------	. 8	----	----
Darnell and Pottsville soils, sloping	----	----	----	----	----	----	------	------	------	------	------	------	------	------	------	----	----
Darnell and Pottsville soils, strongly sloping	----	----	----	----	----	----	------	------	------	------	------	------	------	------	------	----	----
Dennis and Okemah loams, gently sloping	18	30	12	20	25	38	180	290	18	25	1. 7	3. 3	2. 2	3. 3	1. 4	----	----
Dennis and Okemah loams, sloping	16	26	12	18	22	35	------	------	16	23	1. 4	3. 0	------	------	1. 2	----	----
Dennis and Okemah loams, sloping, severely eroded	----	----	----	----	----	----	------	------	------	------	------	------	------	------	. 9	----	----
Dougherty and Stidham fine sandy loams, gently sloping	15	24	8	14	14	26	140	210	16	25	1. 7	2. 8	1. 7	2. 4	------	25	40
Dougherty and Stidham fine sandy loams, nearly level	16	28	10	16	16	30	150	260	18	28	1. 8	3. 0	1. 8	2. 5	------	28	42
Dougherty and Stidham fine sandy loams, sloping	12	20	8	12	12	22	120	180	12	22	1. 4	2. 5	------	------	------	----	----
Doutherty and Stidham loamy fine sands, gently sloping	8	15	----	----	----	----	75	130	8	16	. 8	1. 4	------	------	------	20	32
Dougherty and Stidham loamy fine sands, nearly level	10	16	----	----	----	----	80	150	10	18	1. 0	1. 5	------	------	------	24	38
Eufaula loamy fine sand, gently sloping	8	15	----	----	----	----	70	120	8	16	. 8	1. 4	------	------	------	18	32
Eufaula loamy fine sand, strongly sloping	----	----	----	----	----	----	------	------	------	------	------	------	------	------	------	----	----
Gullied bottom land	----	----	----	----	----	----	------	------	------	------	------	------	------	------	------	----	----
Mason clay loam	16	34	14	23	26	42	200	280	20	34	1. 8	3. 0	2. 7	3. 6	1. 6	----	----
Mason silt loam	18	35	14	23	28	45	210	300	20	34	1. 8	3. 0	2. 5	3. 3	1. 6	----	----
Neosho silt loam	12	26	9	17	16	30	140	230	16	26	1. 6	2. 9	------	------	1. 2	----	----
Oil-waste land	----	----	----	----	----	----	------	------	------	------	------	------	------	------	------	----	----
Okemah and Woodson clay loams	18	30	14	26	24	42	210	320	18	32	1. 8	2. 8	2. 2	3. 1	1. 7	----	----
Port clay loam	28	45	18	30	30	48	260	360	24	36	2. 0	3. 2	3. 0	4. 0	1. 8	----	----
Pulaski fine sandy loam	22	38	9	18	21	36	165	270	20	33	2. 0	3. 0	2. 0	3. 2	------	26	38
Reinach very fine sandy loam	38	60	16	28	35	50	290	400	30	46	3. 0	4. 2	3. 2	4. 5	1. 8	32	50
Roebuck clay	----	----	----	----	----	----	------	------	------	------	------	------	------	------	------	----	----
Stephenville and Darnell fine sandy loams, gently sloping	----	----	6	12	12	22	110	180	11	20	1. 1	2. 0	------	------	1. 0	----	----
Stephenville and Darnell fine sandy loams, sloping	----	----	----	----	----	----	------	------	------	------	------	------	------	------	1. 0	----	----
Stephenville and Darnell fine sandy loams, sloping, severely eroded	----	----	----	----	----	----	------	------	------	------	------	------	------	------	------	----	----
Teller silt loam, gently sloping	16	28	12	18	22	34	220	310	20	32	2. 0	3. 1	2. 5	3. 3	1. 3	23	38
Teller silt loam, nearly level	21	32	14	22	25	46	240	350	24	38	2. 3	3. 5	2. 8	4. 0	1. 5	26	42
Teller silt loam, sloping	----	----	10	16	18	30	------	------	------	------	2. 0	3. 0	------	------	1. 2	----	----
Vanoss silt loam, gently sloping	22	35	15	21	28	42	260	350	25	35	2. 5	3. 5	2. 6	3. 5	1. 5	24	38
Vanoss silt loam, nearly level	25	40	15	25	28	45	300	400	25	38	2. 5	3. 8	3. 0	4. 0	1. 5	26	40
Verdigris clay loam	32	48	20	32	33	50	300	410	28	40	2. 6	3. 4	3. 2	4. 5	1. 8	----	----
Verdigris fine sandy loam	26	45	18	30	30	45	260	380	23	35	2. 4	3. 4	3. 0	4. 3	1. 6	30	45
Verdigris silt loam	30	48	20	32	33	50	300	410	28	40	2. 6	3. 4	3. 2	4. 5	1. 8	32	48
Yahola clay loam	33	55	18	30	35	52	290	415	30	46	2. 8	4. 0	3. 2	4. 5	1. 8	----	----
Yahola very fine sandy loam	26	45	14	26	32	48	260	380	28	42	2. 6	3. 8	3. 0	4. 0	1. 6	33	50

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TABLE 7.—*Range sites and stocking rates*

Range site and soils	Dominant plants when range is in excellent condition	Recommended stocking rates by range condition class [1]			
		Excellent	Good	Fair	Poor
		Acres per cow per year	*Acres per cow per year*	*Acres per cow per year*	*Acres per cow per year*
Loamy bottom land Reinach very fine sandy loam. Port clay loam. Mason clay loam. Mason silt loam. Verdigris clay loam. Verdigris fine sandy loam. Verdigris silt loam. Yahola clay loam. Yahola very fine sandy loam. Pulaski fine sandy loam. Gullied bottomland.	Eastern gamagrass, big bluestem, Florida paspalum, switchgrass, Maximillian sunflower, and Indiangrass, intermixed with scattered hardwood timber.	4 to 5	6 to 7	8 to 10	11 or more.
Heavy bottom land Roebuck clay.	Prairie cordgrass, sedges, eastern gamagrass, Virginia wildrye, big bluestem, switchgrass, and tall dropseed, scattered indigobush, hackberry, elm, pecan, and post oak.	7 to 8	9 to 11	11 to 13	14 or more.
Loamy prairie Bates fine sandy loam, gently sloping. Bates fine sandy loam, sloping. Bates fine sandy loam, sloping, severely eroded.[2] Choteau very fine sandy loam nearly level. Choteau very fine sandy loam, gently sloping. Dennis and Okemah loams, gently sloping. Dennis and Okemah loams, sloping. Dennis and Okemah loams, sloping, severely eroded.[2] Teller silt loam, nearly level. Teller silt loam, gently sloping. Teller silt loam, sloping. Vanoss silt loam, nearly level. Vanoss silt loam, gently sloping.	Big bluestem, switchgrass, Indiangrass, little bluestem, leadplant, and Maximillian and Ashy sunflowers.	7 to 9	10 to 13	14 to 18	19 or more.
Claypan prairie Neosho silt loam. Okemah and Woodson clay loams.	Little bluestem, big bluestem, switchgrass, Indiangrass, sideoats grama, buffalograss, Maximillian sunflower, and leadplant.	10 to 12	13 to 15	16 to 19	20 or more.
Shallow prairie Collinsville and Bates soils, gently sloping. Collinsville and Talihina soils, sloping. Collinsville and Talihina soils, strongly sloping.	Little bluestem, switchgrass, Indiangrass, big bluestem, sumac, persimmon, coralberry, and hackberry.	12 to 14	15 to 17	18 to 22	23 or more.
Deep sand savanna Dougherty and Stidham loamy fine sands, nearly level. Dougherty and Stidham loamy fine sands, gently sloping. Eufaula loamy fine sand, gently sloping. Eufaula loamy fine sand, strongly sloping.	Big bluestem, little bluestem, Indiangrass, wildrye, and beaked panicum, intermixed with blackjack oak, post oak, hickory, coralberry, and sumac.	11 to 13	14 to 18	19 to 24	25 or more.
Sandy savanna Cleburne fine sandy loam. Dougherty and Stidham fine sandy loams, nearly level. Dougherty and Stidham fine sandy loams, gently sloping. Dougherty and Stidham fine sandy loams, sloping. Stephenville and Darnell fine sandy loams, gently sloping. Stephenville and Darnell fine sandy loam, sloping.	Big bluestem, little bluestem, purpletop, Indiangrass, arrowfeather, three-awn, and Virginia tephrosia, intermixed with blackjack oak, post oak, hickory and brush.	9 to 11	12 to 17	18 to 22	23 or more.
Shallow savanna Darnell and Pottsville soils, sloping. Darnell and Pottsville soils, strongly sloping.	Big bluestem, little bluestem, sideoats grama, Indiangrass, Stuve's lespedeza, slender and roundhead lespedeza, prairieclover, and leadplant, intermixed with blackjack oak, post oak, and brush.	12 to 14	15 to 19	20 to 25	26 or more.

See footnotes at end of table.

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TABLE 7.—*Range sites and stocking rates*—Continued

Range site and soils	Dominant plants when range is in excellent condition	Recommended stocking rates by range condition class [1]			
		Excellent	Good	Fair	Poor
		Acres per cow per year	*Acres per cow per year*	*Acres per cow per year*	*Acres per cow per year*
Eroded savanna Broken or gullied sandy upland.[2] Stephenville and Darnell fine sandy loams, sloping, severely eroded.[2]	Little bluestem, Indiangrass, switchgrass, side-oats grama, tall dropseed, roundhead lespedeza, and Stuve's lespedeza.	15 to 19	20 to 24	25 to 30	31 or more

[1] At these stocking rates, the better grasses should maintain themselves. The effects of weather and management on the better plants should be watched and the grazing adjusted accordingly. On sites in fair and poor condition, it may be necessary to defer grazing for at least two growing seasons before starting summer or year-long use.

[2] Most of these severely eroded areas were formerly cultivated and are now in poor condition. They require careful grazing management and sometimes need reseeding.

soil. This site is less productive than the Loamy prairie site because it is lower in moisture-holding capacity.

Deep sand savanna site.—The soils of this site are deep coarse sands that blow badly if cover is removed. They absorb water freely. In excellent condition, this site supports a stand of tall prairie grasses, clumps or single trees of blackjack oak and post oak, and brush. The principal desirable grasses are switchgrass, Indiangrass, little bluestem, and big bluestem. Important legumes are Virginia tephrosia, various perennial lespedezas, and tickclover. The range forage production potential is fairly good.

Sandy savanna site.—Most of this site is on gently rolling topography. Originally, post oaks and blackjack oaks were scattered among the big bluestem, Indiangrass, switchgrass, and little bluestem. Now much of this range site is in poor condition and has a thick overstory of oak brush.

Soils in this range site are deep sandy loams that have good capacity for absorbing and storing moisture. The shallow Darnell soils over sandstone store little moisture; the grasses on these soils dry out between rains, and brush is likely to be thick. Effective control of the brush is an essential step for economic management of this range site.

Shallow savanna site.—Most areas of this range site are strongly sloping to steep. Loose sand and stones occur on the surface. In many places bedrock is near the surface, and there are numerous outcrops of bedrock. Under natural conditions, this site supported grass intermixed with scattered post oaks, blackjack oaks, and brush. In most places, as a result of heavy grazing and fire, the stand of grass has been reduced and the amount of trees and brush has increased greatly. Limited amounts of big bluestem, Indiangrass, switchgrass, and little bluestem grow between the trees.

The shallowness of these soils limits the moisture-holding capacity and restricts the development of plant roots over much of the area. This site is less productive than the Sandy savanna site, but if well managed it provides fair grazing. Control of brush is usually the first step toward efficient grazing management. This site will erode severely if the plant cover is destroyed.

Eroded savanna site.—This site consists of formerly cultivated fields. The soils are severely eroded. They range from shallow sandy soils to deep sands. The potential productivity of this site is lower than that of the uneroded savanna site. Long periods of careful management are required to establish effective erosion control and fair range production. In many places special measures to control gullying are essential.

Loamy bottom-land site.—These deep soils receive additional water from overflow. They comprised the most productive range site in the county, but now practically all of the acreage has been cultivated for field crops. Areas that are flooded too often to be cultivated now support bermudagrass and johnsongrass.

The native grasses were principally eastern gamagrass, Florida paspalum, bottom-land switchgrass, and big bluestem. Some of the bottom lands originally had a savanna type of vegetation, in which hardwood timber grew along with grasses. Many such areas now support a thick stand of timber.

Heavy bottom-land site.—This site is frequently flooded. The only soil in it is Roebuch clay. The vegetation consists of the coarser grasses, including prairie cordgrass and bottom-land switchgrass, and some of the more palatable grasses, including big bluestem and Virginia wild-rye. Overgrazing on this site results in an increase in meadow dropseed, prairie dropseed, and other less palatable grasses.

Factors of management

Native range grasses are a crop and, like any other, they respond to management. To use range efficiently and bring it to maximum production, a rancher should select the kind of livestock to which the range is best suited, limit the number of livestock and the season of use, and control the distribution of grazing.

Kind of livestock.—The ranges in Creek County are grazed principally by cattle.

Proper grazing use.—The number of livestock to be grazed on the range should be decided according to the length of time that the range will be used and the amount of forage available. Enough forage should be left on the ground to—

1. Mulch the soil and increase water-absorption and water-storage capacity. More soil moisture means more grass.

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2. Permit deep vigorous growth of grass roots. Enough green leaves should remain on each plant to provide food to be stored in the roots for early and vigorous spring growth. Generally, about one-half of the leaves can be removed without damaging a plant's vigor and productivity.

3. Protect the soil from wind and water erosion. A good grass cover will prevent eorsion and reduce runoff.

4. Allow the climax grasses to crowd out weeds and other inferior plants. This will improve range condition.

5. Provide a feed reserve for periods of drought that might otherwise force sale of livestock at a time when prices are low.

Season of use.—Grasses that grow well during cool weather generally furnish the earliest spring grazing and may also supply fall grazing. Warm-season grasses should be used during the summer months. The nutritive value of native meadow hay declines as the plants approach maturity. Most grasses in Creek County grow most rapidly in spring and early in summer. Livestock on grass gain the most weight during this period.

The kinds and amounts of grass that each range will produce and the best time for grazing depend on the range site and the condition of the range. Ranges in fair to poor condition usually should be rested until fall or winter, to permit the better grasses to spread from underground stems and by seeding. Ranges that are in good or excellent condition can also benefit from an occasional rest from grazing during the growing season of the principal forage plants. Your Soil Conservation Service technician can advise on seasons of use and rest for individual ranges.

Distribution of grazing.—Many ranges in Creek County are overgrazed. Some are undergrazed or not grazed at all. The distribution of grazing can be improved by the location of water and salt or by fencing.

Poor distribution of water is one of the main causes of uneven grazing. Watering places should be developed over the entire range if possible, so that livestock do not have to walk far to get water. Generally, water is required at about 1-mile intervals in rough country and at 2-mile intervals on more level range.

Salt should be placed in lightly grazed areas where forage is abundant, and where livestock can reach it from several directions. It should not be placed in sandy or other erodible spots. Livestock do not require water and salt at the same location.

Fences are necessary to provide separate pastures for different classes of livestock and for different seasons of use. Where possible, fences should be located on the boundary between two range sites, so that livestock will not overgraze the preferred range site while grazing the other site too lightly.

Origin and Classification of Soils

Soils are developed by the action of several soil-forming processes on accumulated materials. The factors that determine the characteristics of the soil at any given place are (1) the kind of parent material, (2) the climate under which the parent material has accumulated and has existed since its accumulation, (3) the plant and animal life on and in the soil, (4) the relief, or lay of the land, and (5) the length of time the forces of soil development have acted on the soil material.

Soils that have well-developed soil characteristics that are due mainly to the influence of climate and vegetation are zonal soils. The Red-Yellow Podzolic soils and the Reddish Prairie soils are the zonal great soil groups represented in this county. Intrazonal soils also have well-developed characteristics, but the influence of climate and vegetation is overshadowed by that of one or more of the other factors of soil formation. The Planosols are the only intrazonal soils in this county. Their dominating characteristics are due to the fine texture of the parent materials, level relief, and age. Azonal soils do not have strongly developed profile characteristics because of extreme youth, strong relief, or unusually stony parent material. The Lithosols and the Alluvial soils are the two azonal great soil groups of this county.

Creek County has a warm-temperate climate. It is in the humid zone, but its climate is drier than the average humid-zone climate. Most of the county is level to gently sloping. Half of the area has slopes of less than 4 percent. In a few places, slopes are steep enough to retard soil development.

The parent materials of the soils of this county consist of products weathered from sandstones and shales and a little that weathered from limestones or limy sandstones on the uplands; old alluvium washed from these kinds of rocks and deposited on stream benches; and recent alluvium deposited on the bottom lands.[4] Most of the sandstones are red or brown in color, and soft. They contain little lime, phosphate, or other easily weathered minerals. Two thick beds of gray shale crop out in the eastern and northern parts of the county. Thinner beds of red shale crop out elsewhere. These shales are high in easily weathered minerals, and the soils formed mostly from them contain moderate amounts of lime, phosphate, and potash. Most of the soils were formed from mixed sandstone and shale materials, however, and contain a moderate or low supply of these nutrients. Few of the soils are more than slightly acid.

Most of the areas underlain by shale had a prairie vegetation of tall grass or shorter grasses, depending on the depth of the soils. The soils of these areas belong to the Reddish Prairie great soil group. The areas underlain by sandstone generally have a scattered forest in which prairie grasses grow between the trees. Red-Yellow Podzolic soils developed in these places.

The Reddish Prairie soils, the Red-Yellow Podzolic soils, and the Planosols are mature soils. They have developed the characteristics that are normal to the climate, vegetation, and relief. The Lithosols and the Alluvial soils are youthful soils, which have not had time to develop fully.

Table 8 shows the classification of the soils of this county into the zonal, intrazonal, and azonal orders and into great soil groups. Some of the factors that affected the development of the soils are also shown in the table.

[4] FATH, A. E. GEOLOGY OF THE BRISTOW QUADRANGLE, CREEK COUNTY, OKLAHOMA. U. S. Geol. Sur. Bul. 759, 63 pp., illus. 1925.

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TABLE 8.—*Classification of soils into orders, great soil groups, and series, and some of the factors that influenced soil formation*

Great soil group and series	Parent material	Slopes	Drainage		Vegetation
			Surface	Internal	
ZONAL					
Reddish Prairie soils:					
Bates	Neutral sandstone and subsidiary layers of shale	Gentle to moderate.	Moderate	Moderate	Grass.
Choteau	Slightly acid silty and clayey alluvial sediments overlain by loess.	Level to gentle.	Slow to very slow.	Slow	Grass.
Dennis	Interbedded neutral sandy shale, sandstone, and subsidiary clay shale.	Gentle to moderate.	Moderate	Slow	Grass.
Okemah	Weak alkaline clay and shaly clay, with local calcareous lenses.	Gentle to moderate.	Slow to moderate.	Very slow	Grass.
Teller	Neutral to alkaline reddish loamy alluvial deposits and loess.	Level to moderate.	Slow to moderate.	Moderate	Open stand of trees with coarse grasses.
Vanoss	Neutral to alkaline brownish loamy alluvial and loessal sediments.	Level to gentle.	Slow to moderate.	Moderate	Grass.
Red-Yellow Podzolic soils:					
Cleburne	Slightly acid to neutral sandstone	Nearly level to gentle.	Moderate to rapid.	Moderate	Trees.
Dougherty	Reddish slightly acid sandy alluvial sediments	Level to moderate.	Slow to moderate.	Moderate to rapid.	Trees.
Eufaula	Reddish acid sandy alluvial or eolian deposits	Level to strong.	Slow to moderate.	Moderate to rapid.	Trees.
Stephenville	Reddish slightly acid to neutral sandstone or interbedded sandstone and sandy shale.	Gentle to moderate.	Slow to moderate.	Rapid	Trees.
Stidham	Brownish acid sandy alluvial sediments	Level to moderate.	Slow to moderate.	Moderate to rapid.	Trees.
INTRAZONAL					
Planosols:					
Neosho	Neutral clayey alluvial sediments, somewhat stratified with silts and sands.	Level to concave.	Slow to very slow.	Very slow	Grass.
Woodson	Weakly alkaline clays and shaly clays, locally calcareous.	Level to gentle.	Slow to moderate.	Very slow	Grass.
AZONAL					
Lithosols:					
Collinsville	Neutral to slightly acid sandstone with subsidiary layers of sandy shale.	Gentle to moderate.	Moderate	Moderate	Grass.
Darnell	Slightly acid to neutral reddish sandstone	Moderate to strong.	Moderate to rapid.	Moderate	Scrubby trees.
Pottsville	Acid to neutral interbedded clay shale, sandstone, and sandy shale.	Moderate to strong.	Rapid	Very slow	Scrubby trees.
Talihina	Neutral to slightly acid clay shale with lenses of sandstone and sandy shale.	Moderate to strong.	Rapid	Very slow	Grass.
Alluvial soils:					
Mason	Neutral to alkaline and silty to clayey alluvial sediments, somewhat stratified with fine sandy loam.	Level	Slow	Moderate	Trees with ground cover of grass.
Port	Neutral to alkaline silty recent alluvium, derived mainly from areas underlain by redbeds.	Level	Slow	Moderate	Trees.
Pulaski	Slightly acid sandy alluvium, mainly from sandstone areas.	Level	Moderate	Moderate	Trees.
Reinach	Weakly alkaline to calcareous, silty and moderately sandy alluvial deposits.	Level	Slow	Moderate	Trees with ground cover of grass.
Roebuck	Weakly calcareous or alkaline clayey alluvium, mainly from areas underlain by redbeds.	Level	Very slow	Very slow	Trees.
Verdigris	Slightly acid to weakly alkaline, stratified, loamy to clayey recent alluvium, from the dark prairies.	Level	Slow	Slow to moderate.	Trees.
Yahola	Alkaline to calcareous sandy and loamy reddish alluvium, mainly from areas underlain by redbeds.	Level	Slow	Moderate to rapid.	Trees.

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Reddish Prairie Soils

The Reddish Prairie soils of this county are generally better developed than the Reddish Prairie soils of cooler regions. Their horizons are well differentiated in texture, structure, color, and reaction.

Most of the Reddish Prairie soils have a slightly acid to neutral, granular, friable A horizon that ranges in color from brown to dark grayish brown. The texture ranges from fine sandy loam to clay loam. In undisturbed areas the surface soil is moderately high in organic matter. The subsoil is yellowish-brown to grayish-brown clay loam or clay, usually mottled somewhat with reddish brown. The subsoil is medium to slightly acid, friable, and massive to granular in the upper part.

The following profile of Okemah silt loam is representative of the very gently sloping Reddish Prairie soils of the county. In texture and structure, the horizons are somewhat more clearly differentiated than in more strongly sloping Reddish Prairie soils. The Okemah soils developed from more clayey and alkaline parent materials and have a heavier lower subsoil than other Reddish Prairie soils. This profile was observed on a slope of 1½ percent in a concave field used for cotton, corn, small grains, and sorghum.

Profile of Okemah silt loam in SW¼SW¼ sec. 17, T. 16 N., R. 12 E; near Mounds:

- A 0 to 15 inches, very dark grayish-brown (10YR 3/2, dry; 10YR 2/2, moist) to very dark brown (10YR 2/2, moist) silt loam; strong medium granular structure; friable when moist, hard when dry; a thin platy crust forms on surface of cultivated field if soil dries undisturbed after a rain; slightly acid; grades to B_1 horizon.
- B_1 15 to 22 inches, dark grayish-brown (10YR 4/2, dry; 10YR 2.5/2, moist) to very dark grayish-brown (10YR 3/2, moist) silty clay loam; mottles of brown and strong brown comprise 5 to 10 percent of the mass; compound subangular blocky and medium granular structure; crumbly and friable when moist, moderately sticky and plastic when wet; slightly acid.
- B_2 22 to 38 inches, mottled grayish-brown (2.5Y 5/2, dry; 2.5Y 3/2, moist) and light olive-brown (2.5Y 5/4, dry; 2.5Y 4/4, moist) clay; weak blocky structure; very compact when moist, extremely hard when dry; very slowly permeable; contains numerous small dark shot-like concretions of iron; slightly acid to neutral.
- C_1 38 to 50 inches, mottled light-gray (2.5Y 7/2, dry; 2.5Y 6/2, moist), olive-yellow (2.5Y 6/8, dry; 2.5Y 5/8, moist), and pale-olive (5Y 6/4, dry; 5Y 5/4, moist) clay; massive structure; very slowly permeable; contains a few small concretions of iron; weakly alkaline.
- C 50 to 65 inches +, pale-olive (5Y 6/4, dry; 5Y 5/4, moist) and yellow (5Y 7/6, dry; 5Y 6/6, moist) shale; alkaline; contains laminations of light-gray calcareous clay and sandstone.

The thickness of the A horizon ranges from 10 to 18 inches. The color is very dark gray in undisturbed areas under native grass, but in cultivated areas the color ranges to grayish brown. The texture of the B_1 horizon ranges from clay loam to silty clay, and the structure ranges from strong medium granular to compound subangular blocky and granular. In some places the B_1 horizon is mottled with brown. The combined thickness of the A and B_1 horizons ranges from 16 to 28 inches.

Other soils of the Reddish Prairie group differ from the above profile because of differences in parent material, relief, and drainage.

The Dennis soils have more sandstone in their parent material, which is less clayey and more permeable than the parent material of the Okemah soils. The soils are more friable and less clayey. They are slightly lighter colored throughout, but have more mottling of red, brown, and reddish brown in the lower horizons than the Okemah. They occur on stronger slopes.

The Bates soils developed from sandstone that contains lenses of sandy shale. They are browner throughout, and have a friable sandy clay loam B horizon. The Choteau soils are somewhat similar to Dennis soils, but they developed from old acid silty and sandy alluvium on nearly level stream terraces.

The Vanoss soils are youthful but moderately well developed Reddish Prairie soils that formed under grass in silty or sandy eolian or alluvial materials over neutral to alkaline sandy or silty clay loam. They are brown, deep, friable, and permeable. They are neutral to slightly acid.

The Teller soils are transitional to Red-Yellow Podzolic soils. They developed under a savanna forest from alkaline, reddish, loamy sediments washed mainly from grasslands. They are browner in the upper part than typical Red-Yellow Podzolic soils. The A_1 horizons are darker colored and have better developed and more distinct structure.

Red-Yellow Podzolic Soils

The Red-Yellow Podzolic soils of this county have developed under hardwood trees and grass. They are not as clearly characteristic of this great soil group as Red-Yellow Podzolic soils that developed in more humid climates under a pine-and-hardwood forest. Some, however, have the thin organic-mineral A_1 horizon, the light-colored, leached, acid A_2 horizon, and the yellowish or reddish, friable, acid sandy clay loam subsoil that are typical of the Red-Yellow Podzolic soils.

The Red-Yellow Podzolic soils of this county are best represented by the following profile of Dougherty fine sandy loam. It was observed in a gently sloping (2 percent) cultivated field that had moderate runoff and moderate internal drainage. The original vegetation was a thick cover of red oak, post oak, blackjack oak, and hickory trees.

Profile of Dougherty fine sandy loam:

- A_1 0 to 6 inches, grayish-brown (10YR 5/2, dry) to brown (10YR 4/3, moist) light fine sandy loam; structureless; very friable; slightly acid.
- A_2 6 to 14 inches, light yellowish-brown (10YR 6/4, dry; 10YR 5/4, moist) light fine sandy loam; the lower 2 inches is reddish-yellow fine sandy loam or loam; very friable; medium acid.
- B_{21} 14 to 34 inches, red (2.5YR 5/6, dry; 2.5YR 4/6, moist) sandy clay loam; massive structure; friable when moist, hard when dry; permeable; medium acid.
- B_{22} 34 to 54 inches, reddish-yellow (5YR 6/8, dry; 5YR 5/8, moist) sandy clay loam; massive structure; friable when moist, moderately hard when dry; medium acid.
- C 54 to 70 inches +, reddish-yellow sandy clay loam alluvium, weakly stratified with red and yellowish sandy loam; slightly acid.

In areas where Dougherty soils are transitional to Stidham soils, the upper subsoil is reddish yellow.

The Stidham soils have a light brownish-gray A_1 horizon, a very pale brown A_2 horizon, and an upper subsoil of yellowish-brown sandy clay loam. Their lower

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subsoil, beginning 26 to 36 inches below the surface, is yellowish, slightly mottled sandy clay or sandy clay loam; it is moderately plastic and is somewhat less permeable than the subsoil of the Dougherty soil.

The Cleburne soil is similar to the Stidham soil except that it lacks the sandy clay lower subsoil. It developed from sandstone residuum, which lies at depths of about 26 to 46 inches.

The Stephenville soils are similar to the Dougherty soils, but shallower. They are underlain at depths of 20 to 40 inches by partly weathered sandstone.

The Eufaula soils are related to the Stidham and Dougherty soils and are closely associated with them. They have a much thicker A horizon and have no loamy or distinctly heavier layer within 3 feet of the surface. The following profile of Eufaula loamy fine sand was observed on a gently sloping high terrace about 30 feet above the flood plain of the Deep Fork River. The vegetation is a native cover of blackjack oak and post oak.

Profile of Eufaula loamy fine sand in SE¼SW¼ sec. 31, T. 14 N., R. 9 E., about 12 miles south of Bristow:

- A_1 0 to 3 inches, dark grayish-brown (10YR 4/2, dry; 10YR 3/2, moist) loamy fine sand; weak granular structure; very friable; slightly acid.
- A_{21} 3 to 10 inches, light brownish-gray (10YR 6/2, dry; 10YR 5/2, moist) loamy fine sand; structureless; nearly loose when dry; slightly acid.
- A_{22} 10 to 44 inches, light yellowish-brown (10YR 6/4, dry; 10YR 5/4, moist) loamy fine sand; structureless; very friable when moist, loose when dry; medium acid.
- B 44 to 54 inches, reddish-yellow (7.5YR 6/6, dry; 7.5YR 5/6, moist) sandy clay loam, splotched or mottled with light brownish gray and brownish yellow; structureless; friable; permeable; medium acid.
- C 54 to 70 inches, alternating strata of reddish-yellow (7.5YR 6/8, dry) fine sandy loam and fine sand; slightly acid to neutral.

The B horizon may be as described, or it may be yellowish-brown loamy fine sand with narrow bands of reddish-yellow loam or sandy loam.

Planosols

The Planosols in this county developed on nearly level relief. Their parent materials were shales or slowly permeable sandy clays and clays.

Woodson clay loam is representative of the Planosols in the county. The following profile was observed in a nearly level cultivated area in a shallow valley where common field crops are grown. Runoff is slow. Internal drainage is very slow but adequate for the crops commonly grown in the county, including alfalfa.

Profile of Woodson clay loam near Kiefer in the SW¼SW¼ sec. 28, T. 17 N., R. 12 E.:

- A 0 to 12 inches, dark-gray (10YR 4/1, dry; 10YR 2/1, moist) clay loam; moderate medium granular structure; aggregates in lower 2 inches faintly coated with gray; friable when moist, very hard when dry; slightly acid.
- B_2 12 to 22 inches, dark-gray (10YR 4/1, dry; 10YR 2/1, moist) clay, faintly mottled with yellowish brown; mottling in lower part comprises about 10 percent of the mass; weak blocky structure; very compact; extremely hard when dry; neutral.
- B_3 22 to 34 inches, dark grayish-brown (2.5Y 4/2, dry; 2.5Y 3/2, moist) clay, yellowish-brown and olive-brown mottles comprise 10 to 15 percent; massive structure; very compact; contains a few small crystals of gypsum and small shotlike concretions of iron oxide in lower part; neutral.
- C_1 34 to 44 inches, mottled gray (10YR 6/1, dry), yellowish brown (10YR 5/6, dry), and olive-brown (2.5Y 4/4 dry) clay; massive structure; very slowly permeable; contains few to numerous small crystals of gypsum and small concretions of iron oxide; alkaline but not calcareous.
- C 44 to 56 inches+, partly weathered light olive-gray (5Y 6/2) and light olive-brown (2.5Y 5/4) shale or shaly clay; contains a few small crystals of gypsum, but is not calcareous.

The Neosho soil developed in clayey alluvial sediments on level or concave surfaces. Its profile is somewhat similar to that of the Woodson soils in thickness, structure and consistence of horizons. This soil has a lighter colored A horizon and a more mottled and more compact upper subsoil.

Lithosols

The soils in this great soil group are very shallow and stony. They lack well-developed profile characteristics because the strong relief allows rapid erosion, which removes soil about as soon as it develops. The vegetation may be either trees or grasses.

The principal Lithosols of the county are underlain by sandstone, shale, or interbedded sandstone and shale at depths of 5 to 15 inches. A few small areas are underlain by interbedded limestone and shale or interbedded sandy limestone and shale. The rocks under these soils vary so much within short distances and they are so near the surface that the thin profiles of the skeletal soils vary considerably.

The following profile of Darnell stony fine sandy loam was observed on a slope of 7 percent under a cover of scrubby blackjack oak and post oak. It is representative of the shallow Lithosols that overlie sandstone and have a scrubby forest cover.

Profile of Darnell stony fine sandy loam about 5 miles west of Bristow in the SW¼SW¼ sec. 33, T. 16 N., R. 8 E.:

- A_1 0 to 4 inches, dark grayish-brown (10YR 4/2, dry; 10YR 3/2, moist) light fine sandy loam; weak granular structure; very friable; numerous fragments of sandstone ranging up to 12 inches in diameter occur on surface; many outcrops of sandstone; slightly acid.
- A_2 4 to 10 inches, light-brown (7.5YR 6/4, dry; 7.5YR 5/4, moist) light fine sandy loam; structureless; very friable when moist, nearly loose when dry; contains numerous fragments of sandstone; slightly acid; grades to C horizon through a 1- to 2-inch transition zone of yellowish-red (4YR 5/8, dry; 5YR 4/8, moist) fine sandy loam that contains numerous particles of soft partly weathered sandstone.
- C 10 to 40 inches, reddish-yellow (5YR 6/8) to red (2.5YR 5/8) sandstone bedrock; slightly acid to neutral.

Pottsville stony loam, which is closely associated with the Darnell soil, has a thin A_1 horizon of dark grayish-brown loam and a thin A_2 horizon of reddish-yellow loam or clay loam. Slightly acid, thin-bedded, partly weathered, olive-brown, red, or olive-yellow shale or shaly clay and reddish-brown sandstone lie 3 to 15 inches beneath the surface. Sandstone fragments occur on the surface. Outcrops of slightly weathered shale, covered by 2 to 4 inches of sandy clay loam, are common on the steeper slopes. In some places a thin transition layer of reddish-yellow clay lies above the shaly parent material but beneath the soil profile.

Some soils under a grass cover have somewhat similar thin profiles. They most commonly overlie sandstones

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and shales, but many combinations of interbedded sandy limestone, limestone, sandstone, and shale occur. Examples are the Collinsville soils, which developed under grass over sandstone. Their profile consists of 8 to 10 inches of slightly acid, dark grayish-brown, granular loam or fine sandy loam over yellowish-brown, slightly acid sandstone bedrock. Outcrops of bedrock and large sandstone fragments on the surface are characteristic. Where the Collinsville soil is transitional toward Bates fine sandy loam, it has a thin, weakly developed B_1 horizon of yellowish-brown loam or sandy clay loam, 3 to 6 inches thick, just above the sandstone. Undisturbed areas of Collinsville soil support a moderately thick cover of bunchgrasses and scattered mesquite shrubs.

Soils of the Talihina series are closely associated with Collinsville soils, but they occupy more strongly sloping surfaces. They are on shaly slopes below ridgetops of Collinsville soils. The Talihina soils overlie shale or interbedded sandy shale, shale, and sandstone, but fragments of sandstone from the higher Collinsville soils are common on the surface of the Talihina soils. The Talihina soils are more clayey. The thin profile consists of olive-gray to dark grayish-brown clay loam over olive-colored, slightly weathered, neutral shale. The vegetation is a mixture of short and tall prairie grasses, and scattered shrubs and scrubby trees. The trees are rather thick in areas next to, or transitional to, Pottsville soils.

Alluvial Soils

The Alluvial soils in this county range from slightly acid to calcareous in reaction and from dark grayish brown to brown or red in color, depending on the source of the soil materials. They developed from sediments carried by streams and deposited on terraces and flood plains. Some of these materials have not been in place long and have been only slightly modified by soil-forming forces.

The Mason soils are the most extensive Alluvial soils of the area. They show slight profile development. The profile described is on a low terrace about 3 to 5 feet above the flood plain of Polecat Creek. The area is moderately well drained. It is used for growing all crops common in the area, including alfalfa.

Profile of Mason silt loam about 2 miles southwest of Kellyville in the SE¼NE¼ sec. 27, T. 17 N., R. 10 E.:

0 to 15 inches, very dark grayish-brown (10YR 3/2, dry; 10YR 2/2, moist) silt loam; the 5-inch plow layer is grayish brown; moderate medium granular structure; crumbly and friable when moist, hard when dry; slightly acid; grades to horizon below.

15 to 35 inches, dark grayish-brown (10YR 4/2, dry; 10YR 3/2, moist) silty clay loam; weak granular structure; numerous pinholes; friable when moist, moderately plastic when wet; slightly acid.

35 to 45 inches, grayish-brown (2.5Y 5/2, dry; 2.5Y 4/2, moist) light clay; strong-brown (7.5YR 5/8, dry) and yellowish-brown (10YR 5/6, dry) mottles comprise 10 to 15 percent of the mass; moderately crumbly and friable when moist, plastic when wet; permeable; slightly acid.

45 to 60 inches+, dark grayish-brown clay loam that contains thin strata of light-brown fine sandy loam; neutral.

The Verdigris soils are closely related to the Mason soils, but are of more recent origin and show no profile development. They are still flooded periodically. Some areas of Verdigris soils that are next to entrenched channels and are not flooded as often as the others have a weak color profile.

The Pulaski soils consist of brown to reddish-brown slightly acid sandy sediments that have been only slightly altered into a soil. Most of the material was washed from light-colored soils, but some came from Reddish Prairie soils.

The Port, Roebuck, and Yahola soils occur almost entirely on the flood plains of streams that carry sediments from areas of Reddish Prairie and Reddish Chestnut soils underlain by redbeds.

The Port and Yahola soils are similar in surface appearance, but Yahola soils are underlain by more sandy sediments. Yahola soils are generally more calcareous throughout than Port soils. Roebuck soils are poorly drained and normally calcareous. They have a more clayey and mottled subsoil than Port or Yahola soils.

The Reinach soils are similar to the Yahola soils, but they have a somewhat darker surface soil. They are high enough above the stream to be safe from ordinary floods. As a rule, they are more leached of carbonates than the Yahola soils.

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SOILS LEGEND

SYMBOL	NAME
Ba	Bates fine sandy loam, gently sloping
Bb	Bates fine sandy loam, sloping
Bc	Bates fine sandy loam, sloping, severely eroded
Bd	Broken or gullied sandy upland
Ca	Choteau very fine sandy loam, gently sloping
Cb	Choteau very fine sandy loam, nearly level
Cc	Cleburnes fine sandy loam
Cd	Collinsville and Bates soils, gently sloping
Ce	Collinsville and Talihina soils, sloping
Cf	Collinsville and Talihina soils, strongly sloping
Da	Darnell and Pottsville soils, sloping
Db	Darnell and Pottsville soils, strongly sloping
Dc	Dennis and Okemah loams, gently sloping
Dd	Dennis and Okemah loams, sloping
De	Dennis and Okemah loams, sloping, severely eroded
Df	Dougherty and Stidham fine sandy loams, gently sloping
Dg	Dougherty and Stidham fine sandy loams, nearly level
Dh	Dougherty and Stidham fine sandy loams, sloping
Dk	Dougherty and Stidham loamy fine sands, gently sloping
Dl	Dougherty and Stidham loamy fine sands, nearly level
Ea	Eufaula loamy fine sand, gently sloping
Eb	Eufaula loamy fine sand, strongly sloping
Ga	Gullied bottom land
Ma	Mason clay loam
Mb	Mason silt loam
Na	Neosho silt loam
Oa	Oil-waste land
Ob	Okemah and Woodson clay loams
Pa	Port clay loam
Pb	Pulaski fine sandy loam
Ra	Reinach very fine sandy loam
Rb	Roebuck clay
Sa	Stephenville and Darnell fine sandy loams, gently sloping
Sb	Stephenville and Darnell fine sandy loams, sloping
Sc	Stephenville and Darnell fine sandy loams, sloping, severely eroded
Ta	Teller silt loam, gently sloping
Tb	Teller silt loam, nearly level
Tc	Teller silt loam, sloping
Va	Vanoss silt loam, gently sloping
Vb	Vanoss silt loam, nearly level
Vc	Verdigris clay loam
Vd	Verdigris fine sandy loam
Ve	Verdigris silt loam
Wa	Riverwash
Ya	Yahola clay loam
Yb	Yahola very fine sandy loam

WORKS AND

Roads
- Good motor
- Poor motor
- Trail
- Marker, U. S.

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferry
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
- School
- Church
- Station

Mine and Quarry
- Shaft
- Dump
- Prospect

Pits, gravel or other

Power line

Pipeline

Cemetery

Dam

Levee

Tank

Oil well

Windmill

Canal lock (point upstream

Soils surveyed 1940-1949 by O. H. Brensing, Dale Scriven, E. C. Talley, Oklahoma Agricultural Experiment Station; H. P. Mikles, Soil Conservation Service, and H. M. Galloway, Oklahoma Agricultural Experiment Station and U. S. Department of Agriculture.
Correlation by James Thorp, U. S. Department of Agriculture.

Soil map constructed by Cartographic Division, Soil Conservation Service, USDA, from 1949 aerial photographs. Controlled mosaic based on polyconic projection, 1927 North American datum.

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CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Roads
- Good motor
- Poor motor
- Trail
- Marker, U. S. (33)

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferry
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
- School
- Church
- Station

Mine and Quarry
- Shaft
- Dump
- Prospect

Pits, gravel or other

Power line

Pipeline

Cemetery

Dam

Levee

Tank

Oil well

Windmill

Canal lock (point upstream)

BOUNDARIES

- National or state
- County
- Township, civil
- U. S.
- Section
- City (corporate)
- Reservation
- Land grant

DRAINAGE

Streams
- Perennial
- Intermittent, unclass.
- Crossable with tillage implements
- Not crossable with tillage implements

Canals and ditches (CANAL / DITCH)

Lakes and ponds
- Perennial
- Intermittent

Wells (flowing)

Springs

Marsh

Wet spot

RELIEF

Escarpments
- Bedrock
- Other

Prominent peaks

Depressions

	Large	Small
Crossable with tillage implements		
Not crossable with tillage implements		
Contains water most of the time		

SOIL SURVEY DATA

- Soil type outline and symbol (D±)
- Gravel
- Stones
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land

Erosion
- Uneroded spot — U
- Sheet, moderate — S
- Sheet, severe — SS
- Gully, moderate — G
- Gully, severe — GG
- Sheet and gully, moderate — SG
- Wind, moderate
- Wind, severe
- Blowout
- Wind hummock
- Overblown soil

Gullies

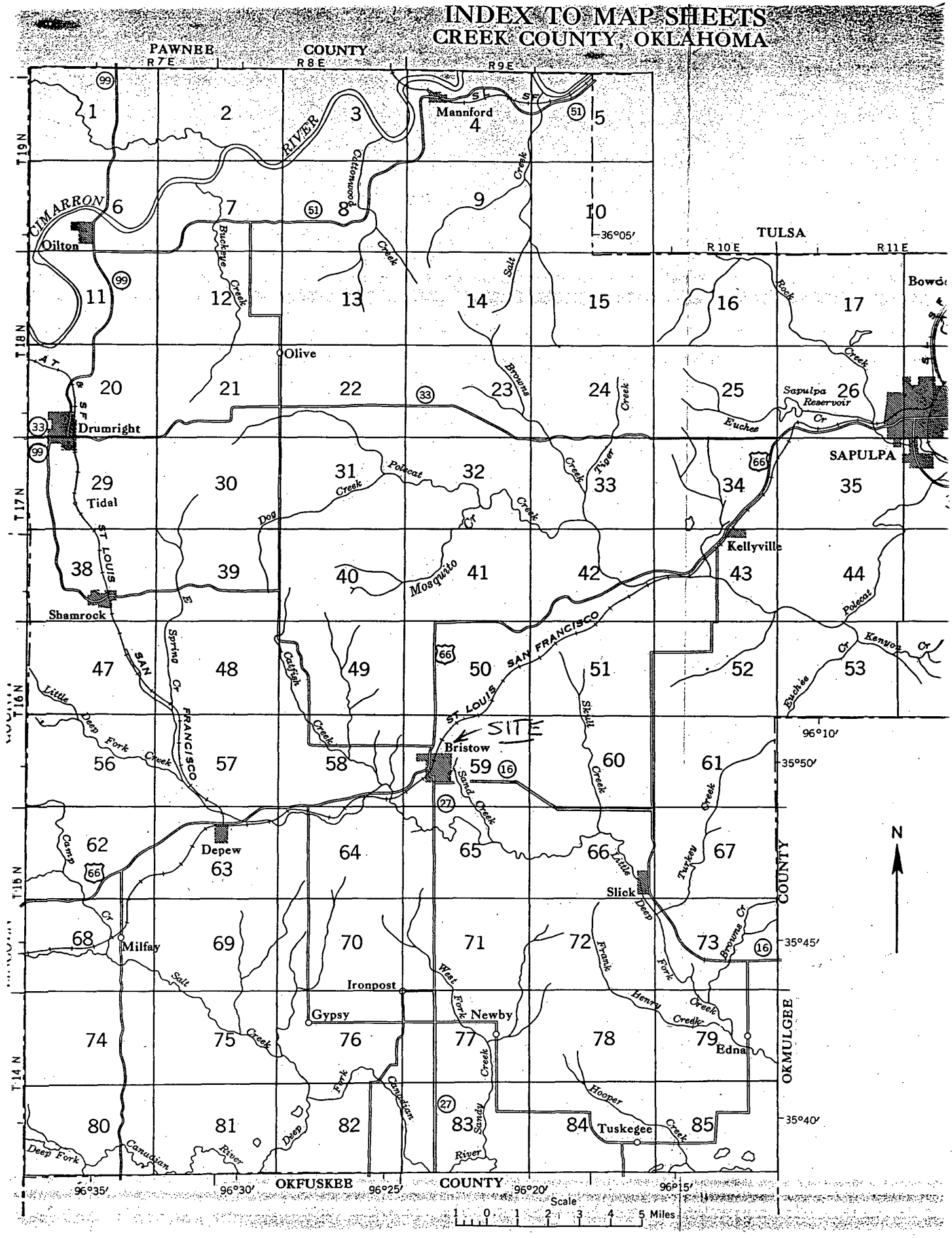
Areas of alkali and salts (A / M / S)
- Strong
- Moderate
- Slight

Free of toxic effect — F

Sample location — 2E

Saline spot

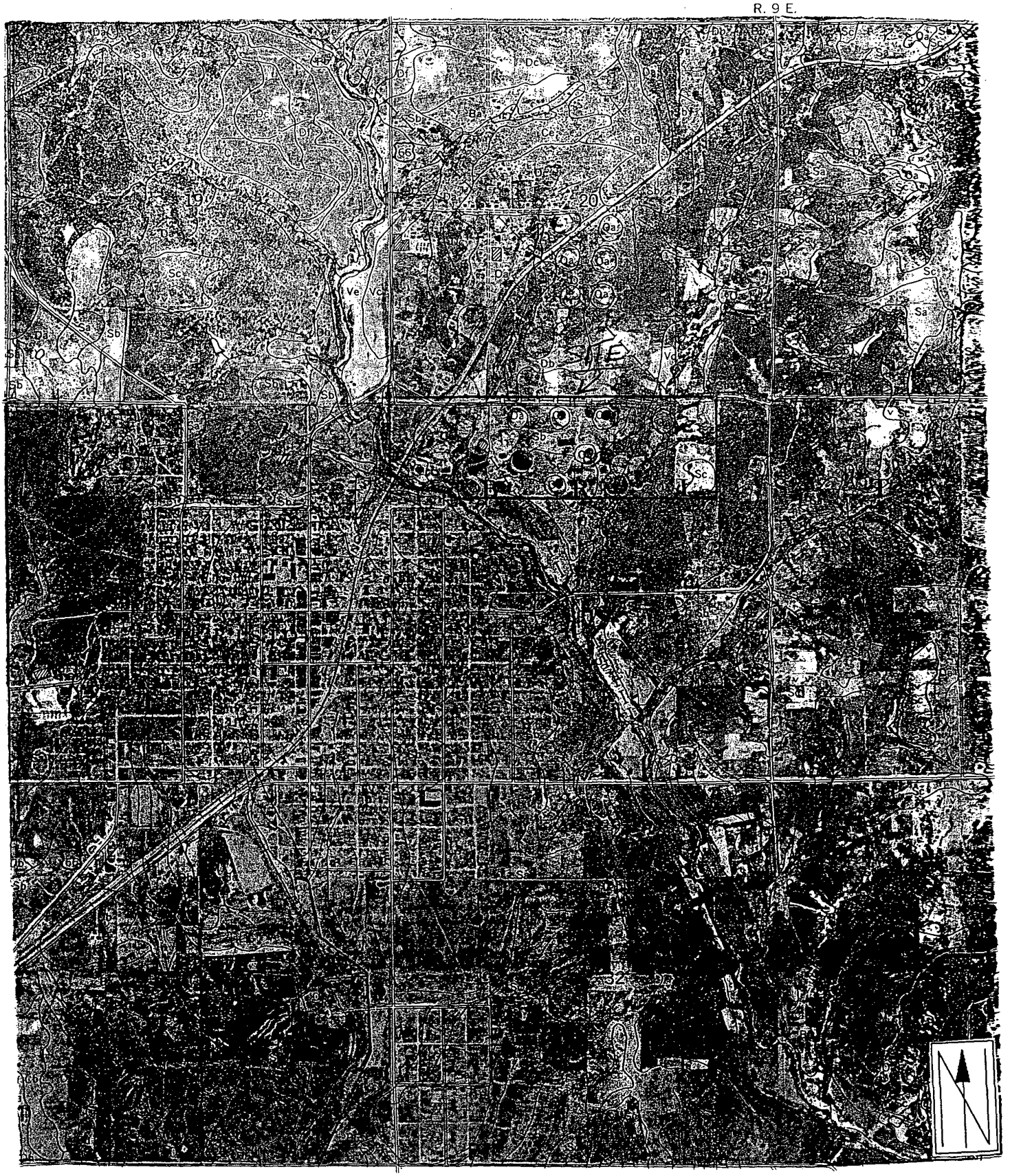
INDEX TO MAP SHEETS
CREEK COUNTY, OKLAHOMA



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CREEK COUNTY, OKLAHOMA

R. 9 E.



0 ½ 1 Mile Scale 1:20000 0

Reference 11

MEMORANDUM

November 8, 1994

To: Rita Kottke (Senior Environmental Specialist), Waste Management Division, Site Assessment Unit.

From: David Cates (Environmental Specialist), Waste Management Division, Site Assessment Unit.

Re: Hydrogeology and Ground Water Use. **Site:** Wilcox Oil Company Refinery. **Location:** Bristow (NE/4 NW/4 NW/4 of Section 29, Township 16 North, Range 9 East of Creek County, Oklahoma).

Regional Hydrogeology

Principal ground water resources in Creek County, as mapped by Johnson (1983), include alluvial and terrace deposits where present throughout the county and the Pennsylvanian age Vamoosa-Ada aquifer in the west. The alluvial and terrace deposits are unconsolidated while the Vamoosa-Ada is considered a bedrock aquifer. Older Pennsylvanian rocks, including the Barnsdall Formation, produce ground water for municipal, domestic and industrial supplies in the central and eastern part of the county.

Quaternary age alluvial aquifers are the youngest in Creek County. Alluvial deposits are wedge shaped layers of sand, silt, clay, and gravel found along the Deep Fork and Cimarron Rivers and their major tributaries. Sediment is continually being eroded, reworked, and redeposited by the rivers and streams. Alluvial deposits range from 0 to 100 feet in thickness for the Deep Fork and Cimarron Rivers, and less for minor streams (Oakes, 1959).

Terrace deposits were formed when ancient streams deposited alluvium consisting mostly of sand, silt, clay, and gravel. Since the ancient streams were the ancestors of the Deep Fork and Cimarron Rivers, terrace deposits are located adjacent to these present-day rivers and streams, but at higher elevations. Like the younger alluvium, the composition and thickness of terrace deposits can vary greatly over short lateral distances.

Water suitable for domestic purposes can be found in the alluvial and terrace aquifers. Ground water in these aquifers is usually found under unconfined (water table) conditions and is susceptible to contamination from surface sources. Alluvial and terrace sediments are moderately permeable and wells yield about 25 to 50 gallons of water per minute (gpm) (Bingham and Moore, 1983).

Underlying the alluvial and terrace deposits in Creek County is bedrock assigned to the Virgilian and Missourian Series of the Pennsylvanian age. These strata outcrop at the surface with the progressively younger beds exposed to the west. The Pennsylvanian strata strike north-south and regional dip is westerly about 30 to 90 feet/mile (Oakes, 1959). However, east dips are encountered around surface folds and faults.

Most of the surface faults in Creek County trend northwest to southeast. They are several miles long with up to 100 feet of vertical displacement which decreases with depth (D'Lugosz et al., 1986). Larger subsurface faults trending northeast to southwest exist at depth but have no direct influence on the near surface ground water hydrology except possibly in the very eastern part of the county. The surface faults, however, may retard ground water flow or provide conduits for rapid recharge depending on the degree of fracturing, brecciation and shearing of the near surface rocks along the fault zones.

The Vamoosa-Ada aquifer consists of, in ascending order, the uppermost part of the Barnsdall Formation, the Tallant Formation. the Vamoosa Formation, the Ada Group and the lower part of the Vanoss Group. The Vamoosa Formation and the Ada Group make up the bulk of the aquifer. The Vamoosa-Ada strata outcrop in the western one third to one half of Creek County and are predominantly composed of red and brown coarse to fine grain well sorted sandstones interbedded with dark red sandy to silty shale. Individual sandstone beds range in thickness from 5 to 60 feet and tend to be either thick and lenticular or thin with large lateral extent. Chert conglomerates and coarse grained sandstones are present near the base of the Vamoosa Formation in the southern part of the county. Oakes (1959) reported that sandstone percentage, bed thickness, and grain size tend to decrease to the north. The thickness for the aquifer ranges between 200 in the south to between 500 and 800 feet elsewhere (Johnson, 1983).

Because of their resistance to weathering the sandstones form east facing escarpments which are a few miles long or, in some cases, extend across the county. The intervening valleys are underlain by silty sandstones and shales. The land is covered by grasses, scrubby blackjack and oak trees.

Ground water under unconfined conditions exists in the outcrop area of the aquifer and for a short distance west of the point where the aquifer is overlain by less permeable rocks. However, confined conditions generally exist at depth even under the outcrop areas because of the presence of shale beds. The occurrence and movement of ground water is controlled by regional and local geologic structures, lateral and vertical distribution of sandstone and shale units, and the physical character of the rocks. The physical characteristics also control the hydraulic properties of the aquifer and are directly related to sedimentary source and depositional environment.

The average hydraulic conductivity for the Vamoosa-Ada aquifer is 3 ft/day based on well test data and an average value for storage coefficient for the confined part of the aquifer is 0.0002 (D'Lugosz et al., 1986). Specific yield for the unconfined part of the aquifer was estimated by D'Lugosz et al. (1986) to be a value of 0.12 and specific capacities for gun perforated wells were reported to be about 1 (gal/min)/ft of drawdown. Wells commonly yield 25 to 150 gpm; and some may yield as high as 300 gpm locally (Johnson, 1983). Water wells in the Vamoosa-Ada are from 30 to 750 feet deep (Bingham and Moore, 1975).

Water from the Vamoosa-Ada aquifer is of generally good quality, ranging in total dissolved solids (TDS) concentrations between 200 to 1,000 milligrams per liter (mg/l) (Johnson, 1983). Ground water composition tends to be dominated by sodium, calcium, and bicarbonate (D'Lugosz et al., 1986). However, sodium, sulfate, and chloride may constitute high proportions in places.

Underlying the Vamoosa Formation are the rocks of the Missourian Series which consist of, in descending order, the Ochelata Group and the Skiatook Group. The strata of the Ochelata Group (in descending order) are the Tallant, Barnsdall, Wann, Iola and Chanute Formations. The rocks of the Skiatook Group consist of (in descending order) the Dewey, Nellie Bly, Hogshooter, Coffeyville, Checkerboard and Seminole Formations. These formations outcrop successively from west to east in the eastern two thirds to one half of the county.

The lithology of these strata is similar to that of the Vamoosa, being composed of resistant sandstone beds and clayey, silty, sandy shale. The sandstone beds tend to be coarse grained, conglomeratic and massive in the south. In the north sandstone units contain thin beds of fine to medium grained sandstone which are interbedded with silty and sandy shale; the shale content being greater in this direction. The Missourian Series strata contain several limestone formations and some coal beds. The shale, limestone and coal beds in the Pennsylvanian section affect ground water by acting as confining beds (aquitards).

In contrast to the Vamoosa-Ada aquifer, none of the older rocks are identified as principal bedrock aquifers (Johnson, 1983). However, wells yield 25 to 50 gpm at depths from 20 to 200 feet from these formations. The quality of ground water is more variable, with some generally good quality water produced just east of the Vamoosa-Ada (TDS of 150 to 500 mg/l) and fair to poor water (650 to 50,000 mg/l TDS) produced in the eastern one third of the county (Bingham and Moore, 1975). The composition of the fresh ground water tends to be mainly made up of calcium, magnesium and bicarbonate but indications of contamination are evidenced by water with large TDS concentrations of which sodium, sulfate and chloride constitute major proportions (Morton, 1986).

Ground water is found at shallow depths in Creek County, usually within 25 feet of ground surface. However, deeper wells may be required to obtain producible quantities of ground water. The base of fresh water (i.e., water containing less than 1,000 mg/l TDS) is encountered at depths of 200 to 500 feet below ground level in the eastern part of Creek County, but is found at depths of 500 to 1,000 feet in the west (Bingham and Moore, 1983). Areas with a deep zone of fresh water tend to be correlated with thick sandstone accumulations (D'Lugosz et al., 1986). Below fresh water is a zone of brackish water followed by brines at greater depths. These deep formation brines constitute a large potential source of contamination of fresh ground water as a result of oil-field activities (Morton, 1986).

The regional ground water flow direction is from west to east as is surface drainage. However, locally the shallow ground water flows in various directions to points of discharge into surface water bodies, such as rivers, creeks, lakes, and ponds. Impacted ground water discharging into a creek may serve as source of surface water pollution.

Almost all recharge to ground water comes from downward infiltration of precipitation that falls on the land surface. However, most of the precipitation is lost to evapotranspiration and surface runoff, thus only about 4 to 10 % reaches the zone of saturation (D'Lugosz et al., 1986). Recharge to the Pennsylvanian aquifers occurs where the formations outcrop. This constitutes a large area in Creek County. Most recharge to ground water occurs during the winter months when evapotranspiration is low.

The shallow subsurface soils and rocks of Creek County have not been reported to be prone to solution cavities. Although high sulfate values in ground water from the Pennsylvanian rocks may be attributed to gypsum dissolution, sink holes have not been reported in the area. Furthermore, a review of the United States Geological Survey topographic map for the site does not show geomorphology of karst terrain. However, clays of outcropping Pennsylvanian rocks are prone to formation of desiccation cracks during dry periods. Also, zones of highly fractured rock may exist near surface faults.

Site Hydrogeology and Ground Water Use

The Barnsdall Formation outcrops under the Wilcox Oil Company Refinery site. The Barnsdall Formation is heterogeneous in character containing sandstone beds collectively known as the Okesa Sandstone Member which are interbedded with silty and sandy shales. Alluvial deposits of the Sand and Little Deep Fork Creeks are present to the south of the site. The site has been spotted on the following reference material: A) Geologic Map of Creek County (Oakes, 1959); B) Maps Showing Principal Ground Water Resources and Recharge Areas in Oklahoma (Johnson, 1983); and C) Geologic Map of the Oklahoma City Quadrangle, (Bingham and Moore, 1975). These maps indicate that the Vamoosa Formation outcrops about one mile to the west of the site. However, the site is shown to be within the potential recharge area for the Vamoosa-Ada aquifer (Johnson, 1983).

The Barnsdall Formation is the principal source of ground water to the eight active municipal water supply wells of Bristow, Oklahoma according to published records. These wells are located within 2 miles west of the site. One of the wells is located about one quarter mile southwest of the site in the NE/4 SE/4 NE/4 of section 30-T16N-R9E. This well, City of Bristow #7, has been capped and is not active at this time. However, it is capable of producing if re-entered according to Danny Trout of the Bristow Department of Public Works. Ground water from the Barnsdall Formation is produced from a domestic well located within one quarter mile north of the site in the SW/4 SW/4 SW/4 of section 20-T16N-R9E. The OWRB Multipurpose Water Well report for this well indicates that it was drilled in 6/2/83 to a depth of 230 feet. Another municipal water supply well was drilled in the center of section 29-T16N-R9E to a depth of 200 feet; but this well has been plugged and abandoned. It is located within one half mile southeast of the site and its production history is unknown.

The shallow ground water system near the site is found in upper weathered bedrock zones and alluvial deposits at depths less than 20 feet in nearby domestic wells. The shallow ground water system is under unconfined (water table) conditions and flow at the site is probably toward the south to southeast, discharging into Sand Creek nearby or the Deep Fork located about 3 miles farther south of the site (professional judgement). Ground water in the Barnsdall Formation is probably under confined conditions at depth due to the presence of shale beds within the formation. The deep ground water may be influenced by pumping from Bristow's water wells and the domestic well cited above; thus the flow direction may be to the southwest, west or north depending on the extent of well pumpage at any specific time.

The shallow aquifer at the site is predominantly composed of sandstone and shale which is

weathered near the ground surface, and is probably not in direct hydraulic connection with the deeper parts of the underlying aquifer in the Barnsdall Formation. Based on professional judgement, contaminants in the shallow soil or ground water environments at the site could migrate to the adjacent alluvial aquifers or the shallow portions of the underlying Barnsdall aquifer. Also, improperly constructed water wells and oil wells in the vicinity could serve as direct conduits for migration of potential contaminants to the aquifers. In fact, as indicated on the Herdon map (which is included in the reference material), there are two abandoned oil-exploration wells located within one quarter mile southeast of the site. It is unlikely, however, that contaminants at the site could reach the Vamoosa-Ada aquifer since it outcrops west of the site and overland flow is locally to the south and southeast. Also, a shale section 30 to 60 feet in thickness within the Tallant Formation may act as a protective barrier against contamination of the Vamoosa-Ada aquifer from below.

References

Bingham R. and Moore R., 1975, Hydrologic Atlas 4, "Reconnaissance of the Water Resources of the Oklahoma City Quadrangle Central Oklahoma", Oklahoma Geological Survey.

D'Lugosz, J.J., McClaflin, R.G., and Marcher, M.V., 1986, "Geohydrology of the Vamoosa-Ada Aquifer East-Central Oklahoma", Oklahoma Geological Survey Circular #87.

Johnson, K., 1983, "Maps Showing Principal Ground-Water Resources and Recharge Areas in Oklahoma", Oklahoma State Department of Health, Complied by Kenneth S. Johnson, Oklahoma Geological Survey, 1983.

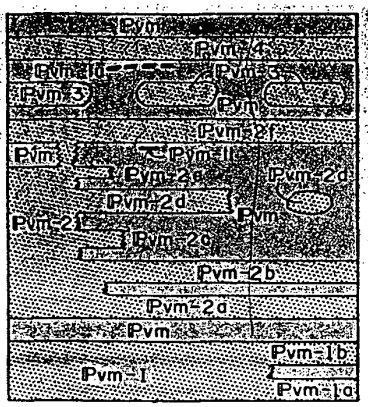
Morton, R.B., 1986, "Effects of Brine on the Chemical Quality of Water in Parts of Creek, Lincoln, Okfuskee, Payne, Pottawatomie, and Seminole Counties, Oklahoma", Oklahoma Geological Survey Circular #89.

Oakes, M.C., 1959, "Geology and Mineral Resources of Creek County, Oklahoma", Oklahoma Geological Survey Bulletin #81.

SYSTEM: PENNSYLVANIAN

SERIES: MISSOURI

GROUP: OCHELATA



VAMOOSA FORMATION

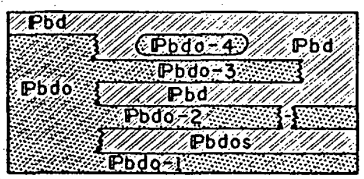
(Resistant sandstone units [Pvm-1, 2, 3, 4] interbedded and intergrading with nonresistant sandstone and sandy, silty shale [Pvm]. In upper part are two sandy limestone beds [Pvm-ll] and [Pvm-lu]. Mapped sandstone units consist of closely related lenses approximately but not strictly in a constant stratigraphic interval.)

unconformity



TALLANT FORMATION

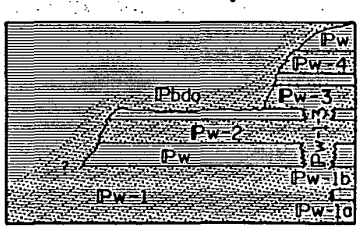
(Lower sandstone member [Ptl-1] containing shale lens [Ptl-1a], and upper shale member [Ptl-2] containing a few thin sandstones.)



BARNSDALL FORMATION

(Unnamed shale member [Pbd] and Okesa sandstone member [Pbdo]. South of Little Deep Fork Creek the Okesa may include representatives of the lower part of the Wann formation. North of Little Deep Fork Creek the Okesa consists of mappable sandstones [Pbdo-1, 2, 3, 4] and shale [Pbdos] as indicated. The top of the Okesa is not everywhere the same bed.)

unconformity



WANN FORMATION

(Sandstone units [Pw-1, 2, 3, 4] and intervening units of sandy shale [Pw]. Overlain unconformably by Okesa sandstone member of Barnsdall formation [Pbdo]. Remnants of the basal part of the Wann present south of Little Deep Fork Creek, if any, are mapped with the Okesa.)

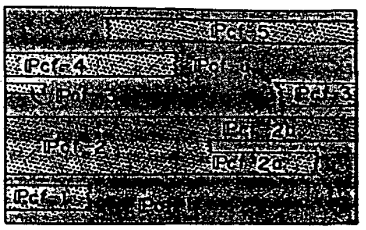
SYSTEM: PENNSYLVANIAN

SERIES: MISSOURI

GROUP: SKIATOOK

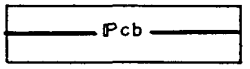
(Nellie Bly formation: Shale, sandstone, and sparse stone. The lower shale unit [Pnb-1] bifurcates southeast contains a sandstone lens [Pnb-1]. Sandstone unit Pn composed of resistant and nonresistant sandstone an tremely sandy shale; base of resistant ledges within th indicated by black lines. The middle shale unit Pnb-m tains four mapped sandstone lenses [Pnb-3], not pre equivalent. Sandstone unit Pnb-4 contains local sandy stone beds. The upper shale unit Pnb-u contains two ma calcareous sandstone lenses [Pnb-5], not precisely equiv and one mapped sandy limestone bed Pnb-ls.

Hogshooter formation Ph: Represented by gray sandy stone and calcareous sandstone which crop out from pl place in shale above sandstones of the Coffeyville form and below sandstones of the Nellie Bly formation.



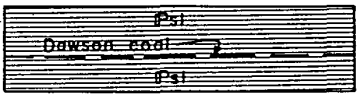
COFFEYVILLE FORMATION

(Units Pcf-1, u are composed of silty, sandy shale. Pcf 1, 2, 3, 4, 5 are composed of resistant sandstone nonresistant sandstone, and extremely sandy, silty Bases of resistant ledges within units are indicated by lines. Neither top nor base of any sandstone unit is the bed throughout.)



CHECKERBOARD LIMESTONE

(A single massive bed of dark blue fossiliferous lime generally about 2.5 feet thick.)



SEMINOLE FORMATION

(Sandstone and shale, undifferentiated. Contains also thin impure fossiliferous limestone lenses of local occurr Dawson coal shown by a single heavy dashed black li

unconformity



HOLDENVILLE SHALE

(Dominantly dark gray shale. Only the upper few feet out in Creek County, southeast of Mounds.)

SERIES: DES MOINES

GROUP: MARMATON

U
D
Fault
Dotted where concealed;
U, upthrown side
D, downthrown side

Quarry

66
U. S. highway

16
State highway

Paved road

Improved road

Unimproved road, trail

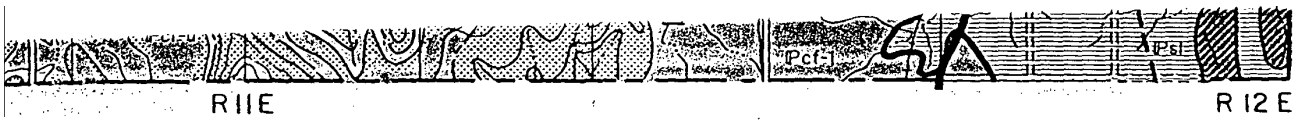
Railroad

Abandoned Railroad

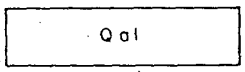
Electric Railway

WILLIAMS & HEINTZ LITHOGRAPH CORPORATI

000280



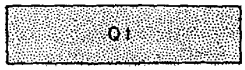
EXPLANATION



ALLUVIUM

nd, silt, and clay on flood plains of present streams.)

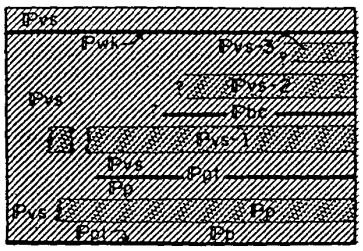
unconformity



TERRACE DEPOSITS

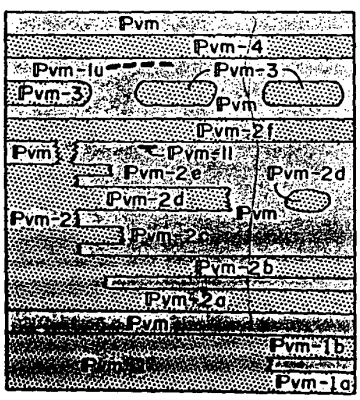
nd, silt, and clay deposited by ancient streams. Includes some eolian deposits.)

unconformity



VANOSS FORMATION (LOWER PART)
AND
PAWHUSKA FORMATION

oss formation: Gray to red shale [Pvs] and sandstones -1, 2, 3]. Intergrades laterally with the Pawhuska forma- and interfingers with the Bird Creek limestone [Pbc]. Contains Wakarusa limestone [Pwk] in upper part. uska formation: Turkey Run limestone member [Ppt] at p and Lecompton limestone member [Ppl] at the base, ated by one or more sandstones and two or more shales [Pp].)



VAMOOSA FORMATION

ant sandstone units [Pvm-1, 2, 3, 4] interbedded and ading with nonresistant sandstone and sandy, silty Pvm]. In upper part are two sandy limestone beds U and [Pvm-1u]. Mapped sandstone units consist of related lenses approximately but not strictly in a constant stratigraphic interval.)

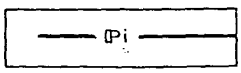
unconformity



TALLANT FORMATION

sandstone member [Ptl-1] containing shale lens , and upper shale member [Ptl-2] containing a few thin sandstones.)

SYSTEM: PENNSYLVANIAN
SERIES: MISSOURI
GROUP: SKIATOOK
GROUP: OCHELATA



IOLA FORMATION

(Sandy limestone, calcareous siltstone, fossiliferous sandstone, and shale. In Creek County the boundaries are indefinite and in part gradational.)



CHANUTE FORMATION

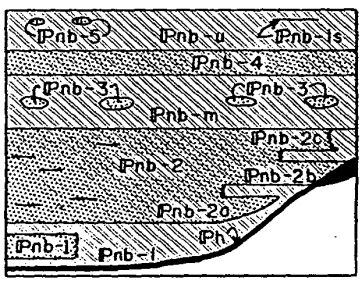
(Sandstone [Pch-1] and shale [Pch-2].)

unconformity



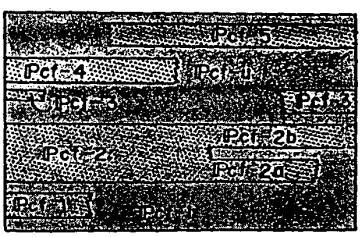
DEWEY FORMATION

(Lower part sandstone, upper part shale. Contains a few local thin sandy limestone beds.)



NELLIE BLY FORMATION
AND
HOGSHOOTER FORMATION

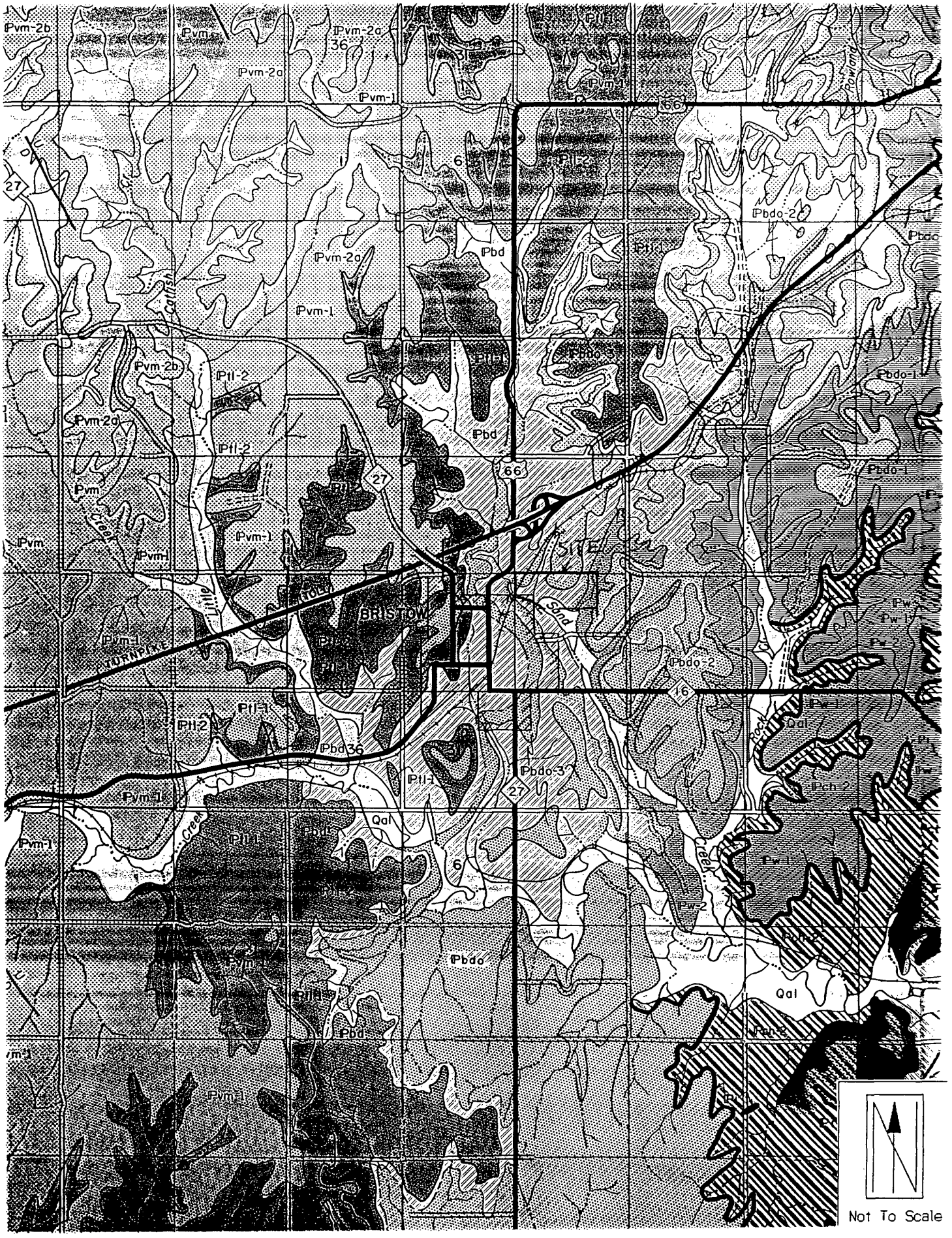
(Nellie Bly formation: Shale, sandstone, and sparse limestone. The lower shale unit [Pnb-L] bifurcates southward and contains a sandstone lens [Pnb-1]. Sandstone unit Pnb-2 is composed of resistant and nonresistant sandstone and extremely sandy shale; bases of resistant ledges within the unit indicated by black lines. The middle shale unit Pnb-m contains four mapped sandstone lenses [Pnb-3], not precisely equivalent. Sandstone unit Pnb-4 contains local sandy limestone beds. The upper shale unit Pnb-u contains two mapped calcareous sandstone lenses [Pnb-5], not precisely equivalent, and one mapped sandy limestone bed Pnb-ls.
Hogshooter formation Ph: Represented by gray sandy limestone and calcareous sandstone which crop out from place to place in shale above sandstones of the Coffeyville formation and below sandstones of the Nellie Bly formation.)



COFFEYVILLE FORMATION

(Units Pcf-l, u are composed of silty, sandy shale. Units Pcf 1, 2, 3, 4, 5 are composed of resistant sandstone lenses, nonresistant sandstone, and extremely sandy, silty shale. Bases of resistant ledges within units are indicated by black lines. Neither top nor base of any sandstone unit is the same bed throughout.)

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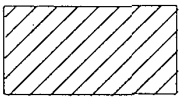

Pvm-2b
Pvm-2a
Pvm-1
Ptl-2
Ptl-1
Pbd
Pbdo-2
Pbdo-3
Pbdo-1
Pbdo
Pbd36
Pw-1
Pw-2
Qal
Pch-2
SITE
BRISTOW
TURNPIKE
Creek
Little Deer
Rock
Pipe
27
66
6
36

Not To Scale

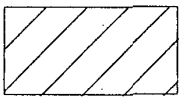
EXPLANATION

RECHARGE AREAS

Patterns of red lines on the map show known or potential recharge areas for the various bedrock aquifers.



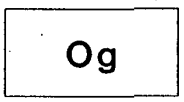
Recharge Areas. This pattern shows areas that are known to be part of the recharge area for a bedrock aquifer: includes outcrops of the aquifer and of overlying porous and permeable rocks hydraulically connected with the aquifer.



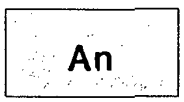
Potential Recharge Areas. This pattern shows areas that may be part of the recharge area for a bedrock aquifer: includes areas where confining strata may contain pathways for downward movement of water to the aquifer, and safety zones (generally extending 4 miles beyond the known limits of the aquifer) that may overlie unknown extensions of the aquifer or rocks hydraulically connected with the aquifer.

BEDROCK AQUIFERS

Colored areas on the map show distribution of bedrock aquifers, which are the rock units generally considered favorable or moderately favorable for development of ground-water resources. Bedrock aquifers are listed below by geologic age from oldest to youngest. References, listed at the end of each aquifer description, include Hydrologic Atlases (HA) and Other Reports that provide more detailed information. All references are given in the 4-page pamphlet that accompanies this map.



Ogallala Formation (Tertiary in age). Loosely cemented layers of fine- to medium-grained sand, silt, clay, and gravel in western Oklahoma and Panhandle; locally contains thin beds of caliche. Thickness generally ranges from 100 to 700 ft. in Panhandle and 100 to 400 ft. elsewhere. Wells commonly yield 25 to 1,500 gpm of water that is of good quality (generally less than 500 mg/L dissolved solids). Recharge areas include all areas where Ogallala crops out or is covered by younger porous and permeable sediments. References: HA-5, HA-8, HA-250, HA-373, HA-450; also Other Reports 12, 13, 17, 21, 22, 23, 24, 25, 26, 28, 30, 31, 32, 33, 40, 42, 43, 52, 54, 55, 61, 66.



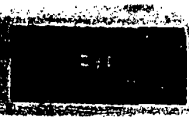
Antlers Sandstone (Cretaceous in age). Loosely cemented fine-grained sand and sandstone with some layers of shale and clay in southeastern Oklahoma. The aquifer includes underlying Holly Creek Formation in T. 6 S., Rs. 24-27 E., of eastern McCurtain County. Antlers aquifer typically ranges from 200 to 700 ft. thick. Wells commonly yield 10 to 50 gpm, but in some areas they may yield up to 400 gpm. The water is of good quality (generally 200 to 1,000 mg/L dissolved solids). Recharge areas include outcrops of Antlers Sandstone and overlying Goodland Limestone; potential recharge areas include areas where aquifer underlies younger Cretaceous strata in the south. References: HA-3, HA-9; also Other Reports 9, 20, 33, 61.



Elk City Sandstone (Permian in age). Fine-grained sandstone with minor amounts of silt and clay in southwestern Oklahoma. Maximum thickness is about 185 ft. Wells commonly yield 25 to 300 gpm of water that is of good quality (generally less than 500 mg/L dissolved solids). Recharge areas include all outcrops of Elk City Sandstone. References: HA-5; also Other Reports 33, 47, 61.



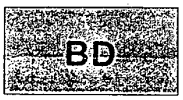
Rush Springs Sandstone and Marlow Formation (Permian in age). Fine-grained sandstone with some layers of gypsum, shale, and dolomite in western Oklahoma. The amount of shale increases in Dewey County and farther north. Thickness of aquifer ranges from 400 ft. in the south to 200 ft. in the north. Wells commonly yield 25 to 300 gpm of water that is of good quality (generally 200 to 1,000 mg/L dissolved solids), although in some areas of Dewey County and farther north the water locally is of fair to poor quality (1,500 to 4,000 mg/L dissolved solids). Recharge areas include Rush Springs and Marlow outcrops and extend to limits of outcrop on south and east; recharge areas also include outcrops of gypsum and other rocks of overlying Cloud Chief Formation in parts of Caddo, Custer, and Washita Counties. Potential recharge areas in the west extend 4 miles beyond the western limit of the aquifer. References: HA-3, HA-5, HA-6, HA-8; also Other Reports 6, 7, 15, 19, 33, 41, 46, 50, 53, 61, 64, 69.



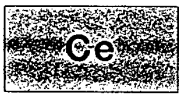
Blaine and Dog Creek Formations (Permian in age). Gypsum and dolomite layers (locally fractured or cavernous) interbedded with shale in southwestern Oklahoma. The total thickness of the aquifer (the lower part of the Dog Creek Formation and the entire Blaine Formation) is about 250 ft. Wells commonly yield 300 to 2,500 gpm of water that is of fair to poor quality

000283

in Dewey County and farther north. Thickness of aquifer ranges from 400 ft. in the south to 200 ft. in the north. Wells commonly yield 25 to 300 gpm of water that is of good quality (generally 200 to 1,000 mg/L dissolved solids), although in some areas of Dewey County and farther north the water locally is of fair to poor quality (1,500 to 4,000 mg/L dissolved solids). Recharge areas include Rush Springs and Marlow outcrops and extend to limits of outcrop on south and east; recharge areas also include outcrops of gypsum and other rocks of overlying Cloud Chief Formation in parts of Caddo, Custer, and Washita Counties. Potential recharge areas in the west extend 4 miles beyond the western limit of the aquifer. References: HA-3, HA-5, HA-6, HA-8; also Other Reports 6, 7, 15, 19, 33, 41, 46, 50, 53, 61, 64, 69.



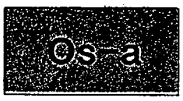
Blaine and Dog Creek Formations (Permian in age). Gypsum and dolomite layers (locally fractured or cavernous) interbedded with shale in southwestern Oklahoma. The total thickness of the aquifer (the lower part of the Dog Creek Formation and the entire Blaine Formation) is about 250 ft. Wells commonly yield 300 to 2,500 gpm of water that is of fair to poor quality (generally 1,500 to 6,000 mg/L dissolved solids). Recharge areas are outcrops of Blaine, Dog Creek, Rush Springs, and Marlow Formations that overlie the aquifer. Potential recharge areas include other outcrops of Rush Springs, Marlow, Dog Creek, and Blaine strata that dip toward the aquifer. References: HA-5, HA-6; also Other Reports 33, 56, 61, 62.



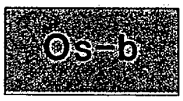
Cedar Hills Sandstone (Permian in age). Fine-grained sandstone interbedded with layers of siltstone and shale in northwestern Oklahoma. Thickness typically is about 180 ft. Wells commonly yield 150 to 300 gpm of water that is of good to poor quality (generally 500 to 3,000 mg/L dissolved solids). Recharge areas include Cedar Hills outcrops and extend to limits of outcrop on east; potential recharge areas in south and west extend 4 miles beyond the limits of aquifer. References: HA-7, HA-8; also Other Reports 15, 57, 63.



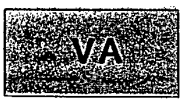
Garber Sandstone and Wellington Formation (Permian in age). Fine-grained sandstone irregularly interbedded with shale and siltstone in central Oklahoma; grades into shale to north and south. Thickness of aquifer ranges from about 300 ft. in the south to about 800 ft. in the north. Wells commonly yield 25 to 400 gpm of water that is of good quality (generally 200 to 1,000 mg/L dissolved solids). Recharge areas consist of outcrops of the aquifer and extend eastward to the approximate top of shales that make up much of the lower one-third of the Wellington Formation. Potential recharge areas include areas in the west where aquifer underlies younger Permian strata; also areas that extend 4 miles south, west, and north of aquifer limits. References: HA-4; also Other Reports 4, 5, 29, 33, 61, 67, 68.



Oscar Group (Early Permian or Late Pennsylvanian in age). Area designated a consists of fine-grained sandstone interbedded with shale and siltstone in central Oklahoma; contains some conglomerate in the south. Main part of aquifer is in lower half of Oscar Group; upper half of Oscar is predominantly shale. Thickness of aquifer ranges from about 150 ft. in south to 300 ft. in north. Wells commonly yield 25 to 50 gpm of water that is of good quality (generally 300 to 1,000 mg/L dissolved solids). Recharge areas include outcrops of Oscar Group; also included are outcrops of shales and sandstones in lower part of overlying Wellington Formation that appear to be hydraulically connected with either the Oscar or the Garber-Wellington aquifer. Potential recharge areas extend 4 miles north, east, and south of aquifer limits. References: HA-4.



Oscar Group (Early Permian or Late Pennsylvanian in age). Areas designated b consist of interbedded sandstones and shales in south-central Oklahoma. Total thickness is 300 to 500 ft. Wells commonly yield 50 to 180 gpm of water that is of good to fair quality (generally 500 to 1,500 mg/L dissolved solids). The Oscar Group does not crop out where it is an aquifer, and thus its recharge area is uncertain. Potential recharge areas include, and extend 4 miles beyond, the known limits of the aquifer. References: HA-3, HA-6; also Other Reports 33, 61.



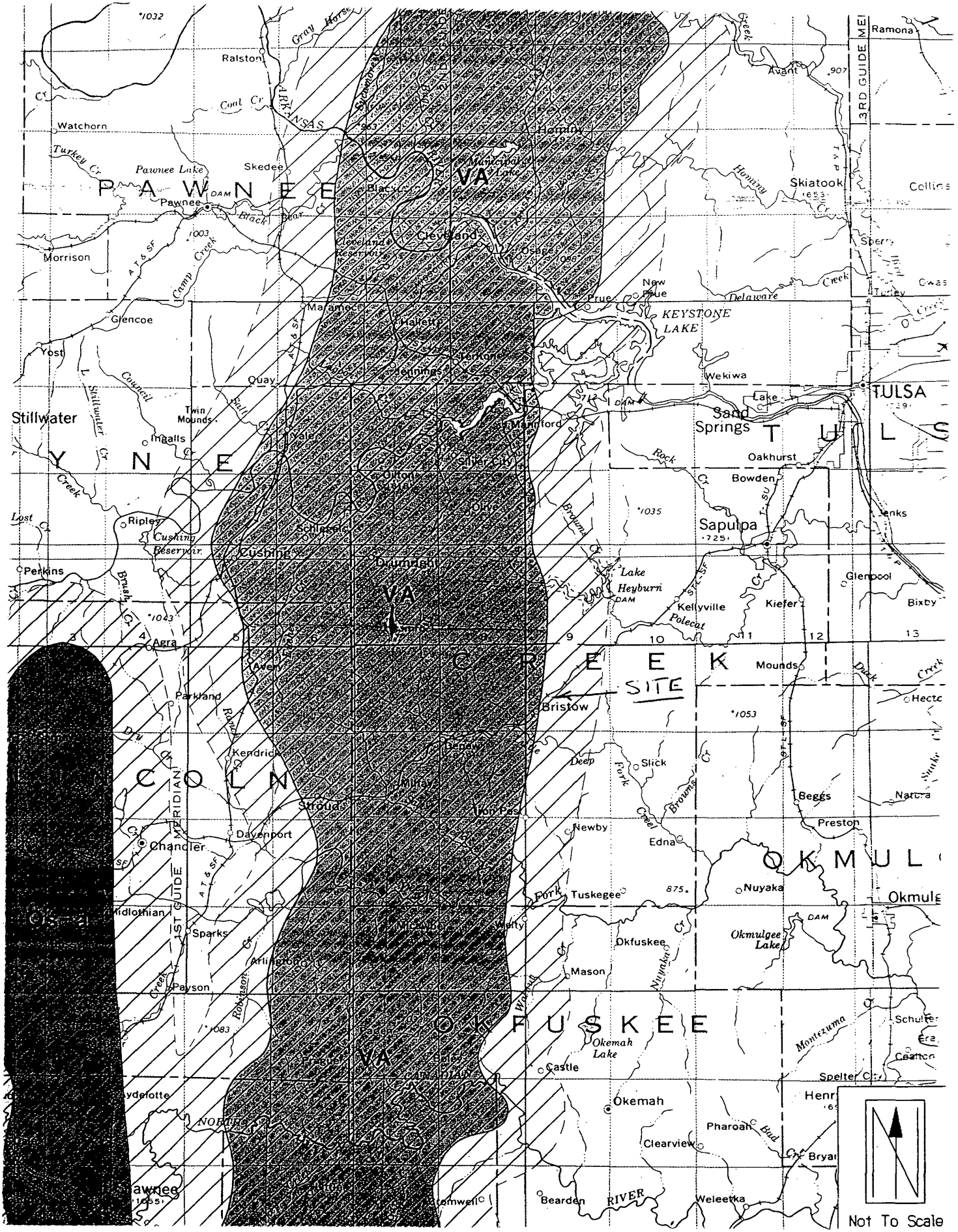
Vamoosa Formation and Ada Group (Pennsylvanian in age). Fine- to coarse-grained sandstone interbedded with shale and siltstone in central and northern Oklahoma; contains some conglomerate in the south. Mapped aquifer locally includes sandstones and shales of overlying Vanoss Group that are hydraulically connected with Vamoosa-Ada aquifer. Boundaries of aquifer shown here represent maximum extent reported on HA-4 and HA-7, or by D'Lugosz, McClaflin, and Marcher (1981). Thickness of aquifer ranges from about 200 ft. in the south to about 500 to 800 ft. elsewhere. Wells commonly yield 25 to 150 gpm, and locally yield as much as 300 gpm, of water that is of good quality (generally 200 to 1,000 mg/L dissolved solids). Recharge areas include outcrops of aquifer and, locally, some hydraulically connected rocks. Potential recharge areas extend 4 miles beyond the aquifer limits. References: HA-3, HA-4, HA-7; also Other Reports 3, 10, 11, 14, 15, 33, 38, 61.

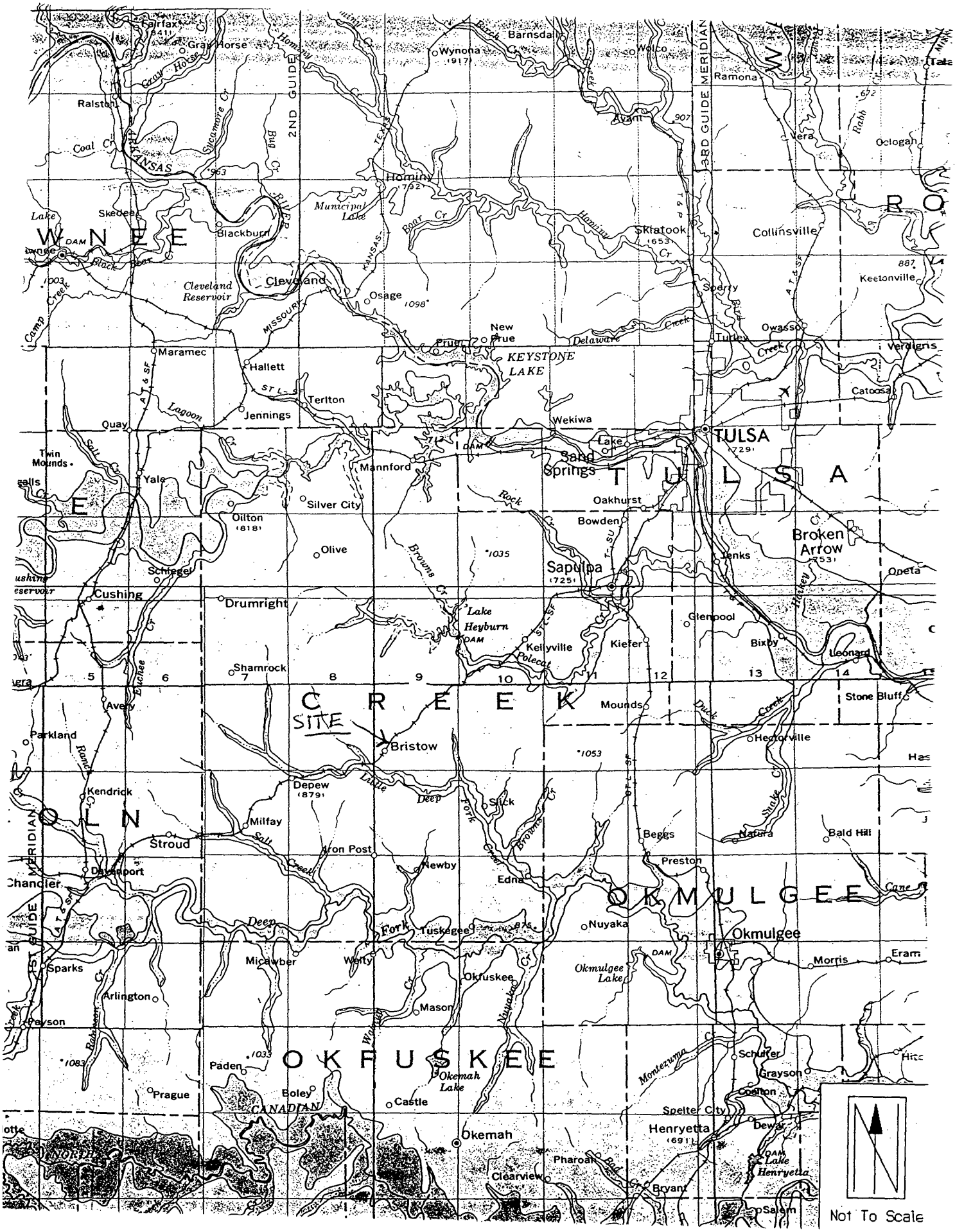


Noxie Sandstone (Pennsylvanian in age). Coarse-grained sandstone with some shale layers in northeastern Oklahoma. Thickness ranges from about 50 to 100 ft. Wells commonly yield 10 to 50 gpm of water that is of good quality (generally less than 1,000 mg/L dissolved solids). Recharge areas include outcrops of aquifer and overlying sandstones and shales of Chanute Formation. Potential recharge areas include areas in west where aquifer underlies younger Pennsylvanian rocks; also areas that extend 4 miles south of aquifer limits. References: HA-2; also Other Reports 14, 33, 38.



Keokuk and Reeds Spring Formations (Mississippian in age). This northeastern Oklahoma unit, also referred to as the "Boone Formation" or "Boone Chert," consists of limestone and cherty limestone beds that locally are fractured or cavernous. Thickness ranges from 250 ft. in south to about 400 ft. in north. Wells consistently yield more than 3 gpm, and some yield as much as 50


Ralston
Watchorn
Pawnee Lake
Skedee
PAWNEE
Pawnee
Morrison
Glencoe
Yost
Stillwater
Twin Mounds
Ingalls
Ripley
Cushing Reservoir
Cushine
Perkins
Agra
Parkland
Kendrick
Chandler
Davenport
Stroud
Milray
Sparks
Arlington
Payson
Midlothian
Sydelotte
Hallett
Jennings
Quay
Maramec
Drumright
Oilton
Silver City
Mannford
Sand Springs
Wekiwa
Lake
Prue
New Prue
KEYSTONE LAKE
Oakhurst
Bowden
Sapulpa
Kellyville
Kiefer
Glenpool
Bixby
Jenks
Mounds
Bristow
SITE
Slick
Beggs
Preston
Newby
Edna
Tuskegee
Nuyaka
Okmulgee Lake
Okfuskee
Mason
Okemah Lake
Castle
Okemah
Clearview
Pharoah
Bearden
Weleetka
Hemmy
Skiatook
Avant
Ramona
Collins
Sperry
Owasso
Turley
Cleveland
Osage
Hominy
Black Bear Creek
Coal Creek
Turkey Creek
Comp Creek
Council Creek
L Stillwater Creek
Lost Creek
Brush Creek
Rock Creek
Deep Fork
Browns Creek
Duck Creek
Polecat Creek
Spring Creek
Robinson Creek
Wildhorse Creek
Montezuma Creek
Spelter City
Henryetta
Bryan
Bud Creek
Gray Horse Creek
Delaware Creek
Honey Creek
Lake Heyburn DAM
Okmulgee DAM
Pawnee DAM
Cleveland Reservoir
Mannford Lake
Keystone DAM
Wekiwa DAM
Cushing Reservoir
Okemah Lake
Okmulgee Lake
Lake Heyburn
Sand Springs Lake
TULSA
OKMULGEE
CREEK
LINCOLN
OKFUSKEE
OSAGE
VA
3RD GUIDE MER
1ST GUIDE MERIDIAN
A T & SF
S T L - S F
T P
Not To Scale

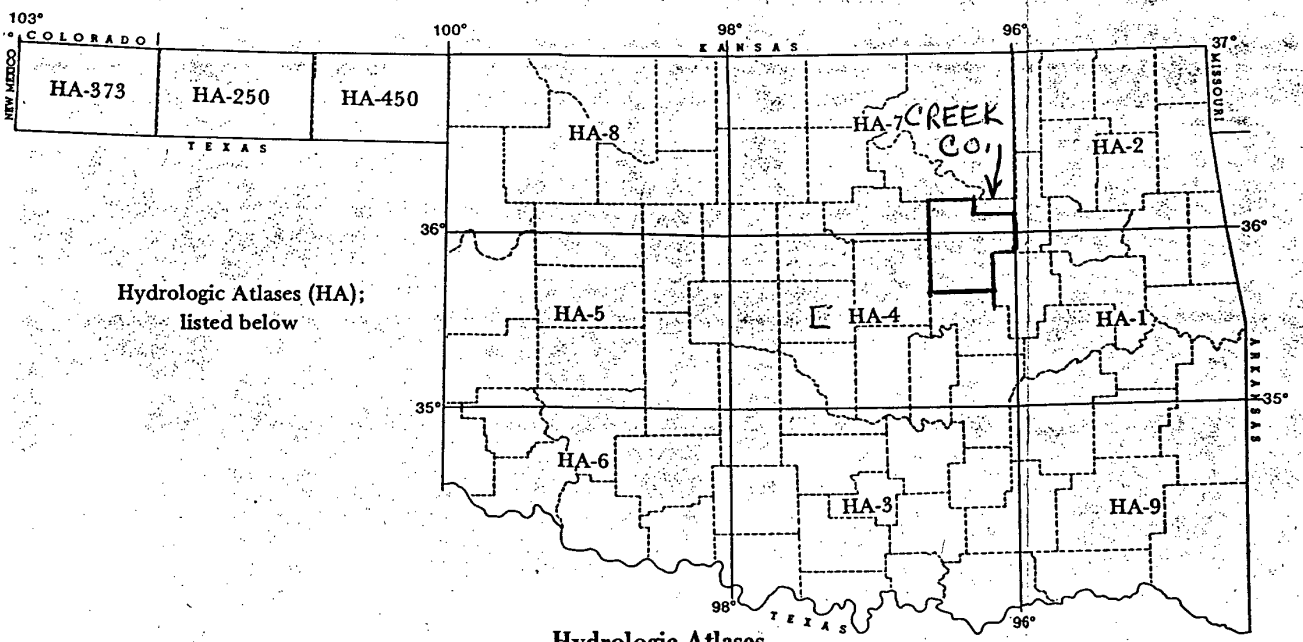


000286

EXPLANATION

Alluvium and Terrace Deposits (Quaternary in age). Unconsolidated deposits of sand, silt, clay, and gravel that occur along or adjacent to modern and ancient rivers and streams. Thickness generally ranges from 10 to 50 ft. (locally as much as 100 ft.). Wells generally yield 10 to 500 gpm of water (locally several thousand gpm), and most water is of good quality (less than 1,000 mg/L). Recharge areas are essentially the same as distribution of the alluvium and terrace deposits.

REFERENCES



Hydrologic Atlases (HA); listed below

Hydrologic Atlases

HA-1. Marcher, M.V., 1969, Reconnaissance of the water resources of the Fort Smith Quadrangle, east-central Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 1, 4 sheets, scale 1:250,000.

HA-2. Marcher, M.V., and Bingham, R.H., 1971, Reconnaissance of the water resources of the Tulsa Quadrangle, northeastern Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 2, 4 sheets, scale 1:250,000.

HA-3. Hart, D.L., Jr., 1974, Reconnaissance of the water resources of the Ardmore and Sherman Quadrangles, southern Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 3, 4 sheets, scale 1:250,000.

HA-4. Bingham, R.H., and Moore, R.L., 1975, Reconnaissance of the water resources of the Oklahoma City Quadrangle, central Oklahoma: Oklahoma Ge[illegible]

HA-7. Bingham, R.H., and Bergman, D.L., 1980, Reconnaissance of the water resources of the Enid Quadrangle, north-central Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 7, 4 sheets, scale 1:250,000.

HA-8. Morton, R.B., 1980, Reconnaissance of the water resources of the Woodward Quadrangle, northwestern Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 8, 4 sheets, scale 1:250,000.

HA-9. Marcher, M.V., and Bergman, D.L., in preparation, Reconnaissance of the water resources of the McAlester and Texarkana Quadrangles, southeastern Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 9, 4 sheets, scale 1:250,000.

HA-250. Wood, P.R., and Hart, D.L., Jr., 1967, Availability of ground water in Texas County, Oklahoma: U.S. Geological

Match line; joins with Beaver County, below

000287

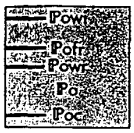
PENNSYLVANIAN

Geuryan

Virgilian

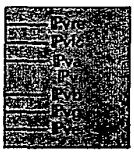
WELLINGTON FORMATION

Red-brown shale and orange-brown fine-grained sandstone, containing much maroon mudstone conglomerate and chert conglomerate to south. Thickness ranges from about 150 feet in south to 500 feet in north.



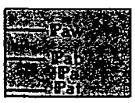
OSCAR GROUP

Red-brown to gray shale and orange-brown fine-grained, crossbedded sandstone; grades southward into arkosic sandstone and conglomerate. Includes *Herington Limestone* at top in Payne County, *Neva Limestone* (0.2 to 1.2 feet thick) at base in Lincoln County, and *Hart Limestone* (4 to 10 feet thick) at base in Pottawatomie County. In Payne County, includes thin stringers of *Winfield Limestone,* Powi (75 feet below top), *Fort Riley Limestone,* Pofr (245 feet below top), *Wreford Limestone,* Powr (345 feet below top), and *Cottonwood Limestone,* Poc (525 feet below top). Thickness ranges from 300 feet in south to 600 feet in north.



VANOSS GROUP

Red-brown to gray shale and orange-brown fine-grained, crossbedded sandstone; grades southward into arkosic sandstone and conglomerate. Includes many thin limestone beds and shale units north of North Canadian River (descending): *Roca Shale* (75 feet thick), *Red Eagle Limestone,* Pvre (3 to 8 feet thick), *Johnson Shale* (60 feet thick), *Long Creek Limestone,* Pvlc (9 to 12 feet thick), *Hughes Creek Shale* (52 feet thick), *Americus Limestone,* Pva (1.0 to 2.5 feet thick), *Admire Shale* (70 feet thick), *Brownville Limestone,* Pvb (1 to 3 feet thick), *Pony Creek Shale* (75 feet thick), *Grayhorse Limestone,* Pvg (1 foot thick), unnamed shale (70 feet thick), *Elmont Limestone,* Pve (1.2 to 7.8 feet thick), *Stonebreaker Shale* (60 feet thick), and *Reading Limestone* (1.5 feet thick), at base. Total thickness of group ranges from 250 feet in south to 490 feet in north.



ADA GROUP

Mostly orange-brown fine-grained sandstone and red-brown to gray shale; grades southward into chert conglomerates. Includes the following thin limestone beds and shale units north of North Canadian River (descending): *Auburn Shale* (80 feet thick), *Wakarusa Limestone,* Paw (1 to 6 feet thick), unnamed shale (95 feet thick), *Bird Creek Limestone,* Pab (1 to 9 feet thick), *Severy-Aarde Shale* (45 feet thick), *Turkey Run Limestone,* Pat (1 foot thick), unnamed shale (45 feet thick), and *Lecompton Limestone* (1.5 to 10 feet thick), at base. Total thickness of group ranges from 100 feet in south to 280 feet in north.



VAMOOSA FORMATION

Alternating thin to massive layers of fine- to coarse-grained sandstone and sandy, silty shale containing some chert conglomerate in middle and lower parts of formation. Thickness ranges from about 200 to about 690 feet.

UNCONFORMITY

Fault, approximately
upthrown side; D, dow

000288

EXPLANATION

The stratigraphic nomenclature and age determinations used herein are those accepted by the Oklahoma Geological Survey and do not necessarily agree with those of the U.S. Geological Survey.

Qal

ALLUVIUM

ay, and lenticular beds of gravel. Thickness about 30 to 100 feet and probably averages along major streams. Along minor streams, ges from a few feet to about 50 feet and prob- s about 25 feet. Alluvium is a major aquifer ıadrangle.

Qt

TERRACE DEPOSITS

eds of sand, silt, clay, and gravel. Thickness few feet to about 100 feet and probably aver- feet along major streams. These deposits are s along Cimarron, Canadian, and North Cana-

UNCONFORMITY

Pm

MARLOW FORMATION

ge-brown fine-grained gypsiferous sandstone, ed-brown shale. Contains 10 feet of calcitic nses near middle and 2 thin dolomites (or top. Exposed thickness, about 50 feet (top 50 ded).

Pdc

DOG CREEK SHALE

rown silty shale and some fine-grained sand- ns one or two layers of thin dolomite (or gyp- part; basal part grades southward into Chick- ion. Thickness averages about 200 feet near 30 feet near Chickasha.

Pb

BLAINE FORMATION

gypsums with thin dolomites below each gyp- lded with red-brown shale; grades southward ıa Formation. Thickness, 50 to 75 feet.

Pf

FLOWERPOT SHALE

rown silty clay shale with stringers of gypsum nd selenite); grades southward into Chickasha hickness, 20 to 40 feet.

Pc

CHICKASHA FORMATION

mudstone conglomerate and red-brown to silty shale and siltstone, with minor amounts

Missourian

NIAN

Phi

HILLTOP FORMATION

Mainly shale, grading upward into massive siltstone and fine-grained sandstone; grades northward into Barnsdall Formation. Chanute Formation, and Dewey Limestone. Thickness ranges from 0 to 200 feet.

Pb

BELLE CITY LIMESTONE

Consists of two fossiliferous limestone units with an intervening fossiliferous shale. Thickness ranges from 12 to 20 feet; present in southern part of area only, where it is below Hilltop Formation.

Pta

TALLANT FORMATION

Mostly fine- to medium-grained sandstone 10 to 60 feet thick overlain by shale 25 to 65 feet thick. Cut out by Vamoosa Formation in central part of area. Total thickness ranges from 0 to 100 feet.

Pbd

BARNSDALL FORMATION

Mostly fine-grained sandstone overlain by shale; may grade northward into Wann Formation. Thickness ranges from about 80 to about 200 feet.

Pwi

WANN FORMATION and IOLA LIMESTONE

Wann Formation, shale and fine- to medium-grained sandstone; thickness, 40 to 180 feet. Underlying *Iola Limestone.* mainly fine-grained calcareous sandstone and limestone with some shale; thickness, 15 to 20 feet.

Pch

CHANUTE FORMATION

Mainly fine- to medium-grained sandstone 3 to 20 feet thick, overlain by shale 20 to 80 feet thick. Total thickness ranges from about 25 to 90 feet.

Pdl

DEWEY LIMESTONE

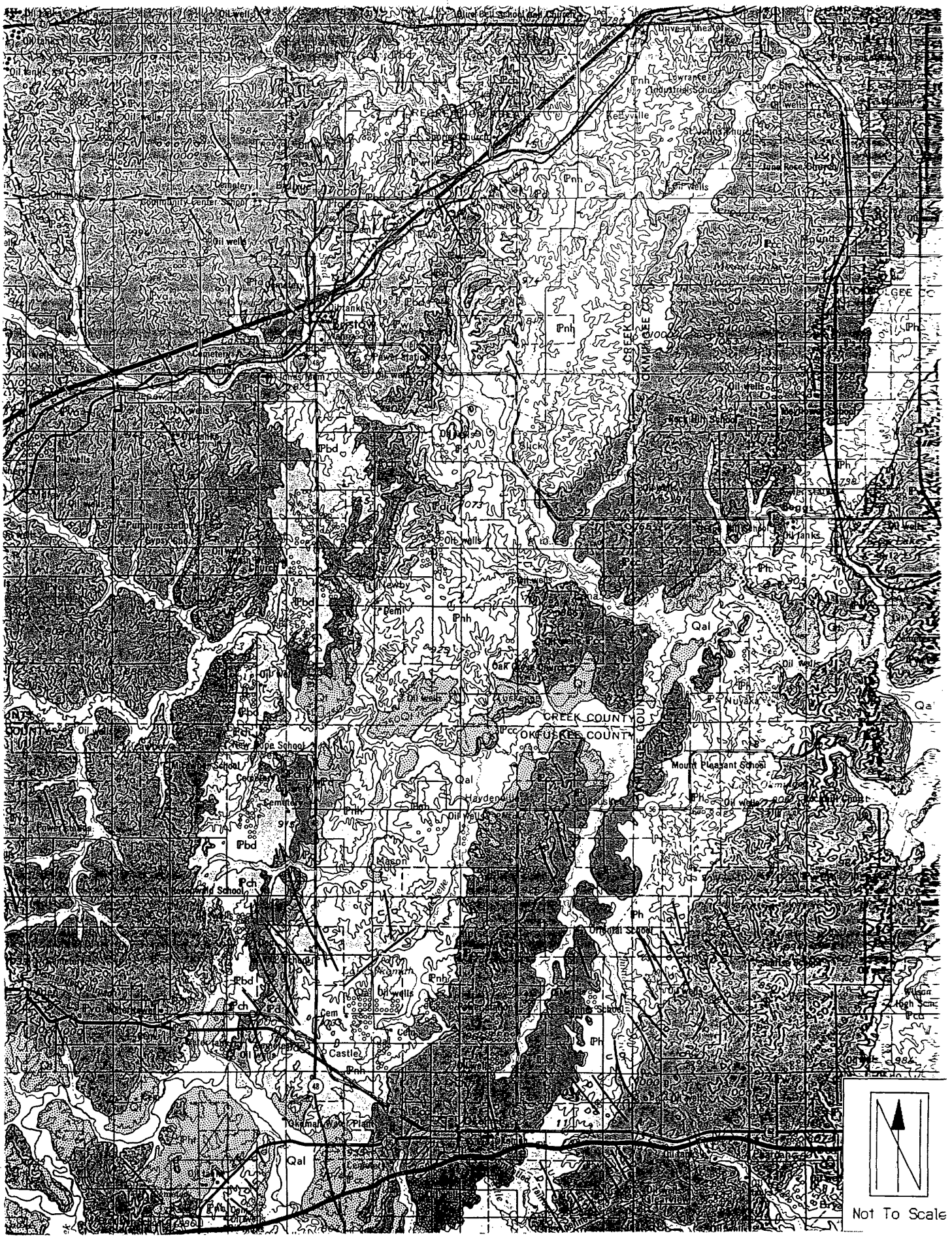
Mainly sandy limestone or calcareous sandstone containing limestone lenses 1.5 to 20 feet thick, overlain by shale 5 to 50 feet thick. Total thickness ranges from 20 to 60 feet.

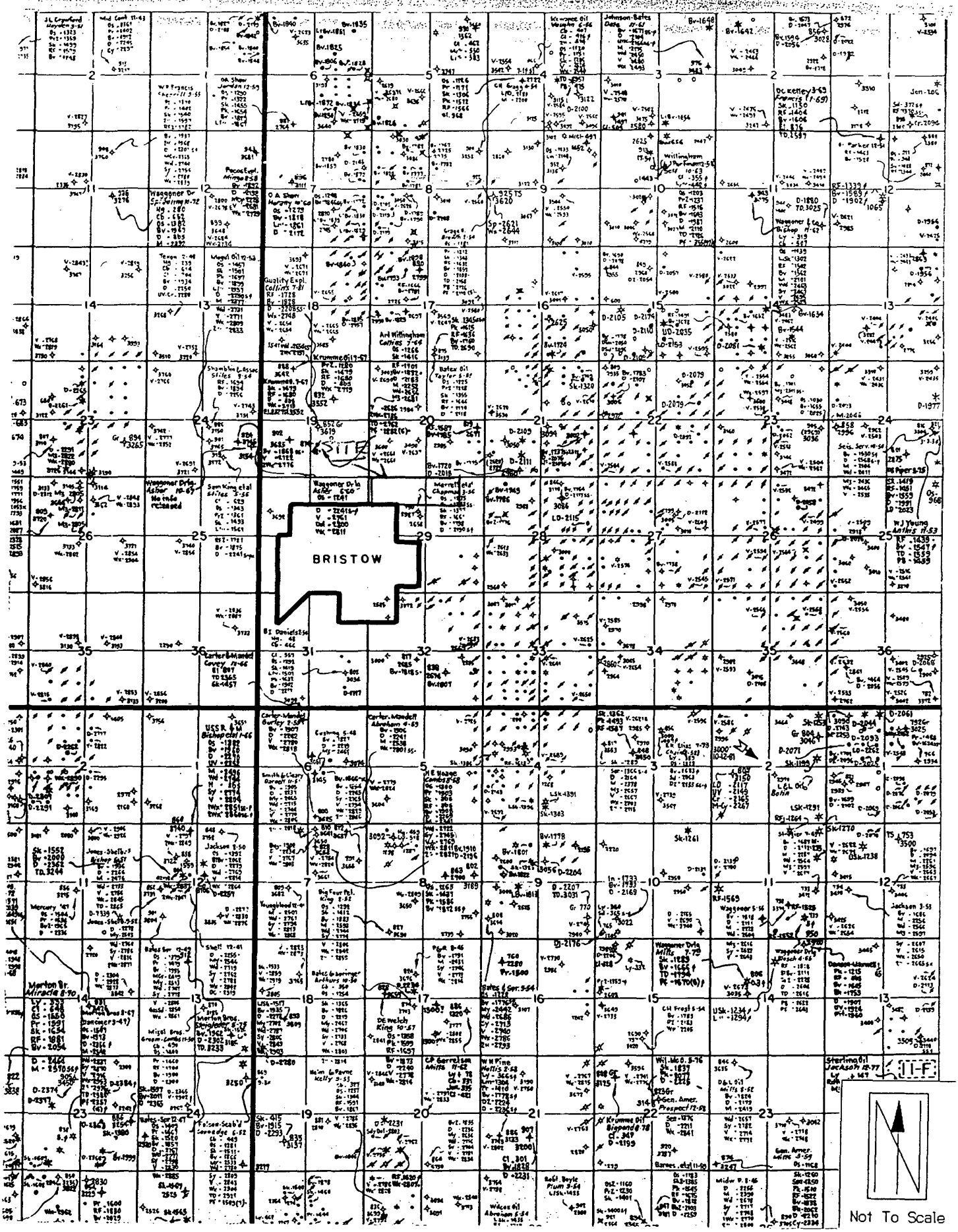
Pnh

NELLIE BLY FORMATION and HOGSHOOTER LIMESTONE

Nellie Bly Formation, mainly shale with

000289


CREEK COUNTY
OKFUSKEE COUNTY
Not To Scale


BRISTOW
Not To Scale

MARK S. COLEMAN
Executive Director



DAVID WALTERS
Governor

State of Oklahoma

DEPARTMENT OF ENVIRONMENTAL QUALITY

August 5, 1993

Mr. Scott Christenson
United States Geological Survey
202 Northwest 66th Street
Building 7
Oklahoma City, Oklahoma 73101

Dear Mr. Christenson:

The purpose of this letter is to request any information regarding the location and use of wells located in the areas listed on the attached page. The information provided by your office will be used to partly describe ground water targets preliminary site assessments conducted by the DEQ (Superfund), as authorized through a cooperative agreement with the U.S. Environmental Protection Agency. For your convenience, I have enclosed a sample of the type of information needed by your office.

Your assistance is greatly appreciated by me and our division. If you have any questions, please call me at 271-7049.

Sincerely,

Scott Stegmann

Scott Stegmann
Site Assessment Unit
Waste Management Division

Attachments

SITE NAME	Sections	Township	Range	County
AT & SF Roundhouse	1, 10-15, 21-28, 33-36	10 N	3 E	Pottawatomie
	5-10, 14-23, 26-35	10 N	4 E	
	1-4, 10-14	9 N	3 E	
	2-10, 16-18	9 N	4 E	
Ben Franklin Refining Company	9-17, 20-36	4 S	4 W	Jefferson
	7, 8, 16-21, 28-33	4 S	3 W	
	1-6, 8-16, 22-24	5 S	4 W	
	4-9, 17, 18	5 S	3 W	
Chicago, Rock Island, & Pacific Roundhouse	35, 36	11 N	3 E	Pottawatomie
	31-33	11 N	4 E	
	1-3, 9-16, 21-28, 33-36	10 N	3 E	
	3-10, 14-23, 26-34	10 N	4 E	
	1-3, 11, 12	9 N	3 E	
	3-8.	9 N	4 E	
Mercury Oil Refining Company	7, 17-21, 28-33	11 N	2 W	Oklahoma
	9-17, 19-36	11 N	3 W	
	4-8, 17, 18	10 N	2 W	
	1-17, 21-24	10 N	3 W	
Rock Island Roundhouse - Haileyville	10-16, 20-29, 32-36	5 N	16 E	Pittsburg
	7, 17-21, 28-33	5 N	17 E	
	1-5, 8-17, 21-24	4 N	16 E	
	4-9, 16-20	4 N	17 E	
10th Street Sludge	10-16, 21-28, 33-36	12 N	3 W	Oklahoma
	7-9, 15-22, 26-35	12 N	2 W	
	1-4, 9-15, 24	11 N	3 W	
	2-10, 16-19	11 N	2 W	
Tide Water Associated Oil Company	25, 26, 35, 36	18 N	6 E	Creek
	19-22, 26-36	18 N	7 E	
	1-3, 10-15, 23-26, 36	17 N	6 E	
	1-24, 26-34	17 N	7 E	
United States Smelting	13, 23-26, 35, 36	12 N	16 E	McIntosh
	4, 7-36	12 N	17 E	
	18, 19, 30, 31	12 N	18 E	
	1, 2, 12	11 N	16 E	
	1-18.	11 N	17 E	
	6	11 N	18 E	
Victory Metals	13, 22-27, 33-36	12 N	12 E	Okmulgee
	17-22, 26-35	12 N	13 E	
	1-4, 9-16, 22-26	11 N	12 E	
	2-11, 14-22, 28-30	11 N	13 E	
Wilcox Oil Company	1-2, 10-15, 22-27, 34-36	16 N	8 E	Creek
	3-11, 13-36	16 N	9 E	
	1-3, 11, 12	15 N	8 E	
	2-10, 17, 18	15 N	9 E	

LOCAL WELL NUMBER	OWNER	DEPTH DRILLED (FEET)	DEPTH OF WELL (FEET)	ALTITUDE OF LAND SURFACE (FEET)	WATER LEVEL (FEET)	WATER-LEVEL DATE	AQUIFER CODE	PRIMARY USE OF WATER
10N-03W-14 CDC 1	Moore, City of, Well 3	—	690	1230	—	—	318GRBR	P
10N-03W-14 DB 1	Moore, City of, Test Hole Loc B.	864	864	1240	—	—	317GBWG	U
10N-03W-14 DBB 1	Moore, City of, (Abandoned)	—	501	1250	160	11-10-42	318GRBR	P
10N-03W-15 ABB 1	Moore, City of, Well 9	—	800	1250	250	00-00-63	318GRBR	P
10N-03W-15 ACC 1	Moore, City of, Well 2	609	609	1240	215.12	07-23-45	318GRBR	P
10N-03W-15 CBA 1	Moore, City of, Well 6	—	735	1240	220	06-08-62	318GRBR	P
10N-03W-15 CDC 1	Moore, City of, Well 1	—	750.	—	—	—	317GBWG	P
10N-03W-16 AAA 1	Moore, City of, Well 31	—	—	—	—	—	317GBWG	P
10N-03W-16 ACA 1	Moore, City of, Well 20	—	750	—	—	—	317GBWG	P
10N-03W-17 BAA 1	Mustang, City of, Well 2	820	820	1222	447	09-08-86	317GBWG	P
10N-03W-17 CBC 1	Mustang, City of, Well 1	845	795	1190	423	11-22-83	317GBWG	P
10N-03W-17 DB 1	Mustang, City of Test Hole 1	891	891	1210	—	—	—	U
10N-03W-17 DDC 1	Mustang, City of, Test Hole M-11	1000	1000	1200	—	—	—	U
10N-03W-21 AAA 1	—	—	318.00	1228	284.26	03-04-87	318GRBR	U
10N-03W-21 AAA 2	—	—	93.00	—	—	—	112TRRCH	U
10N-03W-21 AC 1	Miller 1	8914.	8914	1217	—	—	318HNSS	Z
10N-03W-22 CBA 1	Moore, City of, Well 12	—	880	1214	—	03-31-84	318GRBR	P
10N-03W-22 CCC 1	Moore, City of, Well 21	805	795	1210	370	09-05-86	317GBWG	P
10N-03W-22 DAD 1	Moore, City of, Well 10	—	795	1210	400.00	08-04-87	318GRBR	P
10N-03W-23 ACA 1	Moore, City of, Well 19	—	—	1210	—	—	317GBWG	P
10N-03W-23 DCC 1	Moore, City of, Well 28	820	820	1225	449	09-05-86	317GBWG	P
10N-03W-23 DDD 1	Moore, City of, Well 23	—	—	1225	—	—	317GBWG	P
10N-03W-24 AAA 1	Moore, City of, Well 24	—	767	1185	—	—	317GBWG	P
10N-03W-24 ABB 1	Moore, City of, Well 15	—	734	1220	—	—	317GBWG	P
10N-03W-24 CAA 1	Moore, City of, Well 30	—	—	—	—	—	317GBWG	P
15N-08E-11 AAA 1	—	—	119	—	—	—	323TLNT	U
15N-09E-07 DDA 1	—	—	69.0	—	43.00	04-01-70	323BRDL	U
16N-08E-13 DCD 1	—	—	158	—	—	—	—	U
16N-08E-22 CCD 1	—	—	92.0	850	65	10-15-70	322VMOS	U
16N-08E-27 DDA 1	—	—	140	—	—	—	—	U
16N-09E-06 DA 1	Krumme Oil Co.	—	400	—	50	08-01-69	323WANN	N
16N-09E-06 DDD 1	—	—	120	—	—	—	323TLNT	U
16N-09E-08 CB 1	Krumme Oil Co.	—	325	—	60	11-01-65	323WANN	U
16N-09E-25 ABB 1	—	—	52.0	830	37.00	10-01-70	323DEWY	U
16N-09E-29 C 1	Bristow, City of	—	200	—	120	07-20-71	323BRDL	P
17N-07E-02 BAB 1	—	—	121	—	—	—	—	U
17N-07E-05 A 1	Krumme Oil Co.	—	1145	—	—	—	323BRDL	U
17N-07E-05 AD 1	Gulf Oil Co.	—	1138	—	649	06-01-62	323BRDL	U
17N-07E-06 ACB 1	Drumright, City of	—	260	930	85	07-23-71	322VMOS	P
17N-07E-08 CBC 1	Drumright, City of	—	403	900	75	07-23-71	322VMOS	P

Reference 12

MARK S. COLEMAN
Executive Director

RECEIVED
AUG - 9 1994
Oklahoma Water Resources Board

DAVID WALTERS
Governor

State of Oklahoma

DEPARTMENT OF ENVIRONMENTAL QUALITY

August 5, 1994

RECEIVED
AUG 2 9 1994
Superfund Program

Gary Glover, Hydrologist
Ground Water Division
Oklahoma Water Resources Board
6000 North Harvey
P.O. Box 150
Oklahoma City, Oklahoma 73101-50

Dear Mr. Glover:

The purpose of this letter is to request copies of domestic well logs for both **private** and **municipal** wells that are presumably active and are in the locations described on the attached sheet. Please include copies from your files, archive files, and permit application files; (copies of the actual well log are preferred, and most helpful since they contain local geological information).

Copies of the well logs may be sent to the Department of Environmental Quality (DEQ) through inter-agency mail. The information provided by your office will be used to describe ground water targets in preliminary site assessments being conducted by the DEQ (Superfund), as authorized through a cooperative agreement with the U.S. Environmental Protection Agency.

Your assistance is greatly appreciated by me and our division. If you have any questions, please call me at 271-7049.

Sincerely,

Scott Stegmann

Scott Stegmann
Site Assessment Unit
Waste Management Division

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	1-3, 11, 12	15 N	8 E	
	2-10, 17, 18	15 N	9 E	

3-4'

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

26623

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION SW ¼ of NW ¼ of SW ¼ of sec. 8 TWP. 15 N S; RGE 9 E/W IM ECM COUNTY Creek
FINDING LOCATION From Bristow City Limit S on 48 Hwy 3 Mi House on E. side of Rd.
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Clay	1	5	
Sand Rock	5	15	
Red Clay	15	25	
Sand Rock	25	55	
Water Sand	55	99	✓

RECEIVED
JAN 10 1992
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 12-3-91 Completed 12-5-91
Contractor Harvey Moore Sr.
Driller Harvey Moore Sr.
Diameter Hole 6 3/4 in. Total Depth 99 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4½ in.	12" ground ft.	99 ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 99 ft.
Amount Used: 4yd 1 T.

PERFORATION RECORD

Type/Size		
¼" Drilled	From 55 ft.	To 99 ft.
	From ft.	To ft.
	From ft.	To ft.

9. WELL TEST DATA

Static Water Level
Below Land Surface 60 ft.
Approximate Yield 30 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT

10 Ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # DPC 0140
Address Rt 1 Box 632 Phone #
Depew, Ok 74028
Signed Harvey Moore Date 1-4-92

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000298

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

26622

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION SW¼ of SW¼ of SE¼ of sec. 8 ; TWP. 15 N S; RGE 9 E/W/M (Circle One) ECM COUNTY Creek

FINDING LOCATION S. from Bristow on Hwy. 48 2 Mi, E ½ Mi S, on N side of Rd.
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Red Clay + Sand Rock	1	45	
Water Sand	45	75	
Blue Shale Sand Rock Red Clay - all intermitantly	75	135	

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☒ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-28-91 Completed 10-1-91
Contractor Harvey Moore
Driller Harvey Moore OP-0220
Diameter Hole 6¼ in. Total Depth 135 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4½ in.	12" ground ft.	135 ft.

Cement Grout Surface Seal? ☐ Yes ☒ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 135 ft.
Amount Used: appx 1 ton

PERFORATION RECORD

Type/Size ¼" drilled From 75 ft. To 135 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA

Static Water Level
Below Land Surface 32 ft.
Approximate Yield 5 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

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13. PLAT

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

OWC-0140
Name Harvey Moore License # WD197
Address Rt 1 Box 632 Phone # 367-3137
Pryor OK 74061
Signed Harvey Moore Date 10-5-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000299

3 1 4

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nary — Drill
nk — Driller

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STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

7/23/82

OWNER [redacted] ADDRESS Bristow Okla

PHONE _____

LEGAL DESCRIPTION OF WELL (EIM) (WIM)

SW ¼ of SW ¼ of SW ¼ of sec. 8 : TWP. 15 N S; Rge. 9 ECM; COUNTY Creek

TYPE OF WORK	4. PROPOSED / PAST USE	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic ☐ Irrigation ☐ Stock	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work ☐ Test	☐ Municipal ☐ Industrial ☐ Test	☒ Cable ☐ Other _____

6. LOG

Material	From	To	Saturated ✓
top soil	0	5	
quick sand	5	15	
Sand rock	15	30	
Water Sand.	30	51	

7. NEW WELL CONSTRUCTION DATA

Dates: Started 1-23-84 Completed 1-24-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¾ in. Total Depth 51 ft.

CASING RECORD

Diameter	From	To
4½ in.	18" ↑ ground ft.	51 ft.
_____ in.	_____ ft.	_____ ft.

Surface Seal: ☒ Yes ☐ No Type: Steel pipe & Portland cement
Depth of Seal: 15 ft.
Gravel Packed:
Gravel Packed From -1' ft. to 51 ft.
Amount Used: _____

PERFORATION RECORD

Type _____ From 30 ft. To 51 ft.
Size _____ From _____ ft. To _____ ft.
" _____ From _____ ft. To _____ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 12 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality good

BAILER TEST

Drawdown _____ ft. After Pumping _____ hrs. At 20 gpm.
Size of Bailer: 10 gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT

10 AC.

SW ¼ of SW ¼ of SW ¼ of SEC 8 :
WP 15 N S; RGE 9 EIM WIM ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD 170
Address Rt 1 Depew Okla 74028 Phone # 918-324-5465
Signed Allen Baker Date 1-24-84

USE ADDITIONAL SHEETS IF NECESSARY

FORM 1[illegible]

000300

5-4

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____ (Official Use Only)

#12351

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla. PHONE _____

2. LEGAL DESCRIPTION OF WELL (EIM) (Circle One) WIM

SE ¼ of SW ¼ of SE ¼ of sec. 8 ; TWP 15 (N) S; RGE 9 ECM; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other _____
☐ Test/Monitoring	☐ Test. Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top soil	0	3	
Quick Sand	3	30	
Sand Rock	30	37	
Water Sand	37	65	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 8-26-87 Completed 8-28-87
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¼ in. Total Depth 65 ft.

CASING RECORD

	Diameter	From	To
Inside	4½ in.	12" ↑ ground ft.	65 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 30 ft.
GRAVEL PACKED: Cement of Steel Pipe
Gravel Packed From Ground level ft. to 65 ft.
Amount Used: approx 3/4 Ton
30' Steel pipe - Cement plug at bottom of pipe + at top of pipe

PERFORATION RECORD

Type	Size		
		From 37 ft. To 65 ft.	
		From ____ ft. To ____ ft.	
		From ____ ft. To ____ ft.	

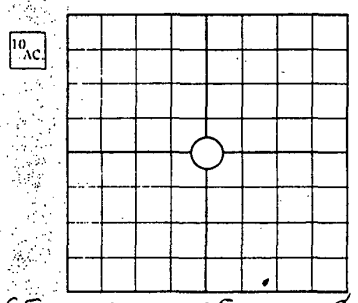
9. WELL TEST DATA

Static Water Level Below Land Surface 10 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 30 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SE ¼ of SW ¼ of SE ¼ of SEC 8 ;
TWP 15 S; RGE 9 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew Okla 74028 Phone (918) 324-5468
Signed Allen Baker Date 8-28-87

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000301

3-4

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MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

#12350

OWNER (b) (6) ADDRESS (b) (6)

PHONE _____

LEGAL DESCRIPTION OF WELL
EIM (Circle One)
WIM
ECM; COUNTY Creek

NW ¼ of SW ¼ of SE ¼ of sec. 7 ; TWP. 15N N S; RGE 9E

TYPE OF WORK
☐ New Well ☐ Plugging
☐ Reconditioning Work
☐ Test/Monitoring

4. USE
☒ Domestic
☐ Stock
☐ Test Monitoring

NON-DOMESTIC
☐ Irrigation
☐ Municipal
☐ Industrial
☐ Commercial
☐ Other

5. DRILLING METHOD
☐ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other _____
☑ Air

LOG

Material	From	To	Saturated
p soil	0	1	
ay	1	15	
nd rock	15	30	2gpm
ay	30	40	
nd rock	40	50	
ter sand	50	80	13gpm

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7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-10-85 Completed 9-10-85
Contractor Knott's Water Well Drilling
Driller Dale Knott
Diameter Hole 8 in. Total Depth 80 ft.

CASING RECORD

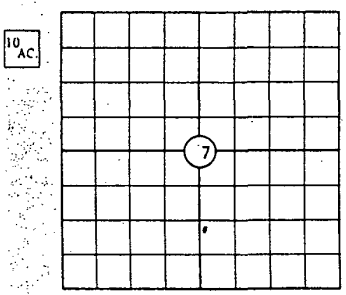
	Diameter		From		To	
Inside	5	in.	80	ft.	+2	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: portland Depth of Seal: 10 ft.
GRAVEL PACKED:
Gravel Packed From 80 ft. to 10 ft.
Amount Used: 3/4T

PERFORATION RECORD

Type Size				
1/32" slotted	From 60	ft. To 77	ft.	
	From	ft. To	ft.	
	From	ft. To	ft.	

1. PLAT



NW ¼ of SW ¼ of SE ¼ of SEC 7 ;
N (Circle One)
WP 15N S; RGE 9E EIM,WIM,ECM

2. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 30 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 15 gpm.
100 mg/l salt; 10g hard;

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name kathleen Knott License # WD 74
Address Rt. 1, Terlton, Ok. 74081 Phone # WS 74

Signed Kathleen Knott Date 9-15-85

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000302

2-3

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

#22621

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION SW ¼ of NW ¼ of NW ¼ of sec. 5 ; TWP. 15N S; RGE 9 E/W/M (Circle One) COUNTY Creek

FINDING LOCATION From County Barn on Hwy 48 in Bristow 1st House on E side of road
Blocks or distance(s) from given point(s).

3. TYPE OF WORK
- [x] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

4. USE
- [x] Domestic
- [ ] Stock
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [ ] Fluid Rotary
- [ ] Rev. Rotary
- [x] Cable
- [ ] Other
- [ ] Air Rotary
- [ ] H.S. Auger

6. LOG

Material	From	To	Saturated
Top Soil	0	1	
Sand Rock	1	14	
Red Clay	14	20	
Water Sand	20	50	—

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Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
[ ] Yes [ ] No Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 8-16-91 Completed 8-18-91
Contractor Harvey Moore OP.0220
Driller Harvey Moore
Diameter Hole 6½ in. Total Depth 50 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	____ in.	____ ft.	____ ft.
Well Casing	4½ in.	12" ground ft.	50 ft.

Cement Grout Surface Seal? [ ] Yes [ ] No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 20 ft. to 50 ft.
Amount Used: appx 4½ T

PERFORATION RECORD
Type/Size: ¼" drilled From 20 ft. To 50 ft.
From ____ ft. To ____ ft.
From ____ ft. To ____ ft.

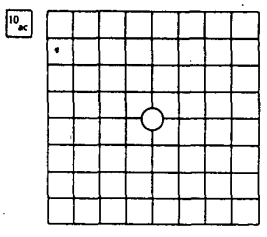
9. WELL TEST DATA
Static Water Level Below Land Surface 15 ft.
Approximate Yield 30 gpm.
If Artesian: Flows ____ gpm.

10. PUMP INFORMATION
Pump Type ____
Power Source ____
Rated Capacity ____ gpm.
Depth of Bowls or Cylinder ____ ft.

11. PLUGGING DATA
Date Plugged ____
Backfilled With ____ Material To ____ ft.
Grouted or Cemented From ____ Ft. To ____ ft.

12. RECONDITIONING WORK
Date Completed ____
Replaced Casing From ____ ft. To ____ ft.
Replaced Screen From ____ ft. To ____ ft.
Deepened Well From ____ ft. To ____ ft.
Redeveloped Well By ____

13. LOCATION



14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 147 DFC-0140
Address Rt 1 Box 632 Phone # 367-3637
Signed Harvey Moore Date 8-21-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

21-3

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

23288

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER (b) (6) [redacted] PHONE (b) (6) [redacted]
(EIN) (Circle One) WIM

2. LEGAL DESCRIPTION SW ¼ of SW ¼ of SW ¼ of sec. 6 TWP. 15 N S. RGE 9 ECM COUNTY Cooke

FINDING LOCATION S. from Bristow on 48 Hwy. 3 Mi. turn W. go 1 Mi W
Blocks or distance(s) from given point(s).
look for trailer on R. (N.) side of road.

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. FORMATIONS

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	10	
Sand Rock	10	18	
Red Clay	18	25	
Sand Rock	25	35	
Water Sand	35	45	✓
Red Clay	45	55	
Water Sand	55	66	✓

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started Oct 2 '90 Completed Oct 3 1990
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6 3/4 in. Total Depth 66 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	____ in.	____ ft.	____ ft.
Well Casing	4 1/2 in.	12" grout ft.	66 ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 66 ft.
Amount Used: 1/2 Ton

PERFORATION RECORD

Type/Size			
1/4" 4 1/2" Drilled	From 35 ft.	To 45 ft.	
	From 55 ft.	To 66 ft.	
	From ____ ft.	To ____ ft.	

9. WELL TEST DATA

Static Water Level
Below Land Surface 25 ft.
Approximate Yield 11 gpm.
If Artesian: Flows ____ gpm.

10. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

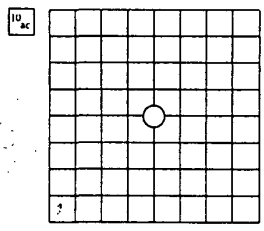
11. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD197
Address RT 1 Box 632 Phone # 367-5137
Depew, Ok
Signed Harvey Moore Date 10-6-90

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000304

White – Water Resources Board
Canary – Drillers Copy
Pink – Drillers Copy

12334

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

1. OWNER [redacted] ADDRESS Drew

PHONE _____

2. LEGAL DESCRIPTION OF WELL (EIM) WIM

NE ¼ of SE ¼ of SE ¼ of sec. 12 ; TWP. 15 (N) S; Rge. 8 ECM; COUNTY Creek

3. TYPE OF WORK	4. PROPOSED / PAST USE	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic ☐ Irrigation ☐ Stock	☒ Rotary ☐ Rev. Rotary
☐ Reconditioning Work ☐ Test	☐ Municipal ☐ Industrial ☐ Test	☐ Cable ☐ Other

6. LOG

Material	From	To	Saturated ✓
Top Soil	0	3	
Sand Rock	3	20	
Red Bed	20	40	
limestone	40	42	
Red Bed	42	50	
lime stone	50	51	
Red Bed	51	84	
Shale	84	98	
Sand	98	115	✓
Red Bed	115	123	

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7. NEW WELL CONSTRUCTION DATA

Dates: Started 11-7-85 Completed 11-7-85
Contractor Spess Water Well
Driller Gary Spess
Diameter Hole 8 in. Total Depth 123 ft.

CASING RECORD

Diameter	From	To
5 in.	2' Above GL ft.	123 ft.
in.	ft.	ft.

Surface Seal: ☒ Yes ☐ No Type: Cement
Depth of Seal: 15 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 123 ft.
Amount Used: 1½ Yards

PERFORATION RECORD

Type 48" Slots From 113 ft. To 123 ft.
Size ⅛" From ft. To ft.
" From ft. To ft.

8. WELL TEST DATA

Static Water Level Below Land Surface ft.
If Artesian: Flows gpm.
Water Temp. °c/f Quality

BAILER TEST

Drawdown ft. After Pumping hrs. At gpm.
Size of Bailer: gal.

PUMPING TEST

Drawdown ft. After Pumping hrs. At gpm.

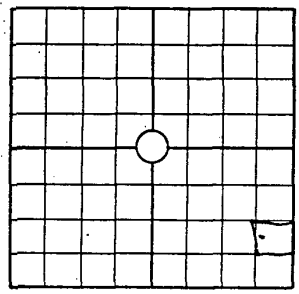
9. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed
☐ Replaced Casing From ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

11. PLAT



NE ¼ of SE ¼ of SE ¼ of SEC 12 ;
TWP 15 (N) S; RGE 8 (EIM,WIM,ECM)

12. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Spess Water Well Serv License # WD 223
Address Mannford Okla. Phone # 918-865-421
Signed [signature] Date 11-8-85

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000305

3 - 4

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

12335

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla.
RR. PHONE —

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM ECM
SE ¼ of NE ¼ of SE ¼ of sec. 12 ; TWP 15 N ; RGE 8 E ; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☒ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other _____
☐ Test/Monitoring	☐ Test Monitoring	☐ Industrial	☒ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
Sand Rock	0	22	
Red Bed	22	30	
Limestone	30	31	
Red Bed	31	53	
Sand	53	65	
Shale	65	85	
Water Sand	85	95	✓
Shale	95	105	

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Oklahoma W... Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 10-31-85 Completed 10-31-85
Contractor Spess Water Well Service
Driller Gary Spess
Diameter Hole 8 in. Total Depth 105 ft.

CASING RECORD

	Diameter		From		To	
Inside	5	in.	2' Above GL	ft.	105	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: Cement Depth of Seal: 15 ft.
GRAVEL PACKED:
Gravel Packed From ~~105~~ 15 ft. to 105 ft.
Amount Used: 2000#

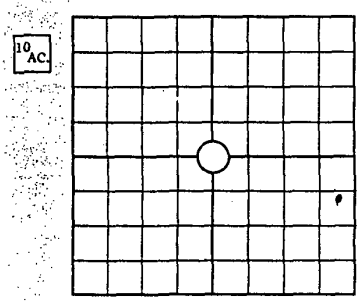
PERFORATION RECORD

Type/Size				
0.125	From	95	ft. To	105 ft.
	From		ft. To	ft.
	From		ft. To	ft.

9. WELL TEST DATA
Static Water Level Below Land Surface _____ ft.
If Artesian: Flows _____ gpm.
Approximate Yield _____ gpm.

10. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SE ¼ of NE ¼ of SE ¼ of SEC 12 ;
TWP 15 N S; RGE 8 E (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Gary Spess License # WD 225
Address Rt 3 Box 140 Mounds Phone # 918-865-4266
Signed _____ Date _____

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000306

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

26618

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER [redacted] PHONE [redacted]
(FILL (Circle One) WTM)

2. LEGAL DESCRIPTION NW ¼ of SW ¼ of NW ¼ of sec. 12 ; TWP. 15 N S; RGE 8 E ECM COUNTY Creek

FINDING LOCATION From Bristow Airport go S. ¼ Mi. Trailer House on L. side of Rd.
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

LITHOLOGY

Material	From	To	Saturated
Top Soil	0	1	
Sand Rock	1	20	
Red Clay	20	40	
Red Rock	40	45	
Red Clay	45	50	
Red Rock	50	55	
Red Clay	55	70	
Red Rock	70	75	
Clay	75	120	
Water Sand	120	140	✓
Red Clay	140	150	

RECEIVED
JAN 29 1992
Oklahoma Water Resources Board

PLAT

10 ac

LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No. _____

6. NEW WELL CONSTRUCTION DATA

DATES: Started 12-5-91 Completed 12-7-91
Contractor Harvey Moore Sr.
Driller Harvey Moore Sr.
Diameter Hole 6 3/4 in. Total Depth 150 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4½	in.	12" ground	ft.	150	ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 150 ft.
Amount Used: 4sx 1½ T

PERFORATION RECORD

Type/Size				
¼" drilled	From	120 ft.	To	140 ft.
	From	ft.	To	ft.
	From	ft.	To	ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 105 ft.
Approximate Yield 15 gpm.
If Artesian: Flows _____ gpm.

10. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

11. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore Sr. License # DPC 0140
Address Rt 1 Box 632 Phone # 367-3137
Pegaw, Ok 74038
Signed Harvey Moore Date 1-3-92

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

5-4

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

30242

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION SW ¼ of SW ¼ of NW ¼ of sec. 4 TWP. 16 N S RGE 9E WIM EIM (Circle One) ECM COUNTY Creek

FINDING LOCATION NE Bristow to State Barn on 66 go NE to 1st RD on R No 1/4 mi S E side of RD
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. FORMATION RECORD

Material	From	To	Saturated
Red Clay	1	200	
Sandstone			
Limestone			
Water Sand	200	220	✓

JAN 18 1994
Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA
DATES: Started 9-18-93 Completed 9-20-93
Contractor Harvey Moore Sr.
Driller Harvey Moore Sr.
Diameter Hole 6 3/4 in. Total Depth 220 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4 1/2 in.	12" ft.	220 ft.

Cement Grout Surface Seal? ☐ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 10 ft.
GRAVEL PACK:
Gravel Packed From 10 ft. to 220 ft.
Amount Used:

PERFORATION RECORD
Type/Size 1/4" drilled From 200 ft. To 220 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA
Static Water Level
Below Land Surface ft.
Approximate Yield 15 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION
Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK
Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT
10 ac

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore Sr. License # DP 0140
Address Rt 1 Box 632 Depew 74028 Phone # 367-3137
Signed Harvey Moore Sr. Date 11-20-93

Form 424-0887
USE ADDITIONAL SHEETS IF NECESSARY

000308

3-41

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12415

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1. OWNER [redacted] ADDRESS [redacted]
Bristow OK 74010 PHONE [redacted]

2. LEGAL DESCRIPTION OF WELL EIM (Circle One) WIM
E ¼ of NW ¼ of NW ¼ of sec. 4 ; TWP. 16 N. S; RGE 9E ECM; COUNTY Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work
☐ Test/Monitoring

4. USE
☑ Domestic
☐ Stock
☐ Test Monitoring

NON-DOMESTIC
☐ Irrigation
☐ Municipal
☐ Industrial
☐ Commercial
☐ Other

5. DRILLING METHOD
☐ Rotary ☐ Rev. Rotary
☑ Cable ☐ Other _____
☐ Air

6. LOG

Material	From	To	Saturated
Top Soil	0	2	
Red Clay	2	6	
Sand Rock	6	15	
Red Clay	15	24	
Wate Sand	24	65	✓
Red Clay	65	82	

RECEIVED
JUN 15 1987
Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 6-8-87 Completed 6-9-87
Contractor Mickey Moore
Driller _____
Diameter Hole 6 1/2 in. Total Depth 82 ft.

CASING RECORD

	Diameter		From	To
Inside	4 1/2 in.	18"	Ground ft.	82 ft.
Outside	in.		ft.	ft.

Cement Grout Surface Seal: ☐ Yes ☐ No
Type of Surface Seal Portland Cement Depth of Seal: 10 ft.
GRAVEL PACKED:
Gravel Packed From 0 ft. to 82 ft.
Amount Used: 1 sack

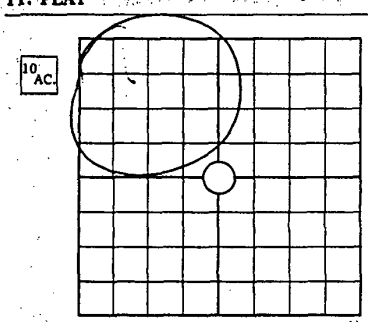
PERFORATION RECORD

Type	Size				
		From 20	ft. To 65	ft.
		From	ft. To	ft.
		From	ft. To	ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 24 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 10 gpm.

10. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



E ¼ of NW ¼ of NW ¼ of SEC 4 ;
TWP 16 N S; RGE 9E (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Mickey Moore License # WD197
Address RT 1 Box 632 Phone # 367-3133
Depew OK 74028
Signed Mickey Moore Date 6-11-87

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000309

3-4'

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

#12419

STATE OF OKLAHOMA
MULTI-PURPOSE WATER WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

NOTICE BEFORE USE OF THIS WELL: It shall be the responsibility of the well owner to have the water tested for quality by any Oklahoma Water Resources Board certified laboratory and supply copy of these results to the Oklahoma Water Resources Board.

1. WELL OWNER [redacted] PHONE
2. LEGAL DESCRIPTION SE ¼ of SW ¼ of SE ¼ of sec. 5 ; TWP. 16 N S; RGE 9 E/W/M (Circle One) COUNTY Creek

FINDING LOCATION
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
top soil	0	3	
Clay	3	12	
shale	12	35	
limestone	35	40	
water sand	40	47	✓
red shale	47	74	

RECEIVED
APR 13 1988
Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA
DATES: Started 3-30-88 Completed 4-5-88
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 ½ in. Total Depth 74 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4 ½ in.	18" Aground ft.	74 ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 10 & 25 ft.
GRAVEL PACK:
Gravel Packed From 10 ft. to 74 ft.
Amount Used: approx 1 Ton

PERFORATION RECORD
Type/Size 25 & 50
From 25 ft. To 50 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 30 ft.
Approximate Yield gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION
Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK
Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT
10 ac

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 - Depew 74028 Phone # 324-5465
Signed Allen Baker Date 4-5-88

Form 424-0487

USE ADDITIONAL SHEETS IF NECESSARY

000310

5-4

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

#12420

1. OWNER (b) (6) ADDRESS (b) (6)
BRISTOW OK 74012 PHONE (b) (6)

2. LEGAL DESCRIPTION OF WELL
EIM (Circle One)
SW ¼ of SE ¼ of NE ¼ of sec. 6 ; TWP 16 N RGE 9 WIM
ECM; COUNTY CREEK

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test Monitoring	☐ Industrial	☒ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
SURFACE	0	3	
CLAY	3	6	
SAND ROCK	6	19	
RED CLAY	19	24	
LIME	24	28	
RED CLAY (GGPM)	28	37	✓
LIME	37	38	
RED CLAY	38	43	
SHALE	43	53	
LIME	53	57	
SHALE	57	65	
RED CLAY	65	127	
LIME	127	130	
RED CLAY	130	146	
LIME	146	149	
SHALE	149	155	
SAND	155	171	✓
LIME	171	182	
RED CLAY	182	188	
LIME	188	193	
WATER SAND	193	210	✓
SHALE	210	213	

RECEIVED
NOV 8 1985
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 20 OCT 85 Completed 22 OCT 85
Contractor WAGNER WATER WELLS
Driller CK WAGNER
Diameter Hole 6 ½ in. Total Depth 213 ft.

CASING RECORD

	Diameter		From		To	
Inside	4 ½	in.	0	ft.	213	ft.
Outside	6	in.	0	ft.	19	ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: _____ Depth of Seal: 19 ft.
GRAVEL PACKED:
Gravel Packed From 65 ft. to 213 ft.
Amount Used: 150 GAL

PERFORATION RECORD

Type Size				
¼" SLOT	From	133 ft.	To	213 ft.
	From	ft.	To	ft.
	From	ft.	To	ft.

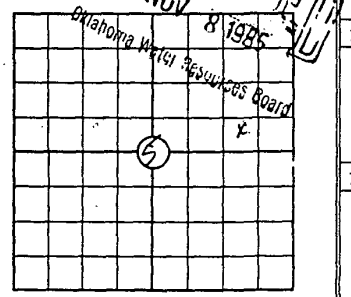
9. WELL TEST DATA

Static Water Level Below Land Surface 62 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 10 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SW ¼ of SE ¼ of NE ¼ of SEC 5 ;
WP 16 N RGE 9 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name CK WAGNER License # WD 209
Address SAPULPA OK Phone # 224-3257
Signed CK Wagner Date 29 OCT 85

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000311

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

3-41

#12421

1. OWNER (b) (6) ADDRESS Kingston Okla PHONE _____

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM ECM; COUNTY Creek

NW ¼ of NW ¼ of SW ¼ of sec. 5 ; TWP 16 S; RGE 9

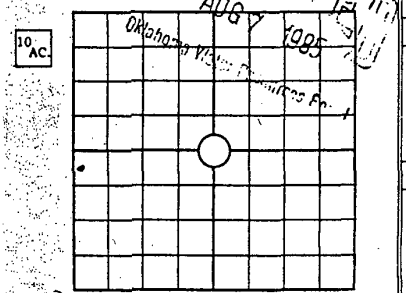
3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other _____
☐ Test/Monitoring	☐ Test Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top Soil	0	5	
Clay	5	10	
Sand rock	10	30	
Water Sand	30	35	✓
Red bed	35	45	
Shale	45	55	
Red bed	55	70	
Shale	70	80	
lime	80	82	
Shale	82	90	
lime	90	94	
Shale	94	125	
Red bed	125	140	
Water Sand	140	150	✓
Red bed	150	156	

RECEIVED AUG 7 1985

11. PLAT



NW ¼ of NW ¼ of SW ¼ of SEC 5 ; TWP 16 N S; RGE 9 (Circle One) EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 7-22-85 Completed 7-23-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 156 ft.

CASING RECORD

	Diameter		From		To	
Inside	4 ½	in.	18" Ground	ft.	156	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 10 ft.
GRAVEL PACKED:
Gravel Packed From 10 ft. to 156 ft.
Amount Used: Approx 1½ ton

PERFORATION RECORD

Type/Size

From 116 ft. To 156 ft.
From 30 ft. To 70 ft.
From _____ ft. To _____ ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 26 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 9 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD 170
Address Rt 1 Depew Okla Phone # 918-324-5465
Signed Allen Baker Date 9/23-85

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000312

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

MULTI-PURPOSE WATER WELL REPORT

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

#12423

Tulsa

1. OWNER (b) (6) ADDRESS Bristow Okla. 74010

(b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION OF WELL

EIM
WIM
ECM: COUNTY Creek

SW ¼ of NE ¼ of NE ¼ of sec. 5 ; TWP. 16N S; Rge. 9E

3. TYPE OF WORK
☒ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☒ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☐ Rotary ☐ Rev. Rotary
☒ Cable ☐ Other _____

6. LOG

Material	From	To	Saturated ✓
top soil	0	10	
Clay	10	20	
Quick sand	20	30	
Clay	30	45	
Water sand	45	55	
Lime Shale	55	64	

RECEIVED
JUL 25 1983
Oklahoma Water Resources Board

RECEIVED
JUL 15 1983
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA

Dates: Started 6-20-83 Completed 6-21-83
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4" in. Total Depth 64 ft.

CASING RECORD

Diameter		From		To	
4½	in.	18" above ground	ft.	64	ft.
	in.		ft.		ft.

Surface Seal: ☒ Yes ☐ No Type: Steel Pipe - Cement
Depth of Seal: 30 ft.
Gravel Packed:
Gravel Packed From 20 ft. to 64 ft.
Amount Used: Approx. 1800 #

PERFORATION RECORD

Type _____ From _____ ft. To _____ ft.
Size 4½" PVC From 45 ft. To 55 ft.
" _____ From _____ ft. To _____ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 45 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality Good

BAILER TEST

Drawdown _____ ft. After Pumping _____ hrs. At 8 gpm.
Size of Bailer: 10 gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT

10 AC.

SW ¼ of NE ¼ of NE ¼ of SEC 5 ;
TWP 16 N S; RGE 9E EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address RR 1 Depew OK 74028 Phone # 918-324-5466
Signed Allen Baker Date 6-21-83

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000313

3-4'

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

#12424

1. OWNER (b) (6) ADDRESS Kiefer Okla - PHONE _____

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM ECM; COUNTY Creek

NE ¼ of SW ¼ of SE ¼ of sec. 5 ; TWP. 16 (N) S; RGE 9

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other _____
☐ Test/Monitoring	☐ Test Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top Soil	0	8	
Clay	8	20	
Sand Rock	20	30	
Water Sand	30	42	
lime	42	44	
Shale	44	50	
lime	50	51	
Shale	51	88	
Red bed	88	135	
Water Sand	135	150	✓
Red bed	150	165	
Shale	165	173	
Red bed	173	180	
Water Sand	180	225	

MAY 8 1985

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 4-10-85 Completed 4-11-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 225 ft.

CASING RECORD

	Diameter		From		To	
Inside	4½	in.	2' Ground	ft.	225	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: Approx 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 225 ft.
Amount Used: Approx 2½ ton

PERFORATION RECORD

Type/Size
From 135 ft. To 225 ft.
From _____ ft. To _____ ft.
From _____ ft. To _____ ft.

9. WELL TEST DATA

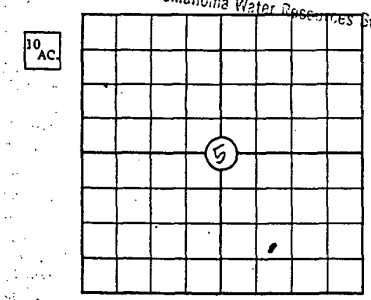
Static Water Level Below Land Surface 100 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 18 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

Oklahoma Water Resources Board



NE ¼ of SW ¼ of SE ¼ of SEC 5 ;
TWP 16 (N) S; RGE 9 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 223 Depew OK 74028 Phone # 918-324-5416
Signed Allen Baker Date 4-11-85

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000314

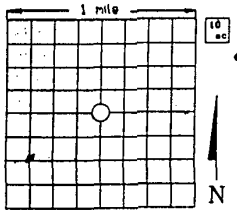
3 L 4'

#29931

MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

Please plot well location



Legal Description

NE 1/4 NW 1/4 SW 1/4 of Sec. 5 Twp. 16 N Rge. 9 E

County Craig Well No:

Well Owner (b) (6) Phone (b) (6)

Address (b) (6) (Vinita) OK

Finding location N 3/4 Mi on 48 from 48 & 66 junction on west side of rd.

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other Water Well

G.W. Use

- ☑ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☑ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	5	
Soft Rock	5	7	
Red Clay	7	12	
Hard Rock	12	25	←
Red Clay	25	50	

I think this is self explanatory.

JUL 30 1993

NOV - 5 1993

Oklahoma Water Resources Board

*See Pump Installers Form On Back

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to exceed 3 acres.)

Permit No: _____

New Boring or Well Construction Data

Date: Started 5-31-93 Completed 5-31-93

Firm Moore Water Wells

Operator Harry Moore

Type of Construction ☐ Open Hole ☑ Cased Hole

Hole Diameter 6 3/4 inches total depth 50 feet

Hole Diameter _____ inches total depth _____ feet

CASING RECORD

	diameter		from ground	to
Surface pipe		inches	feet	feet
Well casing	4 1/2	inches	12' feet	50 feet
Well casing		inches	feet	feet
Well casing		inches	feet	feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from	to
14" Slot	12 feet	25 feet
	feet	feet
	feet	feet

GRAVEL PACK

Type and Size	from	to
1/4 Gravel	12' feet	50 feet
	feet	feet
	feet	feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from	to
Type of Surface Seal Portland	0 feet	12 feet
Aquifer Seal Type	feet	feet
	feet	feet

HYDROLOGIC DATA

First Water Zone Encountered 12 ft.

Approximate Yield 20 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged _____

Backfilled From _____ feet _____ feet Type _____

Cement Grouted From _____ feet _____ feet

Reconditioning Work

Replaced Casing/Screen From _____ feet _____ feet

Deepened Well From _____ feet _____ feet

Redeveloped Well By

Certification

The work described above was done under my supervision. This report is correct to the best of my knowledge.

Name Harry Moore Jr. Lic. No. DPC 0140

Address Pt 1 Box 632 Dyas Phone 367-3137

Signed Harry Moore Jr. Date 6-31-93

000315

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____ (Official Use Only)

3-41

12425

1. OWNER (b) (6) ADDRESS Bristow Okla PHONE _____

2. LEGAL DESCRIPTION OF WELL (EIM) WIM ECM (Circle One)
SW ¼ of SW ¼ of SW ¼ of sec. 6 ; TWP. 16 (N) S; RGE 9 ; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other _____
☐ Test/Monitoring	☐ Test Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
Clay	0	2	
Sand rock	2	18	
Clay	18	28	
Water sand	28	35	
red bed	35	85	
Water sand	85	90	
red bed	90	110	
iron rock	110	120	
red bed	120	125	
iron rock	125	155	
clay	155	169	
Blue Shale	169	170	

RECEIVED
APR 3 1986
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 3-4-86 Completed 3-6-86
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 4½ in. Total Depth 170 ft.

CASING RECORD

	Diameter	From	To
Inside	4½ in.	4' Aground ft.	120 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 170 ft.
Amount Used: Approx 1½ ton

PERFORATION RECORD

Type	Size		
		From 25 ft. To 90	ft.
		From ____ ft. To ____	ft.
		From ____ ft. To ____	ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 20 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 5 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.

SW ¼ of SW ¼ of SW ¼ of SEC 6 ;
TWP 16 (N) S; RGE 9 (Circle One) EIM WIM ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address RT 1 Depew Okla 74028 Phone # 918-324-5466
Signed Allen Baker Date 3-6-86

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000316

3-41

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

#24499

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER (b) (6) PHONE
2. LEGAL DESCRIPTION SE ¼ of SE ¼ of SE ¼ of sec. 6 ; TWP. 16 N S; RGE 9 E W (Circle One) M ECM COUNTY Creek
FINDING LOCATION From Bristow Hwy 48 & 66 juction go ½ Mi. N. house on L. side rd, in a low area
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. FORMATIONS PENETRATED

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	20	
Red Clay	20	60	
Rock	60	61	
Red Clay + Blue Shale	61	140	
Sand Rock	140	155	
Red Clay + Blue Shale	155	230	
Water Sand	230	245	✓
Red Clay	245	251	

APR 8 1991
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 3-21-91 Completed 3-26-91
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6 3/4 in. Total Depth 251 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4½	in.	12" Ground	ft.	251	ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 251 ft.
Amount Used: 6yd 2¼ Ton

PERFORATION RECORD

Type/Size			
1/4" Drilled	From 230 ft.	To 245	ft.
	From ft.	To	ft.
	From ft.	To	ft.

9. WELL TEST DATA

Static Water Level
Below Land Surface ft.
Approximate Yield gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

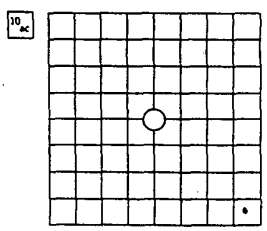
11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 157
Address Rt 1 Box 632 Phone # 367 3137
Depew, Ok 74028
Signed Harvey Moore Date 3-28-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000317

3-4

69.251

25748

WELL INFORMATION

(File one copy for each well within 60 days after completion of well)

Owner Krumme Oil Company

Address Box 749, Bristow, Oklahoma 74010

Well No. 5 ~~1~~ in NE ¼ of SE ¼ of Section 6 Township 16N Range 9E

Creek County Elevation 886 Grd. ft.

Distance from nearest town or highway junction:

3½ miles north of Bristow on Highway 48

Intended use (underline): Irrigation, Municipal, Industrial, Other Waterflood

GENERAL DRILLING INFORMATION

(Fill in completely with assistance of well driller)

Contractor Company Tools Address Box 749, Bristow, Okla. 74010

Driller Bill Polm Address 401 E. 8th St. Bristow, Oklahoma 74010

Dates: Started July 25, 1969 Completed August 6, 1969

Type of Rig: Cable tool Yes Rotary Other

Size of Hole 10" hole to 107 ft; 8" hole to 400 ft. Total Depth 400 ft.
(Example: 8 in. to 65 ft.)

Water encountered at: 35', 80' ft. 130', 210' ft. 240' ft. 300'

Water stands at 50 feet below the surface.

TESTS

Swab Test ~~Test~~ 90 bbl/Hr. bailers per hour. Size of bailer Gal.

Pump test gallons per minute for hours

Drawdown: 175 feet after ~~pumping or bailing~~ swabbing 10 hrs. at 63 GPM.

Quality of Water: Taste good Odor none Color clear

Hard somewhat Soft Temperature unknown

MATERIAL AND EQUIPMENT

Casing record 8 5/8" to 107 ft cemented to surface, 7" to 400 ft.
(Example: 8 in. to 65 ft.; 6 in. 65 to 227 ft.)

Screen or perforation record 7" perforated with slots from 137 ft. to 295 ft.

Gravel packed No Diameter Amt. of Gravel used

Pump Type Pumping Unit Rated Capacity GPM against feet of head.

Rated Capacity: 23 GPM at 18 64inch strokes per minute

Depth to bowls or cylinder ft.

Power: Electric h.p. Gasoline motor 12 h.p.

RECEIVED
SEP 4 - 1969
OKLA. WATER RESOURCES BOARD

D H Krumme
Signature of Owner

7-29-69
Date

(OVER)

9-68

000318

2'-3'

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WATER WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

RECEIVED
NOV 28 1988
Oklahoma Water Resources Board

#12426

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION SE ¼ of SE ¼ of SE ¼ of sec. 7 ; TWP. 16 N S; RGE 9 E/W (Circle One) WIM ECM COUNTY Creek

FINDING LOCATION 2 Mi. N of Sixtown on Hwy 66 E side of New Hwy
Blocks or distance(s) from given point(s).
Property lies between Old Hwy 66 & New Hwy 66

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. FORMATIONS PENETRATED

Material	From	To	Saturated
Top Soil	0	6"	
Sand Rock & Red Clay	6"	50	
Water Sand (Iron & Salt)	50	85	✓
Red Clay	85	125	
Water Sand	125	140	✓
Red Clay	140	155	✓
Water Sand	155	195	✓
Red Clay	195	200	
Water Sand	200	212	✓

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 11-12-88 Completed 11-15-88
Contractor Harvey Moore
Driller None
Diameter Hole 6 1/2 in. Total Depth 212 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	____ in.	____ ft.	____ ft.
Well Casing	4 1/2 in.	12" Ground ft.	212 ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 182 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 212 ft.
Amount Used: 1.97 TONS

PERFORATION RECORD

Type/Size		
1/4" Drilled	From 192 ft. To 212 ft.	
	From ____ ft. To ____ ft.	
	From ____ ft. To ____ ft.	

9. WELL TEST DATA

Static Water Level
Below Land Surface 60 ft.
Approximate Yield 5 gpm.
If Artesian: Flows ____ gpm.

10. PUMP INFORMATION

Pump Type ____
Power Source ____
Rated Capacity ____ gpm.
Depth of Bowls or Cylinder ____ ft.

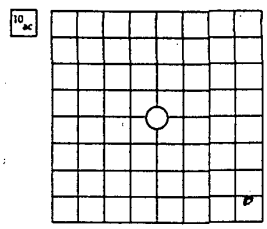
11. PLUGGING DATA

Date Plugged ____
Backfilled With ____ Material To ____ ft.
Grouted or Cemented From ____ Ft. To ____ ft.

12. RECONDITIONING WORK

Date Completed ____
Replaced Casing From ____ ft. To ____ ft.
Replaced Screen From ____ ft. To ____ ft.
Deepened Well From ____ ft. To ____ ft.
Redeveloped Well By ____

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Moore Water Wells License # WD 147
Address ~~Rt. 1 Box 63E~~ Depew, OK 74028 Phone # 367-3137

Signed Harvey Moore Date 11-15-88

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000319

2-31

White — Water Resources Board
Canary. — Drillers Copy
Pink — Drillers Copy

#12427

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

1. OWNER (b) (6) ADDRESS Sapulpa, Okla PHONE

2. LEGAL DESCRIPTION OF WELL
SW ¼ of NE ¼ of SE ¼ of sec. 7 ; TWP. 16 N S; Rge. 9 EIM WIM ECM; COUNTY Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other _____

6. LOG

Material	From	To	Saturated ✓
top Soil	0	5	
Quick Sand	5	15	
Clay	15	28	
Shale	28	33	
Lime	33	35	
Shale	35	74	
Rock	74	90	
Water Land	90	110	✓

RECEIVED
DEC 10 1984
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA

Dates: Started 11-5-84 Completed 11-5-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 110 ft.

CASING RECORD

Diameter	From	To
4 1/2 in.	2' Ground ft.	110 ft.
in.	ft.	ft.

Surface Seal: ☑ Yes ☐ No Type: Portland Cement + Steel + ice
Depth of Seal: 15 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 110 ft.
Amount Used: Approx 1 Yard

PERFORATION RECORD

Type _____ From 70 ft. To 110 ft.
Size _____ From _____ ft. To _____ ft.
" _____ From _____ ft. To _____ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 70 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality Good

BAILER TEST

Drawdown _____ ft. After Pumping _____ hrs. At 10 gpm.
Size of Bailer: 12 gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

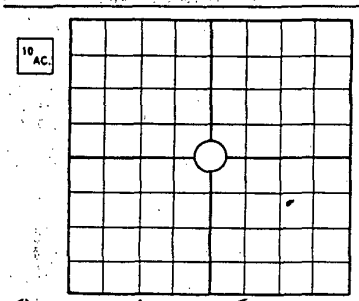
9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT



SW ¼ of NE ¼ of SE ¼ of SEC 7 ;
TWP 16 N S: RGE 9 EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew 74028 Phone # 918-324-5465

Signed Allen Baker Date 11-5-84

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000320

2-3

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WATER WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

#12428

1. WELL OWNER (b) (6) PHONE (b) (6)
EIM (Circle One) WIM
2. LEGAL DESCRIPTION SE Cor N½ ¼ of NW ¼ of NW ¼ of sec. 8 ; TWP. 16 N S; RGE 9 E/W COUNTY Creek
FINDING LOCATION Apx 600' E of (b) (6)
Blocks or distance(s) from given point(s). From Micks Country Store.

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGY LOG

Material	From	To	Saturated
Top Soil	0	6"	
Red Clay & Limestone Intermixed	6"	170	
Water Sand	170	180	✓

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-24-88 Completed 9-28-88
Contractor Harvey Moore
Driller Same
Diameter Hole 7 in. Total Depth 180' ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4½ in.	12" ground ft.	130' ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From Surface ft. to 180' ft.
Amount Used: 1.7 Tons

PERFORATION RECORD

Type/Size Drilled ¼" From 170 ft. To 180 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA

Static Water Level
Below Land Surface 70 ft.
Approximate Yield 20 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # 160 197
Address Rt 1 Box 632 Phone # 367-3137
Signed Harvey Moore Date 11-15-88

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000321

2-3

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

12429

STATE OF OKLAHOMA
MULTI-PURPOSE WATER WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER [redacted] (b) (6) PHONE [redacted] (b) (6)

2. LEGAL DESCRIPTION SW ¼ of NE ¼ of NW ¼ of sec. 8 ; TWP. 16 N S; RGE 9E (EIM) (Circle One) WIM ECM COUNTY Creek
(See Attached)
FINDING LOCATION
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	30	
Water Sand	30	40	✓
Red Clay	40	80	
Sand Rock	80	105	
Red Clay & Limestone Intermitently	105	198	
Water Sand	198	226	✓

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 7-9-88 Completed 7-13-88
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6¼ in. Total Depth 226 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	1 ft.	ft.
Well Casing	4½ in.	12" above ft.	226 ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 40 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 226 ft.
Amount Used: 1.4 T Copy.

PERFORATION RECORD

Type/Size Drilled ¼" From 200 ft. To 226 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA

Static Water Level
Below Land Surface 70 ft.
Approximate Yield 15+ gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

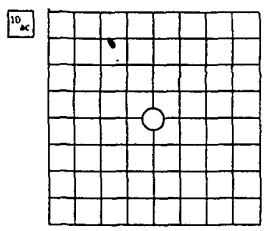
11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 197
Address Rt 1 Box 632 Depew, OK Phone # 367-3137
Signed Harvey Moore Date 8-1-88

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000322

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

12430

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St. P.O. Box 53585
Oklahoma City, Oklahoma 73152

MULTI-PURPOSE WATER WELL REPORT

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

Tulsa

1. OWNER (b) (6) ADDRESS Tulsa Okla
PHONE
EIM
WIM
ECM; COUNTY Creek

2. LEGAL DESCRIPTION OF WELL
SW ¼ of SW ¼ of SW ¼ of sec. 8 ; TWP. 16 N S; Rge. 9

3. TYPE OF WORK	4. PROPOSED / PAST USE	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic ☐ Irrigation ☐ Stock	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work ☐ Test	☐ Municipal ☐ Industrial ☐ Test	☐ Cable ☐ Other

6. LOG

Material	From	To	Saturated ✓
of Soil	0	4	
ed bed	4	25	
hale	25	90	
lime	90	95	
ed bed	95	145	
lime	145	150	
ater Sand	150	176	

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Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA
Dates: Started 9-15-83 Completed 9-16-83
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¾ in. Total Depth 176 ft.

CASING RECORD

Diameter		From		To	
4½	in.	12" Aground	ft.	176	ft.
	in.		ft.		ft.

Surface Seal: ☑ Yes ☐ No Type: portland cement
Depth of Seal: 12 ft.
Gravel Packed:
Gravel Packed From 12 ft. to 176 ft.
Amount Used: approx 1¾ ton

PERFORATION RECORD
Type _____ From 146 ft. To 176 ft.
Size _____ From _____ ft. To _____ ft.
" _____ From _____ ft. To _____ ft.

8. WELL TEST DATA
Static Water Level Below Land Surface 35 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality good

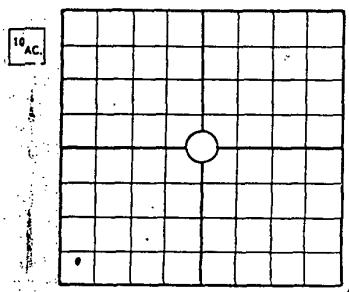
BAILER TEST
Drawdown 15 ft. After Pumping _____ hrs. At 15 gpm.
Size of Bailer: 10 gal.

PUMPING TEST
Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT



SW ¼ of SW ¼ of SW ¼ of SEC 8 ;
TWP 16 N S; RGE 9 EIM,WIM,ECM

12. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-100
Address 1241 Depew Okla 74028 Phone # 918-321-5165
Signed Allen Baker Date 9-16-83

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000323

2-3'

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____ (Official Use Only)

#12430

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla

PHONE _____

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM ECM

SE ¼ of NE ¼ of SE ¼ of sec. 8 ; TWP. 16 N S; RGE 9 ; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other _____
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
Top Soil	0	4	
Sand rock	4	27	
Shale	27	33	
lime	33	35	
Shale	35	50	
red bed	50	58	
lime	58	59	
red bed	59	65	
Water Sand	65	95	
red bed	95	105	
Sand rock	105	112	
Hard rock	112	115	
Water Sand	115	120	✓
Hard rock	120	140	
Water Sand	140	155	✓
Hard rock	155	165	
Water Sand	165	195	✓

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 4-9-84 Completed 7-10-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 195 ft.

CASING RECORD

	Diameter		From	To
Inside	4 ½	in.	24" Ground	196 ft.
Outside		in.	ft.	ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACKED: Gravel Packed From 15 ft. to 195 ft.
Amount Used: Approx 2 tons

PERFORATION RECORD

Type Size
From 115 ft. To 196 ft.
From _____ ft. To _____ ft.
From _____ ft. To _____ ft.

9. WELL TEST DATA

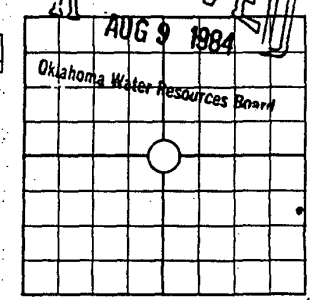
Static Water Level Below Land Surface 105 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 20 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

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Oklahoma Water Resources Board



SE ¼ of NE ¼ of SE ¼ of SEC 8 ;
TWP 16 N S; RGE 9 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD 170
Address Rt 1 Depew Okla Phone # 918-324-5464
Signed Allen Baker Date 7-10-84

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000324

2-31

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12432

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St. P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla
PHONE 8

2. LEGAL DESCRIPTION OF WELL
NE ¼ of SW ¼ of NW ¼ of sec. 8 ; TWP. 16 N S; Rge. 9 EIM WIM ECM; COUNTY Creek.

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other _____

6. LOG

Material	From	To	Saturated ✓
Clay	0	6	
Shale	6	30	
Red bed	30	45	
Water sand	45	85	
Shale	85	92	
Red bed	92	98	
Iron rock	98	100	
Red bed	100	106	

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JUL 10 1984
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA
Dates: Started 6-2-84 Completed 6-3-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 106 ft.

CASING RECORD
4½ Diameter in. From 3' ft. Ground To 106 ft.
_____ in. _____ ft. _____ ft.
Surface Seal: ☑ Yes ☐ No Type: Portland Cement
Depth of Seal: 15 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 106 ft.
Amount Used: _____

PERFORATION RECORD
Type _____ From 46 ft. To 106 ft.
Size _____ From _____ ft. To _____ ft.
" _____ From _____ ft. To _____ ft.

8. WELL TEST DATA
Static Water Level Below Land Surface 55 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality good

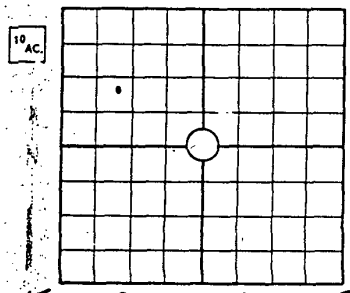
BAILER TEST
Drawdown _____ ft. After Pumping _____ hrs. At 10 gpm.
Size of Bailer: 10 gal.

PUMPING TEST
Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT



NE ¼ of SW ¼ of NW ¼ of SEC 8 ;
TWP 16 N S; RGE 9 EIM WIM ECM

12. PUMP INFORMATION
Pump [redacted]
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Depew Okla 74028 Phone # 224-5765 (918)
Signed Allen Baker Date 6-3-84

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000325

2'-3

#25749

WELL INFORMATION

Owner Krumme Oil Company

Address Box 749, Bristow, Oklahoma

Well No. ~~SE~~ in NW ¼ of SW ¼ of Section 8 Township 16N Range 9E

Creek County Elevation 833 ft.

Distance from nearest town or highway junction:

Three miles north of Bristow

Intended use (underline): Irrigation, Municipal, Industrial, Other Water supply, for waterflood (oil)

GENERAL DRILLING INFORMATION

(File one for each well)

Contractor Company Rig Address

Driller Bill Polm Address 401 East 8th

Dates: Started November 4, 1965 Completed November 11, 1965

Type of Rig: Cable tool X Rotary Other

Size of Hole 10" to 107', 8" to 325' Total Depth 325'

(Example: 8 in. to 55 ft.)

Water encountered at: 15' ft. 60' ft. 90' ft. 107' ft.

Water stands at 60' feet below the surface.

TESTS

Bailer test bailers per hour. Size of bailer Gal.

~~Pump test~~ Swab Test 63 gallons per minute for 2 hours

Drawdown: 60 feet after pumping or bailing 2 hrs. at 63 GPM.

Quality of Water: Taste good Odor good Color clear

Hard Soft X Temperature

MATERIAL AND EQUIPMENT

Casing record 8 5/8" to 107' (cemented), 7" to 325'

(Example: 8 in. to 55 ft.; 6 in. 55 to 227 ft.)

Screen or perforation record 7" casing perforated 125' to 300'

Gravel packed No Diameter Amt. of Gravel used

Pump Type turbine Rated Capacity 50 GPM against 238 feet of head.

Depth to bowls or cylinder 200 ft.

Power: Electric h.p. ~~Gasoline motor~~ Natural gas engine 15 h.p.

RECEIVED
OCT 31 1968
OKLA. WATER RESOURCES BOARD

George Krumme
Signature of Owner

Oct 30, 1968
Date

(OVER)

000326

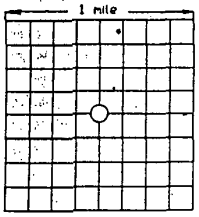
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2-3

MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

Please plot well location



Legal Description

E½ NW 1/4 NW 1/4 NE 1/4 of Sec. 8 Twp. 16 N Rge. 9E

County Creek Well No:

Well Owner (b) (6) Phone (b) (6)

Address (b) (6) Bristow, Ok 74010

Finding location

Type of work
- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other

G.W. Use
- ☑ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method
- ☐ Hand Auger
- ☑ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	20	
Blue Shale	20	150	
Red Clay	150	175	
Water Sand	175	197	✓

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to exceed 3 acres.)

Permit No:

New Boring or Well Construction Data

Date: Started 1-5-92 Completed 1-9-92

Firm Moore Water Well Drilling

Operator Harvey Moore Sr.

Type of Construction ☐ Open Hole ☑ Cased Hole

Hole Diameter 6½ inches total depth 197 feet

Hole Diameter ____ inches total depth ____ feet

CASING RECORD

	diameter		from		to	
Surface pipe		inches		feet		feet
Well casing	4½	inches	12" ground	feet	197	feet
Well casing		inches		feet		feet
Well casing		inches		feet		feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from		to	
¼" Drilled	175	feet	197	feet
		feet		feet
		feet		feet

GRAVEL PACK

Type and Size	from		to	
⅜" Limestone	0	feet	197	feet
		feet		feet
		feet		feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from		to	
Type of Surface Seal Portland	0	feet	20	feet
Aquifer Seal Type		feet		feet
		feet		feet

HYDROLOGIC DATA

First Water Zone Encountered 175 ft.

Approximate Yield 15 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged

Backfilled From ____ feet ____ feet Type

Cement Grouted From ____ feet ____ feet

Reconditioning Work

Replaced Casing/Screen From ____ feet ____ feet

Deepened Well From ____ feet ____ feet

Redeveloped Well By

Certification

The work described above was done under my supervision.
This report is correct to the best of my knowledge.

Name Harvey Moore Sr. Lic. No. DPC 014

Address Rt 1 Box 632 Depew Phone 367-3137

Signed Harvey Moore Date 1-30-92

RECEIVED
JUL 13 1992
Oklahoma Water Resources Board

*See Pump Installers Form On Back

000327

2-31

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

38007

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER (b) (6) PHONE
2. LEGAL DESCRIPTION E½ of NW ¼ of NW ¼ of sec. 5 ; TWP. 16 N ; RGE 9 (E) WIM (Circle One) COUNTY Creek

FINDING LOCATION
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Sand Rock	1	10	
Red Clay	10	35	
Limestone	35	40	
Water Sand	40	50	
Blue Shale & Limestone	50	120	
Red Clay	120	150	
Sand Rock with Blue Shale	150	190	
Red Clay	190	204	
Water Sand	204	219	

RECEIVED
JUL 13 1992
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 3-3-92 Completed 3-9-92
Contractor Henry Drilling Co.
Driller Henry Drilling Co.
Diameter Hole 6¼ in. Total Depth 220 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4½	in.	1 2" above ground	ft.	120	ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 219 ft.
Amount Used: 2 sacks

PERFORATION RECORD

Type/Size			
¼" drilled	From 204 ft.	To 219 ft.	
	From ft.	To ft.	
	From ft.	To ft.	

9. WELL TEST DATA

Static Water Level
Below Land Surface 129 ft.
Approximate Yield 22 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Henry Drilling Co. License # 1140
Address RT 1 Box 632 Kiefer Phone # 918-321-7
Signed Henry Drilling Co. Date 3-10-92

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000328

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1-21

12433

1. OWNER (b) (6) [redacted] ADDRESS Kiefer Okla
PHONE _____

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM ECM; COUNTY Creek
SE ¼ of NE ¼ of SE ¼ of sec. 17; TWP. 16 (N) S; RGE 9

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top Soil	0	2	
red bed	2	25	
	25	27	
lime	27	30	
shale	30	32	
lime	32	45	
shale	45	70	
red bed	70	73	
shale	73	88	
red bed	88	90	
iron rock	90	120	
red bed	120	177	
water sand			

RECEIVED
AUG 9 1984
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 7-31-84 Completed 8-1-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¾ in. Total Depth 177 ft.

CASING RECORD

	Diameter	From	To
Inside	4½ in.	3' ↑ Ground ft.	177 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland cement Depth of Seal: 15 ft.
GRAVEL PACKED:
Gravel Packed From 15 ft. to 177 ft.
Amount Used: approx 1¾ ton

PERFORATION RECORD

Type Size		
	From 120 ft.	To 177 ft.
	From ft.	To ft.
	From ft.	To ft.

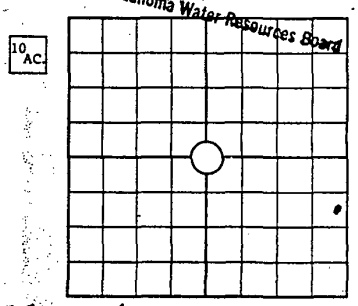
9. WELL TEST DATA

Static Water Level Below Land Surface 145 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 18 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From X ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SE ¼ of NE ¼ of SE ¼ of SEC 17;
TWP 16 (N) S; RGE 9 (Circle One) EIM WIM ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity X gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From X ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address RR 1 Depew Okla 74028 Phone # 348-5465 (918)
Signed Allen Baker Date 8-1-84

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000329

White -- Water Resources Board
Canary -- Drillers Copy
Pink -- Drillers Copy

#12434

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____ (Official Use Only)

1-2'

1. OWNER (b) (6) ADDRESS Bristow Okla

PHONE _____

2. LEGAL DESCRIPTION OF WELL (EIM (Circle One) WIM)

SE ¼ of NE ¼ of SE ¼ of sec. 17 ; TWP 16 N S; RGE 9 ECM; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other _____
☐ Test/Monitoring	☐ Test Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top soil	0	2	
red bed	2	25	
lime	25	27	
shale	27	30	
lime	30	32	
shale	32	45	
red bed	45	70	
shale	70	73	
red bed	73	88	
iron rock	88	90	
red bed	90	120	
water sand	120	179	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-21-87 Completed 9-24-87
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¼ in. Total Depth 179 ft.

CASING RECORD

	Diameter		From		To	
Inside	4½	in.	18"	ft. Ground	179	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACKED: Cement
Gravel Packed From 20 ft. to 179 ft.
Amount Used: Approx 1½ ton

PERFORATION RECORD

Type	Size		
		From 139 ft. To 179	ft.
		From ____ ft. To ____	ft.
		From ____ ft. To ____	ft.

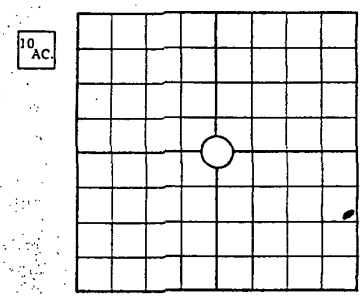
9. WELL TEST DATA

Static Water Level Below Land Surface 144 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 15 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SE ¼ of NE ¼ of SE ¼ of SEC 17 ;
TWP 16 N S; RGE 9 (Circle One) EIM WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-1170
Address Rt 1 Box 293 Depew Okla 74028 Phone # 918 324-5465
Signed Allen Baker Date 9-24-87

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000330

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1-21

#12435

1. OWNER Cummins Const. Co Inc ADDRESS 1420 W Chestnut
P.O. Box 748 Enid, Okla 73702 PHONE _____

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM
SE ¼ of ¼ ¼ of SW ¼ of sec. 18 ; TWP. 16 (N) S; RGE 9E ECM; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
Top Soil	0	4	
Quick Sand	4	25	
Water Sand	25	43	✓
Red Clay	43	45	

RECEIVED
APR 14 1987
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 4-6-87 Completed 4-8-87
Contractor Moore Water Wells
Driller Mickey Moore
Diameter Hole 6 1/2 in. Total Depth 45 ft.

CASING RECORD

	Diameter		From		To	
Inside	4 1/2	in.	18"	ft.	45	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal Portland Cement Depth of Seal: 26 ft.
GRAVEL PACKED:
Gravel Packed From 0 ft. to 45 ft.
Amount Used: _____

PERFORATION RECORD

Type Size				
_____	From	26 ft.	To	45 ft.
_____	From	ft.	To	ft.
_____	From	ft.	To	ft.

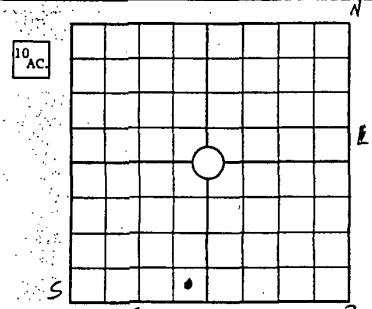
9. WELL TEST DATA

Static Water Level Below Land Surface 25 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 30 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SE ¼ of SE ¼ of SW ¼ of SEC 18 ;
TWP 16 (N) S; RGE 9E (Circle One) EIM WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Mickey Moore License # WD 197
Address Rt 1 Box 632 Phone # 367-3137
Signed Mickey Moore Date 4-13-87

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000331

1-2'

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12436

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

Tulsa

MULTI-PURPOSE WATER WELL REPORT

1 OWNER (b) (6) ADDRESS Bristow Okla 74010
PHONE None

2. LEGAL DESCRIPTION OF WELL
NW ¼ of NE ¼ of NE ¼ of sec. 18 ; TWP. 16 N S; Rge. 9E EIM WIM ECM; COUNTY Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other _____

6. LOG

Material	From	To	Saturated ✓
top Soil	0	5	
Sand rock	5	20	
Clay	20	40	
Water sand	40	60	
Clay	60	85	
red rock	85	90	
Water sand	90	110	
Clay	110	120	

RECEIVED
SEP 6 1983
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA

Dates: Started 7-20-83 Completed 7-20-83
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¾ in. Total Depth 120 ft.

CASING RECORD

4½ Diameter in. 13" above ground From ~~ft.~~ To ft.
_____ in. _____ ft. _____ ft.
Surface Seal: ☑ Yes ☐ No Type: Portland Cement
Depth of Seal: 20 ft.
Gravel Packed:
Gravel Packed From 20 ft. to _____ ft.
Amount Used: Approx 2 Ton

PERFORATION RECORD

Type _____ From _____ ft. To _____ ft.
Size _____ From 40 ft. To 60 ft.
" _____ From 90 ft. To 110 ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 45 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality Good

BAILER TEST

~~Drawdown~~ _____ ft. After Pumping _____ hrs. At 5-6 gpm.
Size of Bailer: 10 gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT

10 AC.

NW ¼ of NE ¼ of NE ¼ of SEC 18 ;
TWP 16 N S; RGE 9E EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD 170
Address Rt 1 Depew Okla Phone # 224-5466
Signed Allen Baker Date 7-20-83

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000332

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

12439

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

MULTI-PURPOSE WATER WELL REPORT

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)
Tulsa

1. OWNER [redacted] ADDRESS Bristow, OKla. 74010

PHONE [redacted]

2. LEGAL DESCRIPTION OF WELL
SW ¼ of SW ¼ of SW ¼ of sec. 20 ; TWP. 16 N S; Rge. 9 EIM WIM ECM; COUNTY Creek

3. TYPE OF WORK
☒ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☒ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☒ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other

6. LOG

Material	From	To	Saturated ✓
Topsoil	0	2	
Red shale	2	5	
SAND rock	5	35	
Red SAND Rock	35	50	
SAndy Shale	50	60	
SAND rock with Shale Lay	60	105	✓
Red Shale	105	120	
WATER SAND	120	137	✓
Red Lime	137	145	
" SAND	145	145	
Red shale	165	180	
SAnd Lime	180	185	
Red Shale Lime Shelves	185	198	
SAndy Blue Shale	198	200	
WATER SAND	200	202	✓
Lime & Hard Sand	202	206	
WATER SAND	206	220	✓
Blue Shale	220	230	

RECEIVED
JUN 27 1983
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA

Dates: Started 6-20-83 Completed 6-22-83
Contractor Tull's Waterwell Drlg.
Driller Dale E Tull
Diameter Hole 7⅞ in. Total Depth 230 ft.

CASING RECORD

Diameter		From	To
5"	in.	+1 ft.	230 ft.
PVC	in.	ft.	ft.

Surface Seal: ☒ Yes ☐ No Type: Portland
Depth of Seal: 10 ft. AGAIN from 105-145
Gravel Packed:
Gravel Packed From 230 ft. to 145 ft.
Amount Used: 1500#

PERFORATION RECORD

Type 3/32 From 155 ft. To 145 ft.
Size SAWSLOTS From 170 ft. To 180 ft.
" From 190 ft. To 225 ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 120 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality good

BAILER TEST

Drawdown 20 ft. After Pumping 2 hrs. At 10 gpm.
Size of Bailer: 10 gal.

PUMPING TEST

Drawdown 50 ft. After Pumping 6 hrs. At 15 gpm.

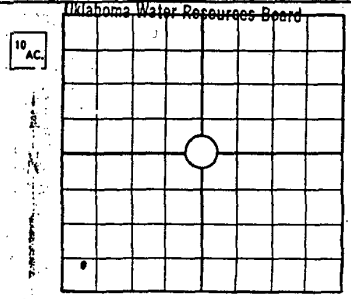
9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT



SW ¼ of SW ¼ of SW ¼ of SEC 20 ;
TWP 16 S; RGE 9 EIM WIM ECM

12. PUMP INFORMATION

Pump Type 1hp Submerge
Power Source 220
Rated Capacity 15 gpm.
Depth of Bowls or Cylinder 1½ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Kelly B Tull License # WD224
Address RR#2 Jennings Okla Phone # 918-757-258
Signed Kelly B Tull Date 6-27-83

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000333

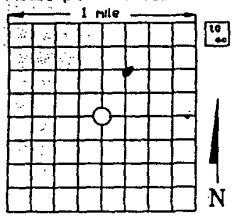
MULTI-PURPOSE COMPLETION REPORT

#28567

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

1/2-1

Please plot well location



Legal Description

NE 1/4 ~~SW 1/4~~ NE 1/4 of Sec. 20 Twp. 16N Rge. 9E

County Creek Well No: _____

Well Owner (b) (6) Phone (b) (6)

Address (b) (6)

Finding location Bristow - E. of Magnolia Cemetary 1½ Mi on R. side of rd

Type of work
- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other Waterwell

G.W. Use
- ☑ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method
- ☐ Hand Auger
- ☑ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	30	
Rock	30	33	
Red Clay	33	90	
Sand Rock	90	115	
Red Clay	115	125	
Water Sand	125	150	
Red Clay	150	160	

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to exceed 3 acres.)

Permit No: _____

New Boring or Well Construction Data

Date: Started 8-9-92 Completed 8-13-92

Firm Moore Waterwell Drilling

Operator Harvey Moore Jr.

Type of Construction ☐ Open Hole ☑ Cased Hole

Hole Diameter 6 1/2 inches total depth 160 feet

Hole Diameter _____ inches total depth _____ feet

CASING RECORD

	diameter		from		to	
Surface pipe		inches	ground	feet		feet
Well casing	4 1/2	inches	12"	feet	160	feet
Well casing		inches		feet		feet
Well casing		inches		feet		feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from	to
1/4" Drilled	125 feet	150 feet
	feet	feet
	feet	feet

GRAVEL PACK

Type and Size	from	to
1/4" Limestone	20 feet	160 feet
	feet	feet
	feet	feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from	
Type of Surface Seal Portland	8 feet	20 feet
Aquifer Seal Type	feet	feet
	feet	feet

HYDROLOGIC DATA

First Water Zone Encountered 125 ft.

Approximate Yield 10 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged _____

Backfilled From _____ feet _____ feet Type _____

Cement Grouted From _____ feet _____ feet

Reconditioning Work

Replaced Casing/Screen From _____ feet _____ feet

Deepened Well From _____ feet _____ feet

Redeveloped Well By

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OCT 29 1992
Oklahoma Water Resources Board

Certification

The work described above was done under my supervision. This report is correct to the best of my knowledge.

Name Harvey Moore Jr. Lic. No. APC 0140

Address Rt 1 Box 632 Depew Phone 367-3137

Signed Harvey Moore Jr. Date 8-14-92

*See Pump Installers Form On Back

000334

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WATER WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

NOTICE BEFORE USE OF THIS WELL: It shall be the responsibility of the well owner to have the water tested for quality by any Oklahoma Water Resources Board certified laboratory and supply copy of these results to the Oklahoma Water Resources Board.

#12438

1. WELL OWNER (b) (6) PHONE
2. LEGAL DESCRIPTION SE ¼ of NW ¼ of NE ¼ of sec. 20 TWP. 16 S. RGE 9 EIM (Circle One) WIM ECM COUNTY Creek

FINDING LOCATION
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
top soil	0	1	
red bed	1	50	
shale	50	100	
water sand	100	107	✓
red bed	107	155	
water sand	155	167	✓
red bed	167	172	

RECEIVED
MAY 13 1988
Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA
DATES: Started 5-10-88 Completed 5-13-88
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 in. Total Depth 172 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4½ in.	18 ft. Ground	172 ft.

Cement Grout Surface Seal? ☐ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACK:
Gravel Packed From 12 ft. to 172 ft.
Amount Used: Approx 1½ ton

PERFORATION RECORD
Type/Size
From 106 ft. To 172 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 102 ft.
Approximate Yield 15 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION
Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK
Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT
10 ac

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 193 Depew OKla 74028 Phone # 324-5445
Signed Allen Baker Date 5-13-88

Form 424-0487

USE ADDITIONAL SHEETS IF NECESSARY

000335

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12437

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1/2-1' 1

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla, PHONE _____

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM ECM; COUNTY Creek

SE ¼ of SE ¼ of NW ¼ of sec. 20; TWP. 16 N S; RGE 9

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other _____
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top soil	0	5	
Clay	5	30	
Sand rock	30	50	
Clay	50	67	
Water sand	67	97	
Clay	97	98	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-17-87 Completed 9-19-87
Contractor Allen Baker
Driller Allen Baker
Diameter Hole _____ in. Total Depth _____ ft.

CASING RECORD

	Diameter	From	To
Inside	4½ in.	2' Ground	98 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: Portland cement Depth of Seal: 15 ft.
GRAVEL PACKED:
Gravel Packed From 15 ft. to 98 ft.
Amount Used: approx 1 ton

PERFORATION RECORD

Type Size
From 58 ft. To 98 ft.
From _____ ft. To _____ ft.
From _____ ft. To _____ ft.

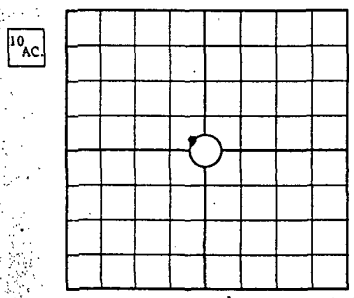
9. WELL TEST DATA

Static Water Level Below Land Surface 65 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 8 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SE ¼ of SE ¼ of NW ¼ of SEC 20;
TWP 16 N S; RGE 9 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew Okla, Phone # 918-324-54
Signed Allen Baker Date 9-19-87

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000336

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WATER WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1/2-1

#24771

NE NW SW

DEC 1 1988

Oklahoma Water Resources Board

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION ___ ¼ of E ½ of NE ¼ of sec. 20 TWP. 16 N S RGE 9 EIM (Circle One) WIM ECM COUNTY Creek

FINDING LOCATION 4 by 1 Mi E of Magnolia Cemetary on South side of road
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. FORMATION RECORD

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	40	
Water Sand	40	50	✓
Red Clay	50	95	
Water Sand	95	125	✓

RECEIVED
JAN 3 1989
OKLA. WATER RESOURCES BOARD

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. ___

8. NEW WELL CONSTRUCTION DATA

DATES: Started 11-6-88 Completed 11-9-88
Contractor Harvey Moore
Driller Same
Diameter Hole 6 1/2 in. Total Depth 125 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	___ in.	___ ft.	___ ft.
Well Casing	4 1/2 in.	12" Grouted ft.	125 ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 125 ft.
Amount Used: 4 yd 1 Ton

PERFORATION RECORD

Type/Size		
¼" Drilled	From 40 ft. To 50 ft.	
"	From 95 ft. To 125 ft.	
___	From ___ ft. To ___ ft.	

9. WELL TEST DATA

Static Water Level Below Land Surface 30 ft.
Approximate Yield ___ gpm.
If Artesian: Flows ___ gpm.

10. PUMP INFORMATION

Pump Type ___
Power Source ___
Rated Capacity ___ gpm.
Depth of Bowls or Cylinder ___ ft.

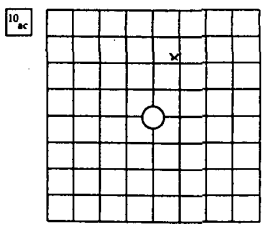
11. PLUGGING DATA

Date Plugged ___
Backfilled With ___ Material To ___ ft.
Grouted or Cemented From ___ Ft. To ___ ft.

12. RECONDITIONING WORK

Date Completed ___
Replaced Casing From ___ ft. To ___ ft.
Replaced Screen From ___ ft. To ___ ft.
Deepened Well From ___ ft. To ___ ft.
Redeveloped Well By ___

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 197
Address Rt 1 Box 632 Depew Phone # 367-8133
Signed Mickey Moore Date 11-30-88

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000337

#28839

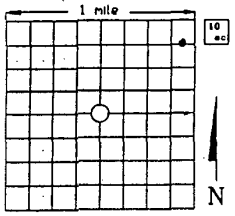
1-2

MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

FEB 10 1993

Please plot well location



Legal Description

NE 1/4 NE 1/4 NE 1/4 of Sec. 20 Twp. 16N Rge. 9E

County Creek Well No: ____

Well Owner (b) (6) Phone (b) (6)

Address (b) (6) Bristow, OK 74010

Finding location Bristow - E of Magnolia cemetery 1½ Mi on R. side of Rd.

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other Water Well

G.W. Use

- ☑ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☑ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	30	
Rock	30	33	
Red Clay	33	90	
Sand Rock / Salt Water	90	115	✓
Red Clay	115	125	
Water Sand	125	150	✓
Red Clay	150	160	

N

*See Pump Installers Form On Back

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to exceed 3 acres.)

Permit No: ____

New Boring or Well Construction Data

Date: Started 8-7-92 Completed 8-13-92

Firm Moore Water Wells

Operator Harvey Moore Jr.

Type of Construction ☐ Open Hole ☑ Cased Hole

Hole Diameter 6½ inches total depth 160 feet

Hole Diameter ____ inches total depth ____ feet

CASING RECORD

	diameter		from	to
Surface pipe	____	inches	ground feet	____ feet
Well casing	4½	inches	21" feet	160 feet
Well casing	____	inches	____ feet	____ feet
Well casing	____	inches	____ feet	____ feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from	to
1/4" Drilled	125 feet	150 feet
____	____ feet	____ feet
____	____ feet	____ feet

GRAVEL PACK

Type and Size	from	to
1/4" Limestone	0 feet	160 feet
____	____ feet	____ feet
____	____ feet	____ feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from	to
Type of Surface Seal Portland	0 feet	115 feet
Aquifer Seal Type ____	____ feet	____ feet
____	____ feet	____ feet

HYDROLOGIC DATA

First Water Zone Encountered 90 ft.

Approximate Yield 7 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged ____

Backfilled From ____ feet ____ feet Type ____

Cement Grouted From ____ feet ____ feet

Reconditioning Work

Replaced Casing/Screen From ____ feet ____ feet

Deepened Well From ____ feet ____ feet

Redeveloped Well By

Certification

The work described above was done under my supervision.
This report is correct to the best of my knowledge.

Name Harvey Moore Jr. Lic. No. OPC 0180

Address Rt 1 Box 632 Depew Phone 367-3137

Signed Jeanette Moore Date 2-2-93

000338

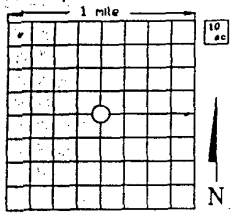
28840

1-2

MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

Please plot well location



Legal Description

NW 1/4 NW 1/4 NW 1/4 of Sec. 5 Twp. 1 Rge. E

County [illegible] Well No:

Well Owner (b) (6) Phone (b) (6)

Address

Finding location [illegible]

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other

G.W. Use

- ☐ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☐ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Red [illegible]	1	30	

KW

*See Pump Installers Form On Back

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to exceed 3 acres.)

Permit No:

New Boring or Well Construction Data

Date: Started Completed

Firm

Operator

Type of Construction ☐ Open Hole ☐ Cased Hole

Hole Diameter inches total depth feet

Hole Diameter inches total depth feet

CASING RECORD

	diameter		from	to
Surface pipe		inches	feet	feet
Well casing		inches	feet	feet
Well casing		inches	feet	feet
Well casing		inches	feet	feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from	to
	feet	feet
	feet	feet
	feet	feet

GRAVEL PACK

Type and Size	from	to
[illegible]	0 feet	[illegible] feet
	feet	feet
	feet	feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from	to
Type of Surface Seal [illegible]	feet	feet
Aquifer Seal Type	feet	feet
	feet	feet

HYDROLOGIC DATA

First Water Zone Encountered [illegible] ft.

Approximate Yield 3 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged

Backfilled From feet feet Type

Cement Grouted From feet feet

Reconditioning Work

Replaced Casing/Screen From feet feet

Deepened Well From feet feet

Redeveloped Well By

Certification

The work described above was done under my supervision.
This report is correct to the best of my knowledge.

Name [illegible] Lic. No. [illegible]

Address [illegible] Dixon Phone

Signed [illegible] Date 7-10-92

000339

2-3

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

#12440

1. OWNER (b) (6) ADDRESS Kingston Okla PHONE _____

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM ECM

NW ¼ of NW ¼ of SE ¼ of sec. 22 ; TWP. 16 N S; RGE 9 ; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other _____
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top soil	0	4	
sand rock	4	22	
Water Sand	22	25	✓
sand rock	25	30	
Water sand	30	64	✓
red bed	64	72	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-14-85 Completed 9-15-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 72 ft.

CASING RECORD

	Diameter	From	To
Inside	_____ in.	24" Ground ft.	72 ft.
Outside	_____ in.	_____ ft.	_____ ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 10 ft.
GRAVEL PACKED:
Gravel Packed From 10 ft. to 72 ft.
Amount Used: Approx 3/4 Ton

PERFORATION RECORD

Type/Size
From 30 ft. To 72 ft.
From _____ ft. To _____ ft.
From _____ ft. To _____ ft.

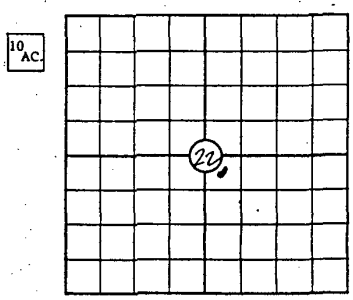
9. WELL TEST DATA

Static Water Level Below Land Surface 18 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 18 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



NW ¼ of NW ¼ of SE ¼ of SEC 22 ;
TWP 16 N S; RGE 9 (Circle One) EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew Okla 74028 Phone # 924-5865 918
Signed Allen Baker Date 9-15-85

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000340

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

2-4-3

#12441

1. OWNER (b) (6) ADDRESS Bristow Okla

PHONE _____

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM ECM; COUNTY Creek

SW ¼ of SE ¼ of NW ¼ of sec. 22; TWP. 16 (N) S; RGE 9

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☒ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top soil	0	2	
Sand rock	2	20	
red shale	20	30	
water sand	30	43	
red shale	43	46	
iron rock	46	50	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 6-3-56 Completed 6-3-56
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 50 ft.

CASING RECORD

	Diameter		From		To	
Inside	4½	in.	15" ↑ ground	ft.	46	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: portland cement Depth of Seal: 13' ft.
GRAVEL PACKED:
Gravel Packed From 13 ft. to 50 ft.
Amount Used: Gravel rock ½ to ...

PERFORATION RECORD

Type/Size

From 30 ft. To 46 ft.
From _____ ft. To _____ ft.
From _____ ft. To _____ ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 12 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 12 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.

SW ¼ of SE ¼ of NE ¼ of SEC 22;
TWP 16 (N) S; RGE 9 (Circle One) EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source X
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # 41-196
Address Rt 1 Box 293 Kiefer Okla Phone # 918 224-5465
74035
Signed Allen Baker Date 6-3-56

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000341

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

24500

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1-2-

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION SE ¼ of SW ¼ of SW ¼ of sec. 22 TWP. 16 N S, RGE 9 W (Circle One) ECM COUNTY Creek

FINDING LOCATION 2 Mi E of Bristow on Hwy 16 Turn Left appx 2 Mi
Blocks or distance(s) from given point(s)
turn Right appx 1 Mi + property will be on Right at curve.

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Sand Rock	1	16	
Clay	16	18	
Water Sand	18	45	✓

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 4-6-91 Completed 4-6-91
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6 3/4 in. Total Depth 45 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	____ in.	____ ft.	____ ft.
Well Casing	4½ in.	12" ground ft.	45 ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 45 ft.
Amount Used: ½ Ton appx.

PERFORATION RECORD

Type/Size ¼" drilled From 20 ft. To 45 ft.
From ____ ft. To ____ ft.
From ____ ft. To ____ ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 10 ft.
Approximate Yield 15 gpm.
If Artesian: Flows ____ gpm.

10. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

11. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 197
Address Rt 4 Box 632 Drumright Phone # 367-3137
Signed Harvey Moore Date 4-12-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000342

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

2-3

#12442

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla. PHONE _____

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM

SW ¼ of NE ¼ of SW ¼ of sec. 22 ; TWP. 16 (N) S; RGE 9 ECM; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other _____
☐ Test/Monitoring	☐ Test Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top Soil	0	1	
Sand rock	1	22	
Water Sand	22	30	
Sand rock	30	44	

RECEIVED
JAN 7 1985
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 12-7-84 Completed 12-8-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 44 ft.

CASING RECORD

	Diameter	From	To
Inside	_____ in.	_____ ft.	_____ ft.
Outside	4½ in.	15" Approx ft.	44 ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 44 ft.
Amount Used: Approx 3/4 Ton

PERFORATION RECORD

Type Size
From 15 ft. To 30 ft.
From _____ ft. To _____ ft.
From _____ ft. To _____ ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 18 ft.
If Artesian: Flows _____ gpm.
Approximate Yield _____ gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.

(22)

SW ¼ of NE ¼ of SW ¼ of SEC 22 ;
WP 16 (N) S; RGE 9 (Circle One) EIM WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source X
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replace I Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address RT 1 Box 293 Drumright Okla. 74030 Phone # 918-324-5465
Signed Allen Baker Date 12-8-84

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000343

#29932

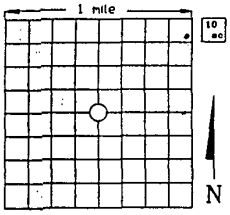
MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

2-3

K.K

Please plot well location



Legal Description

NE/4 NE/4 NE/4
1/4 1/4 1/4 of Sec. 22 Twp. 9E Rge. 1

County [illegible] Well No:

Well Owner (b) (6) Phone (b) (6)

Address (b) (6)

Finding location [illegible]

Type of work
- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other

G.W. Use
- ☐ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method
- ☐ Hand Auger
- ☐ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
[illegible]	0	1	
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to exceed 3 acres.)

Permit No:

New Boring or Well Construction Data

Date: Started [illegible] Completed [illegible]

Firm [illegible]

Operator [illegible]

Type of Construction ☐ Open Hole ☐ Cased Hole

Hole Diameter [illegible] inches total depth [illegible] feet

Hole Diameter ____ inches total depth ____ feet

CASING RECORD

	diameter		from		to	
Surface pipe	____	inches	____	feet	____	feet
Well casing	[illegible]	inches	[illegible]	feet	[illegible]	feet
Well casing	____	inches	____	feet	____	feet
Well casing	____	inches	____	feet	____	feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from		to	
[illegible]	[illegible]	feet	[illegible]	feet
____	____	feet	____	feet
____	____	feet	____	feet

GRAVEL PACK

Type and Size	from		to	
[illegible]	23	feet	[illegible]	feet
____	____	feet	____	feet
____	____	feet	____	feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

		from		to	
Type of Surface Seal	[illegible]	[illegible]	feet	[illegible]	feet
Aquifer Seal Type	____	____	feet	____	feet
____	____	____	feet	____	feet

HYDROLOGIC DATA

First Water Zone Encountered [illegible] ft.

Approximate Yield [illegible] GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged ____

Backfilled From ____ feet ____ feet Type ____

Cement Grouted From ____ feet ____ feet

Reconditioning Work

Replaced Casing/Screen From ____ feet ____ feet

Deepened Well From ____ feet ____ feet

Redeveloped Well By

JUL 30 1993

NOV - 5 1993 Oklahoma Water Resources Board

Certification

The work described above was done under my supervision. ✓
This report is correct to the best of my knowledge.

Name [illegible] Lic. No. [illegible]

Address [illegible] Phone [illegible]

Signed [illegible] Date [illegible]

*See Pump Installers Form On Back

000344

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12444

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1-2

MULTI-PURPOSE WATER WELL REPORT

1. OWNER (b) (6) ADDRESS Bristow Okla
PHONE —

2. LEGAL DESCRIPTION OF WELL (EIM WIM)
NW ¼ of SW ¼ of SE ¼ of sec. 28 ; TWP. 16 N S; Rge. 9 ECM; COUNTY Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other

6. LOG

Material	From	To	Saturated ✓
top Soil	0	2	
Sand rock	2	20	
Clay	20	30	
Water sand	30	60	
Red Shale	60	85	
Water sand	85	94	
Lime stones	94	100	

RECEIVED
MAR 7 1984
Oklahoma ... Resources Board

7. NEW WELL CONSTRUCTION DATA
Dates: Started 2-10-84 Completed 2-10-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¾ in. Total Depth 100 ft.

CASING RECORD

Diameter		From		To	
4½	in.	18"	ft.	100	ft.
	in.		ft.		ft.

Surface Seal: ☑ Yes ☐ No Type: Portland Cement
Depth of Seal: 15 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 100 ft.
Amount Used: Approx 1 ton

PERFORATION RECORD
Type _____ From 30 ft. To 60 ft.
Size _____ From 80 ft. To 100 ft.
" _____ From _____ ft. To _____ ft.

8. WELL TEST DATA
Static Water Level Below Land Surface 60 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality Good

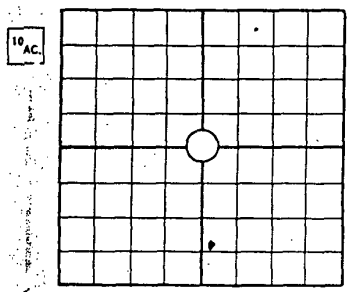
BAILER TEST
Drawdown _____ ft. After Pumping _____ hrs. At 5½ gpm.
Size of Bailer: 10 gal.

PUMPING TEST
Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT



NW ¼ of SW ¼ of SE ¼ of SEC 28 ;
TWP 16 N S; RGE 9 EIM,WIM,ECM

12. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Name Allen Baker License # WD-170
Address 641 Depew Okla. 74028 Phone # 918-324-5946
Signed Allen Baker Date 2-18-84

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000345

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

#12445

1-21

1. OWNER (b) (6) **ADDRESS** (b) (6) Bristow, Ok. 74010
PHONE (b) (6)

2. LEGAL DESCRIPTION OF WELL
EIM (Circle One)
WIM
ECM; COUNTY Creek

SE ¼ of SE ¼ of NE ¼ of sec. 28 ; TWP. 16N (N) S; RGE 9E

3. TYPE OF WORK
☒ New Well ☐ Plugging
☐ Reconditioning Work
☐ Test/Monitoring

4. USE
☒ Domestic
☐ Stock
☐ Test Monitoring

NON-DOMESTIC
☐ Irrigation
☐ Municipal
☐ Industrial
☐ Commercial
☐ Other

5. DRILLING METHOD
☐ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other
☒ Air

6. LOG

Material	From	To	Saturated
Top soil	0	1	
Clay	1	4	
Sand rock	4	11	
Clay	11	28	
Sand rock	28	30	
Clay	30	38	
Sand rock	38	45	
Clay	45	55	
Sand rock	55	60	
Limestone	60	63	
Cay	63	65	
Limestoen	65	66	
Sand rock	66	70	
Clay	70	74	
Sand rock	74	84	4 gpm
Shale	84	100	

7. LOCATION PERMIT
If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 6-26-85 Completed 6-26-85
Contractor Knott's Water Well drilling
Driller Dale Knott
Diameter Hole 8 in. Total Depth 100 ft.

CASING RECORD

	Diameter		From		To	
Inside	5"	in.	100	ft.	+2	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: portland Depth of Seal: 15' ft.
GRAVEL PACKED:
Gravel Packed From 100 ft. to 15 ft.
Amount Used: 1 T

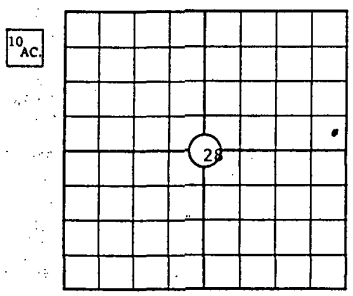
PERFORATION RECORD

Type/Size				
1/32" slotted	From	60 ft.	To	97 ft.
	From	ft.	To	ft.
	From	ft.	To	ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 70 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 4 gpm.

10. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SE ¼ of SE ¼ of NE ¼ of SEC 28 ;
(N) (Circle One)
TWP 16N S; RGE 9E EIM,WIM,ECM

12. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Kathleen Knott License # WD 74
Address Rt. 1, Terlton, Ok. 74081 Phone # (918)865-354
Signed Kathleen Knott Date 6-29-85

Form 424-0684
USE ADDITIONAL SHEETS IF NECESSARY

000346

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

12446

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1-21

1. OWNER (b) (6) **ADDRESS** (b) (6) Bristow **PHONE**

2. LEGAL DESCRIPTION OF WELL (EIM) (Circle One) WIM

NE ¼ of SW ¼ of NE ¼ of sec 28 ; TWP. 16 (N) S; RGE 9E ECM; **COUNTY** Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☐ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other _____
☐ Test/Monitoring	☐ Test Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
Top Soil	0	3	
Red Clay	3	30	
Sand Rock	30	60	
Water Sand	60	80	✓
Red Clay	80	85	
Water Sand	85	100	
Red Clay	100	108	

RECEIVED
APR 14 1987
Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started Apr 8 Completed Apr 10
Contractor Moore Water Wells
Driller Mickey Moore
Diameter Hole 6 1/2 in. Total Depth 108 ft.

CASING RECORD

	Diameter		From		To	
Inside	4 1/2	in.	18" Aground	ft.	108	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 10 ft.
GRAVEL PACKED:
Gravel Packed From 0 ft. to 108 ft.
Amount Used: 1 TON

PERFORATION RECORD

Type Size				
60	From	60 ft.	To	100 ft.
	From	ft.	To	ft.
	From	ft.	To	ft.

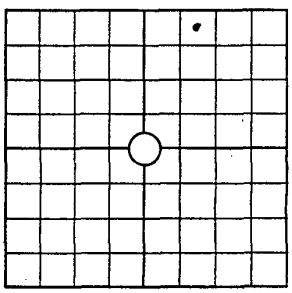
9. WELL TEST DATA

Static Water Level Below Land Surface 60 ft.
If Artesian: Flows _____ gpm.
Approximate Yield _____ gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



NE ¼ of SW ¼ of NE ¼ of SEC 28 ;
TWP 16 (N) S; RGE 9E (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Mickey Moore License # WD 197
Address RT 1 Box 362 Phone # 367-3137
Bristow OK 74028
Signed Mickey Moore Date 4-13-87

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000347

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

24501

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1-2

1. WELL OWNER (b) (6) PHONE (b) (6)
EIM (Circle One) WIM ECM

2. LEGAL DESCRIPTION SE¼ of NE¼ of NE¼ of NE¼ of sec. 28 ; TWP. 16 S; RGE 9E COUNTY Creek

FINDING LOCATION From Bristow: 2 Mi. E on 16 Hwy ½ Mi. N on left side "Round House"
Blocks or Distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. FORMATION RECORD

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	40	
Water Sand	40	50	✓
Blue Shale	50	90	

APR 2 1991
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 1-15-91 Completed 1-17-91
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6 3/4 in. Total Depth 90 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4½ in.	12" ground ft.	90 ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 90 ft.
Amount Used: Appx 3/4 Ton

PERFORATION RECORD

Type/Size		
¼" drilled	From 40 ft. To 50 ft.	
	From ft. To ft.	
	From ft. To ft.	

9. WELL TEST DATA

Static Water Level Below Land Surface 30 ft.
Approximate Yield 4½ gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 197
Address Rt 1 Box 632 Phone # 367-3137
Depew, Okla 74028
Signed Harvey D Moore Date 3-24-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000348

1-2

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

26627

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER (b) (6) PHONE (b) (6)
(Circle One) WIM

2. LEGAL DESCRIPTION SE¼ of SE ¼ of NE ~~NE~~ ¼ of sec. 28 ; TWP. 16 N S; RGE 9 E/W COUNTY Creek

FINDING LOCATION 3 Mi E on Hwy 16 from Bristow Approx ½ Mi N on left side of road
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	8	
Water Sand	8	12	
Red Clay	12	86	
Water Sand	86	90	~
Red Clay & Blue Shale Intermitently	90	143	

OKLAHOMA WATER RESOURCES BOARD
RECEIVED
OCT 1 1991

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 8-12-91 Completed 8-15-91
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6 ½ in. Total Depth 143 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4½	in.	12" ground	ft.	143	ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 143 ft.
Amount Used: Approx 1¼ Ton

PERFORATION RECORD

Type/Size				
¼" drilled	From 86	ft. To 90	ft.
	From	ft. To	ft.
	From	ft. To	ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 73 ft.
Approximate Yield 3 gpm.
If Artesian: Flows _____ gpm.

10. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

11. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

PLAT

10 ac

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

DF 140

Name Harvey Moore License # WD 147
Address Rt 1 Box 632 Phone # 367-3137
Depew OK 74028
Signed Harvey Moore Date 8-25-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000349

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA

MULTI-PURPOSE WATER WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1-2

#25157

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION NE ¼ of SW ¼ of SE ¼ of sec. 31 ; TWP. 16 N S; RGE 9 (IM) (Circle One) WIM ECM COUNTY Creek

FINDING LOCATION W on Old County Barn Rd appx ½ Mi from Hwy 48 White House w/ circle drive around house
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
quick sand	1	28	
Red Clay	28	40	
Water Sand	40	71	←

RECEIVED
JUL 8 - 1991
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started April 30 Completed May 2 1991
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6¾ in. Total Depth 71 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe	8	in.	10	ft.	28	ft.
Well Casing	4½	in.	12" ground	ft.	71	ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland cement Depth of Seal: 28 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 71 ft.
Amount Used: appx ½ Ton

PERFORATION RECORD

Type/Size			
¼" drilled	From 40 ft.	To 71 ft.	
	From ____ ft.	To ____ ft.	
	From ____ ft.	To ____ ft.	

9. WELL TEST DATA

Static Water Level Below Land Surface 25 ft.
Approximate Yield 15 gpm.
If Artesian: Flows ____ gpm.

10. PUMP INFORMATION

Pump Type ____
Power Source ____
Rated Capacity ____ gpm.
Depth of Bowls or Cylinder ____ ft.

11. PLUGGING DATA

Date Plugged ____
Backfilled With ____ Material To ____ ft.
Grouted or Cemented From ____ Ft. To ____ ft.

12. RECONDITIONING WORK

Date Completed ____
Replaced Casing From ____ ft. To ____ ft.
Replaced Screen From ____ ft. To ____ ft.
Deepened Well From ____ ft. To ____ ft.
Redeveloped Well By ____

13. PLAT

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 197
Address Rt 1 Box 632 Phone # 367 3137
Signed Harvey Moore Date 6-22-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000350

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1-2

#36628

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION NW ¼ of SW ¼ of SW ¼ of sec. 31 ; TWP. 16 S. RGE 9 (EIM (Circle One) WIM) ECM COUNTY Creek

FINDING LOCATION From Herns store on W. edge of Bristow on Hwy 66 go S. on Airport Rd. ½ Mi. House on E side of Rd.
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. DRILLING LOG

Material	From	To	Saturated
Top Soil	0	1	
Sand	1	10	
Quick Sand	10	31	
Water Sand	31	63	✓

RECEIVED
JAN 30 1992
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 11-13-91 Completed 11-15-91
Contractor Harvey Meare Sr.
Driller Harvey Meare Sr.
Diameter Hole 6 3/4 in. Total Depth 63 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	8 in.	10 ft.	31 ft.
Well Casing	4½ in.	12" ground ft.	63 ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 63 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 63 ft.
Amount Used: 4yd 1/2 T

PERFORATION RECORD

Type/Size		
¼" Drilled	From 31 ft.	To 63 ft.
	From ft.	To ft.
	From ft.	To ft.

9. WELL TEST DATA

Static Water Level
Below Land Surface 33 ft.
Approximate Yield 15 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

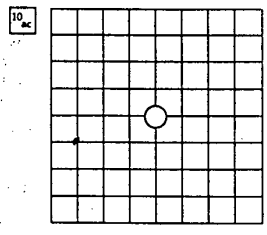
11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. FLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Meare Sr. License # OPC 0140
Address Rt #1 Box 632 Phone #
Depew, OK 74028
Signed Harvey Meare Date 1-4-92

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000351

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

RECEIVED
APR 22 1992
Oklahoma Water Resources Board

#27736

1. WELL OWNER (b) (6) PHONE (b) (6)
ELM (Circle One) WIM

2. LEGAL DESCRIPTION NE ¼ of NE ¼ of NE ¼ of sec. 32 ; TWP. 16 N S; RGE 9 ECM COUNTY Creek

FINDING LOCATION (b) (6) R side of Rd.
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Sand Rock	1	15	
Red Clay	15	17	
Sand Rock	17	35	
Red Clay	35	38	
Water Sand	38	48	←
Red Clay	48	50	

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No. ____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 1-19-92 Completed 1-21-92
Contractor Harvey Moore Sr.
Driller Harvey Moore Jr.
Diameter Hole 6 1/2 in. Total Depth 50 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe	____	in.	1	ft.	____	ft.
Well Casing	4 1/2	in.	12" ground	ft.	50	ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 50 ft.
Amount Used: 3/4 Ton

PERFORATION RECORD
Type Size 1/4" drilled From 38 ft. To 48 ft.
From ____ ft. To ____ ft.
From ____ ft. To ____ ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 30 ft.
Approximate Yield 10 gpm.
If Artesian: Flows ____ gpm.

10. PUMP INFORMATION
Pump Type ____
Power Source ____
Rated Capacity ____ gpm.
Depth of Bowls or Cylinder ____ ft.

11. PLUGGING DATA
Date Plugged ____
Backfilled With ____ Material To ____ ft.
Grouted or Cemented From ____ Ft. To ____ ft.

12. RECONDITIONING WORK
Date Completed ____
Replaced Casing From ____ ft. To ____ ft.
Replaced Screen From ____ ft. To ____ ft.
Deepened Well From ____ ft. To ____ ft.
Redeveloped Well By ____

13. PLAT
10 ac

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore Sr. License # OWRB 0140
Address Rt 1 Box 632 Depew Phone # ____
Signed Harvey Moore Sr. Date 1-30-92

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000352

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____ (Official Use Only)

#12386

1. OWNER (b) (6) ADDRESS Bristow Okla. PHONE _____

2. LEGAL DESCRIPTION OF WELL (EIM) WIM (Circle One)

SW ¼ of SW ¼ of SW ¼ of sec. 11 ; TWP. 16 (N) S; RGE 8 ECM; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☒ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
topsoil	0	2	
Red bed	2	25	
Sand rock with Water sand layers	25	45	✓
Red bed	45	55	
iron rock	55	60	
Water sand	60	120	✓

RECEIVED
AUG 9 1984
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 7-20-84 Completed 7-21-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¾ in. Total Depth 120 ft.

CASING RECORD

	Diameter	From	To
Inside	4½ in.	18" ground	120 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 15 ft.
GRAVEL PACKED:
Gravel Packed From 15 ft. to 120 ft.
Amount Used: Approx 1¼ Tons

PERFORATION RECORD

Type	Size		
		From 60 ft.	To 120 ft.
		From ft.	To ft.
		From ft.	To ft.

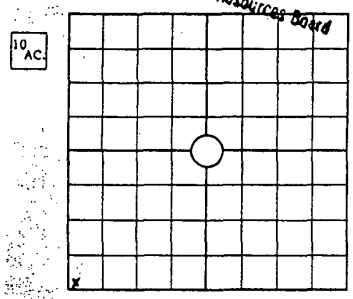
9. WELL TEST DATA

Static Water Level Below Land Surface 50 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 10 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SW ¼ of SW ¼ of SW ¼ of SEC 11 ;
TWP 16 (N) S; RGE 8 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Depew Okla Phone # 918-324-5465
Signed Allen Baker Date 7-21-84

USE ADDITIONAL SHEETS IF NECESSARY

000353

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

3-4-

12387

1. OWNER (b) (6) ADDRESS Bristow Okla

PHONE _____
EIM (Circle One)
WIM
ECM; COUNTY Creek

2. LEGAL DESCRIPTION OF WELL

SE ¼ of SW ¼ of NE ¼ of sec. 11 ; TWP. 16 N S; RGE 8

3. TYPE OF WORK
- [x] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Test/Monitoring

4. USE
- [x] Domestic
- [ ] Stock
- [ ] Test Monitoring

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [x] Rotary
- [ ] Rev. Rotary
- [ ] Cable
- [ ] Other
- [ ] Air

6. LOG

Material	From	To	Saturated
top Soil	0	6"	
Sand rock	6"	15'	
Red bed	15'	25	
Sand rock	25	33	
iron rock	33	34	
Red bed	34	42	
Sand rock	42	60	
Water Sand	60	80	✓
iron rock	80	81	
Red bed	81	93	
Sand rock	93	105	
Water Sand	105	131	✓
iron rock	131	135	
Clay	135	150	

Chl... APPROX 1900 GPM

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

[ ] Yes [ ] No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 3-25-85 Completed 3-26-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 150 ft.

CASING RECORD

	Diameter	From	To
Inside	in.	ft.	ft.
Outside	4 1/2 in.	18" Above ground	150 ft.

Cement Grout Surface Seal [x] Yes [ ] No
Type of Surface Seal Portland Cement Depth of Seal: Approx 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 150 ft.
Amount Used: Approx 1½ Tons

PERFORATION RECORD

Type	Size		
		From 50 ft. To 150	ft.
		From ft. To	ft.
		From ft. To	ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 30 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 24 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.
Squares S.
11

SE ¼ of SW ¼ of NE ¼ of SEC 11 ;
WP 16 N S; RGE 8 (Circle One) EIM WIM ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
[ ] Replaced Casing From _____ ft. To _____ ft.
[ ] Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew OKla 74028 Phone # (918) 324-5465
Signed Allen Baker Date 3-26-85

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000354

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

3-4

#22291

1. WELL OWNER (b) (6) Bristow, Ok. 74010 PHONE (b) (6)
EIM (Circle One) WIM ECM

2. LEGAL DESCRIPTION SE ¼ of SW ¼ of SE ¼ of sec. 11 TWP. 16N N S. RGE 8E COUNTY Creek

FINDING LOCATION
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☒ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

Material	From	To	Saturated
Top soil	0	1	
Clay	1	7	
Sand rock	7	24	
Red clay	24	32	
Sand rock	32	42	1gpm
Limestone	42	46	
Clay	46	52	
Sand rock	52	63	
Clay	63	67	
Sand rock	67	76	2gpm
Red clay	76	83	
Sand rock	83	90	3 gpm
Clay	90	98	
Sandy shale	98	114	
Sand rock	114	125	
Clay	125	135	
Limestone	135	137	
Sand rock	137	146	
Shale	146	156	
Sand rock	156	185	20gpm
Red clay	185	189	
Sand rock	189	195	5 gpm
Limestone	195	197	
Shale	197	218	
Limestone	218	221	
Sand rock	221	226	
Clay	226	240	
Limestone	240	243	
Clay & shale	243	260	
Red clay	260	264	
Water sand	264	300	30+ gpm

RECEIVED
AUG 21 1990
Oklahoma Water Resources Board

6. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

7. NEW WELL CONSTRUCTION DATA
DATES: Started 8-2-90 Completed 8-3-90
Contractor Knott's Water Well Drilling
Driller Dale Knott
Diameter Hole 8 in. Total Depth 300 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	5" in.	300 ft.	+2 ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 10 ft.
GRAVEL PACK:
Gravel Packed From 300 ft. to 10 ft.
Amount Used: 3T

PERFORATION RECORD

Type/Size		
1/32" slotted	From 80 ft. To 100 ft.	
	From 160 ft. To 180 ft.	
	From 280 ft. To 298 ft.	

8. WELL TEST DATA
Static Water Level
Below Land Surface 95 ft.
Approximate Yield 60+ gpm.
If Artesian: Flows gpm.
100 mg/l salt; 11g hard;

10. PUMP INFORMATION
Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK
Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Kathleen Knott License # WD 74
Address Terlton, Ok. 74081 Phone # (918)865-3546
Signed Kathleen Knott Date 8-4-90

10 ac

Form 424-0857

USE ADDITIONAL SHEETS IF NECESSARY

000355

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

2-3

12388

1. OWNER (b) (6) ADDRESS Bristow Okla

PHONE _____

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM

NE ¼ of SE ¼ of SW ¼ of sec. 13 ; TWP. 16 N S; RGE 8 ECM; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top Soil	0	2	
Sand rock	2	30	
Red bed	30	60	
Water sand	60	85	
Red bed	85	140	
Shale	140	163	
Red bed	163	180	
lime	180	182	
shale	182	205	
Water sand	205	212	
iron rock	212	215	
Water sand	215	233	
shale	233	235	

RECEIVED
AUG 1 1986
Oklahoma Water Resources Board

7. LOCATION PERMITS

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 7-22-86 Completed 7-23-86
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 235 ft.

CASING RECORD

	Diameter		From		To	
Inside		in.	18" Aground	ft.	235	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland cement Depth of Seal: 15 ft.
GRAVEL PACKED:
Gravel Packed From 15 ft. to 235 ft.
Amount Used: Approx 2 1/4 ton

PERFORATION RECORD

Type/Size				
	From 55	ft. To 95	ft.
	From 195	ft. To 235	ft.
	From	ft. To	ft.

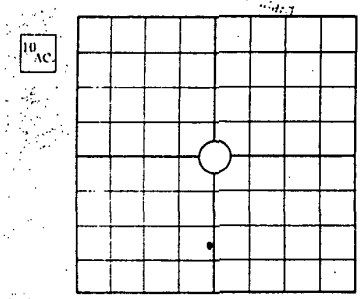
9. WELL TEST DATA

Static Water Level Below Land Surface 130 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 10 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



NE ¼ of SE ¼ of SW ¼ of SEC 13 ;
TWP 16 S; RGE 8 (Circle One) EIM WIM ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License #WD-120
Address Rt 1 Box 293 Depew Okla 74028 Phone #918-324-5465
Signed Allen Baker Date 7-23-86

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000356

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

12389

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

2-31

MULTI-PURPOSE WATER WELL REPORT

1. OWNER (b) (6) ADDRESS Kingston Okla
PHONE
2. LEGAL DESCRIPTION OF WELL EIM WIM
NW ¼ of NW ¼ of SE ¼ of sec. 13 ; TWP. 16 N S; Rge. 8 E ECM; COUNTY Creek

3. TYPE OF WORK	4. PROPOSED / PAST USE	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic ☐ Irrigation ☐ Stock	☒ Rotary ☐ Rev. Rotary
☐ Reconditioning Work ☐ Test	☐ Municipal ☐ Industrial ☐ Test	☐ Cable ☐ Other

6. LOG

Material	From	To	Saturated
Topsoil	0	6	
Sand Rock	6	15	
Water Sand	15	50	
Red bed	50	58	
Brown Rock	58	60	
Red bed	60	110	
Shale	110	135	
Water Sand	135	180	

RECEIVED JUL 10 1984

7. NEW WELL CONSTRUCTION DATA

Dates: Started 6-15-84 Completed 6-20-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 180 ft.

CASING RECORD

4½ Diameter in. 15" From ground ft. To 180 ft.
_____ in. _____ ft. _____ ft.
Surface Seal: ☒ Yes ☐ No Type: portland cement
Depth of Seal: 12 ft.
Gravel Packed:
Gravel Packed From 12 ft. to 180 ft.
Amount Used: Approx 2 ton

PERFORATION RECORD

Type _____ From 30 ft. To 50 ft.
Size _____ From 120 ft. To 180 ft.
" _____ From _____ ft. To _____ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 30 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality good

BAILER TEST

Drawdown _____ ft. After Pumping _____ hrs. At 20 gpm.
Size of Bailer: 12 gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT

RECEIVED AUG 8 1984 Oklahoma W... Resources ...

10 AC.

NW ¼ of NW ¼ of SE ¼ of SEC 13 ;
TWP 16 N S; RGE 8 E EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address 241 Depew Okla 74028 Phone # 918-324-5465
Signed Allen Baker Date 6-20-84

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000357

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12390

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

3-4'

1. OWNER [redacted] ADDRESS Sapulpa Okla.
PHONE _____
EIM (Circle One)
WIM

2. LEGAL DESCRIPTION OF WELL
SE ¼ of NW ¼ of NW ¼ of sec. 14 ; TWP. 16 N; RGE 8 ECM; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other _____
☐ Test/Monitoring	☐ Test-Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
Clay	0	45	
Water Sand	45	60	
Red Rock	60	195	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 11-8-85 Completed 11-10-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¼ in. Total Depth 195 ft.

CASING RECORD

	Diameter	From	To
Inside	4½ in.	15" Ground ft.	195 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 195 ft.
Amount Used: Approx 2 ton

PERFORATION RECORD

Type Size		
_____	From 130 ft.	To 190 ft.
_____	From _____ ft.	To _____ ft.
_____	From _____ ft.	To _____ ft.

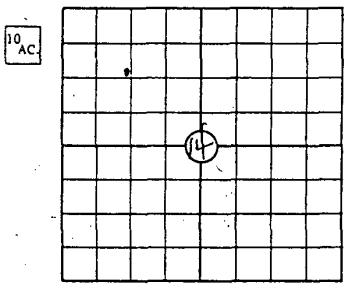
9. WELL TEST DATA

Static Water Level Below Land Surface 35 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 5 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



____ ¼ of ____ ¼ of ____ ¼ of SEC ____ ;
(Circle One)
TWP ____ N S; RGE ____ EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD 170
Address 321 Rogers Okla 74025 Phone # 918-224-5465
Signed Allen Baker Date 11-16-85

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000358

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

3-6-

#-12391

MULTI-PURPOSE WATER WELL REPORT

OWNER (b) (6) [redacted] ADDRESS Kiefer Okla.

PHONE _____

LEGAL DESCRIPTION OF WELL

NW ¼ of NW ¼ of NW ¼ of sec. 14 ; TWP. 16 N S; Rge. 8 EIM WIM ECM; COUNTY Creek

1. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other _____

6. FORMATION LOG

Material	From	To	Saturated ✓
Top Soil	0	5	
Sand rock	5	12	
Clay	12	20	
Sand rock	20	30	
Water Sand	30	45	
Red bed	45	60	
Water Sand	60	75	
Red bed	75	120	
Layers of Shale Mixed With red rock	120	145	
Water sand	145	160	
Red bed	160	164	

RECEIVED
MAY 3 1984
Oklahoma Water Resources Board

7. PLAT

10 AC.

NW ¼ of NW ¼ of NW ¼ of SEC 14 ;
TWP 16 N S; RGE 8 E EIM WIM ECM

8. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

9. NEW WELL CONSTRUCTION DATA
Dates: Started 4-19-84 Completed 4-21-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¼ in. Total Depth 164 ft.

CASING RECORD
4½ Diameter in. From 10" Ground ft. To 164 ft.
_____ in. _____ ft. _____ ft.
Surface Seal: ☑ Yes ☐ No Type: Portland Cement
Depth of Seal: 15 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 164 ft.
Amount Used: Approx 2 Tons

PERFORATION RECORD
Type _____ From 36 ft. To 75 ft.
Size _____ From 148 ft. To 164 ft.
" _____ From _____ ft. To _____ ft.

10. WELL TEST DATA
Static Water Level Below Land Surface 34 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality Good

BAILER TEST
Drawdown _____ ft. After Pumping _____ hrs. At 10 gpm.
Size of Bailer: 10 gal.

PUMPING TEST
Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

11. PLUGGING DATA
Date Plugged _____
Backfilled With X Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

12. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From X ft. To _____ ft.
☐ Replaced Screen From X ft. To _____ ft.
Deepened Well From X ft. To _____ ft.
Redeveloped Well By _____

13. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Depew Okla 74028 Phone # 918-324-5465
Signed Allen Baker Date 4-21-84

USE ADDITIONAL SHEETS IF NECESSARY

FORM 4/4-10 /h

000359

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WATER WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

3-4

#12392

1. WELL OWNER (b) (6) [redacted] PHONE
2. LEGAL DESCRIPTION NW ¼ of NW ¼ of SE ¼ of sec. 15 TWP. 16 (N) S, RGE 8 (IM/WIM (Circle One)) ECM COUNTY Creek

FINDING LOCATION
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

FORMATION RECORD

Material	From	To	Saturated
Sand rock	0	35	
Water Sand	35	45	✓
Iron rock	45	48	
Red bed	48	58	
Water Sand	58	102	✓

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

COMPLETION DATA

DATES: Started 8-8-88 Completed 8-9-88
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 ¼ in. Total Depth 102 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4 ½	in.	18" Above ground	ft.	102	ft.

Cement Grout Surface Seal? ☐ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACK:
Gravel Packed From 12 ft. to 102 ft.
Amount Used: Approx 1 ton

PERFORATION RECORD

Type/Size				
	From	42	ft. To	102 ft.
	From		ft. To	ft.
	From		ft. To	ft.

WELL DATA

Static Water Level Below Land Surface 50 ft.
Approximate Yield gpm.
If Artesian: Flows 12 gpm.
Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

PLUGGING

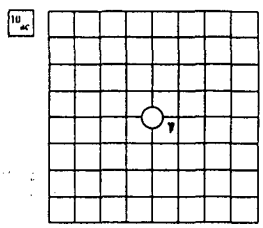
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

RECONDITIONING OR TEST HOLE

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

RECEIVED
SEP 1
Oklahoma Water Resources Board

LOCATION



CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew Okla Phone # 324-5465
Signed Allen Baker Date 8-8-88

Form 424 (10/87)

USE ADDITIONAL SHEETS IF NECESSARY

000360

White -- Water Resources Board
Canary -- Drillers Copy
Pink -- Drillers Copy

#12396

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____ (Official Use Only)

3-41

1. OWNER (b) (6) [redacted] ADDRESS Luther Okla.
PHONE
EIM (Circle One)
WIM
ECM; COUNTY Creek

2. LEGAL DESCRIPTION OF WELL
SW ¼ of SW ¼ of NE ¼ of sec. 15 ; TWP. 16 (N) S; RGE 8 ECM; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test-Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated ✓
top Soil	0	3	
Sand, rock	3	15	
red bed	15	60	
water Sand	60	80	✓
red bed	80	110	
water sand	110	135	✓
red bed	135	135	

RECEIVED
OCT 1 1986

7. LOCATION PERMIT
If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 9-24-86 Completed 9-24-86
Contractor Gilley Baker
Driller Gilley Baker
Diameter Hole 6 3/4 in. Total Depth 135' ft.

CASING RECORD

	Diameter		From		To	
Inside	4 ½	in.	18" ↑ ground		135	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 135 ft.
Amount Used: Gypsum 1 ½ sacks

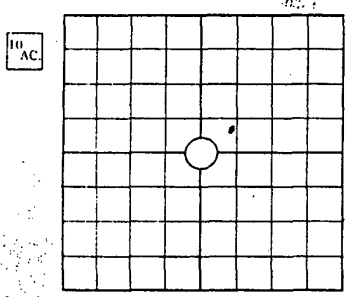
PERFORATION RECORD

Type Size				
	From	60 ft.	To	80 ft.
	From	95 ft.	To	135 ft.
	From	ft.	To	ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 103 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 15 gpm.

10. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SW ¼ of SW ¼ of NE ¼ of SEC 15 ;
TWP 16 (N) S; RGE 8 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Name Gilley Baker License # WD-176
Address RR 1 Box 293 Kiefer Okla 74041 Phone #918-321-5465
Signed Gilley Baker Date 9-24-86

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000361

3-4

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WATER WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION S 1/2 of SE ¼ of ¼ of sec. 25 TWP. 16 N S RGE 8 E (IM) W (IM) (Circle One) COUNTY Creek

FINDING LOCATION From Intersection 66 & 16 go W, cross turnpike & turn L, go appx 3 mi - house on R. side of road just past a curve.
Blocks or distance(s) from given point(s)

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Sand Rock	1	20	
Red Clay	20	70	
Water Sand	70	90	✓
Red Clay	90	93	
Water Sand	93	102	✓

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 8-28-90 Completed 9-2-90
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6 1/2 in. Total Depth 102 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4 1/2 in.	12" ground ft.	102 ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 102 ft.
Amount Used: 1 sx

PERFORATION RECORD

Type/Size		
1/4" Drilled	From 70 ft.	To 102 ft.
	From ft.	To ft.
	From ft.	To ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 60 ft.
Approximate Yield 20 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT

Submitted to Water Resources Board

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 197
Address Rt 1 Box 632 Phone 367-3137
Signed Harvey Moore Date

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000362

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WATER WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

#12402

1-2

1. WELL OWNER (b) (6) PHONE

2. LEGAL DESCRIPTION SW ¼ of SW ¼ of SW ¼ of sec. 24 TWP. 16 (N) S. RGE 8 (E/W/M) (Circle One) COUNTY Creek

FINDING LOCATION
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
top Soil	0	2	
Sand rock	2	25	
Water sand	25	35	✓
red bed	35	45	
Water sand	45	75	✓
red bed	75	80	

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA
DATES: Started 5-24-88 Completed 5-25-88
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¼ in. Total Depth 80 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4½	in.	18" Ground		80	ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 10 ft.
GRAVEL PACK:
Gravel Packed From 10 ft. to 80 ft.
Amount Used: approx 1 ton

PERFORATION RECORD
Type/Size
From 20 ft. To 80 ft.
From ____ ft. To ____ ft.
From ____ ft. To ____ ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 15 ft.
Approximate Yield 8 gpm.
If Artesian: Flows ____ gpm.

10. PUMP INFORMATION
Pump Type
Power Source
Rated Capacity ____ gpm.
Depth of Bowls or Cylinder ____ ft.

11. PLUGGING DATA
Date Plugged
Backfilled With ____ Material To ____ ft.
Grouted or Cemented From ____ Ft. To ____ ft.

12. RECONDITIONING WORK
Date Completed
Replaced Casing From ____ ft. To ____ ft.
Replaced Screen From ____ ft. To ____ ft.
Deepened Well From ____ ft. To ____ ft.
Redeveloped Well By

RECEIVED
JUL 12 1988
Oklahoma Water Resources Board

13. PLAT
10 ac

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # W.D-170
Address Rt 1 Box 293 Keystone Okla 74028 Phone # 3245465
Signed Allen Baker Date 5-25-88

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000363

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12404

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

MULTI-PURPOSE WATER WELL REPORT

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1-21

1. OWNER (b) (6) ADDRESS Tulsa Kristow Okla
PHONE _____

2. LEGAL DESCRIPTION OF WELL
EIM
WIM
NE ¼ of SE ¼ of NE ¼ of sec. 24 ; TWP. 16 N S; Rge. 8 ECM; COUNTY Creek

3. TYPE OF WORK
☒ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☒ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☒ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other _____

6. LOG

Material	From	To	Saturated ✓
Top Soil	0	3	
Sand Rock	3	20	
Water Sand	20	60	
Clay	60	105	

RECEIVED
SEP 6 1983
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA

Dates: Started 8-1-83 Completed 8-1-83
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 105 ft.

CASING RECORD

Diameter	From	To
4½ in.	15' above ground ft.	105 ft.
in.	ft.	ft.

Surface Seal: ☒ Yes ☐ No Type: Portland Cement
Depth of Seal: 15 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 105 ft.
Amount Used: Approx 1½ Ton

PERFORATION RECORD

Type _____	From 80 ft.	To 60 ft.
Size _____	From 85 ft.	To 105 ft.
" _____	From _____ ft.	To _____ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 60 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality Good

BAILER TEST

Drawdown _____ ft. After Pumping _____ hrs. At 5 gpm.
Size of Bailer: 10 gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT

10 AC.

NE ¼ of SE ¼ of NE ¼ of SEC 24 ;
WP 16 N S; RGE 8 EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Depew Okla Phone # 918-32X-5465
Signed Allen Baker Date 8-1-83

USE ADDITIONAL SHEETS IF NECESSARY

FORM 474-10 /6

000364

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

24741

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1-2

1. WELL OWNER (b) (6) Bristow, Ok, 74010 PHONE (b) (6)

2. LEGAL DESCRIPTION SW ¼ of NE ¼ of NE ¼ of sec. 24 TWP. 16N N S; RGE 8E EIM (Circle One) WIM ECM COUNTY Creek

FINDING LOCATION _____
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
XX New Well ☐ Plugging	XX Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	XX Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. FORMATION RECORD

Material	From	To	Satu-rated
Top soil	0	1	
Clay	1	2	
Sand rock	2	16	
Red clay	16	22	
Red sand rock	22	25	
Red clay	25	27	
San rock	27	34	20gpm
Red clay	34	57	
San rock	57	75	
Red clay	75	83	
Sand rock	83	100	

RECEIVED
MAY 8 - 1991
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 4-26-91 Completed 4-26-91
Contractor Knott's Water Well Drilling
Driller Dale Knott
Diameter Hole 8 in. Total Depth 100 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	5"	in.	100	ft.	+2	ft.

Cement Grout Surface Seal? XX Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 10 ft.
GRAVEL PACK:
Gravel Packed From 100 ft. to 10 ft.
Amount Used: 1T

PERFORATION RECORD

Type/Size				
1/32" slotted	From 97	ft. To 80	ft.
	From 35	ft. To 25	ft.
	From	ft. To	ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 20 ft.
Approximate Yield 20 gpm.
If Artesian: Flows _____ gpm.
75mg/l salt; 10g hard;

10. PUMP INFORMATION

Pump Type Submersible
Power Source Electric
Rated Capacity 10 gpm.
Depth of Bowls or Cylinder 90 ft.

11. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. SURFACE SKETCH

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Kathleen Knott License # WD 74
Address Rt. 1, TErlton, Ok, 74081 Phone # 4-27-91
Signed Kathleen Knott Date 965-3546

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000365

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1-'21

#12405

1. OWNER (b) (6) [redacted] ADDRESS Drumright Okla.
PHONE _____
2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM
NW ¼ of NW ¼ of NE ¼ of sec. 25 ; TWP. 18 N; RGE 8 E; ECM; COUNTY Creek.

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. WELL LOG

Material	From	To	Saturated ✓
top Soil	0	1	
Sand rock	1	25	
red bed	25	80	
Water Sand	80	100	✓
red bed	100	128	
Water Sand	128	145	✓
Sand rock	145	168	
Water Sand	168	176	
Shale	176	180	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 5-2-86 Completed 5-3-86
Contractor Gillen Baker
Driller Gillen Baker
Diameter Hole 6 3/4 in. Total Depth 150 ft.

CASING RECORD

	Diameter		From		To	
Inside	4 ½	in.	12" Above ground	ft.	150	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 15' ft.
GRAVEL PACKED:
Gravel Packed From 15 ft. to 180 ft.
Amount Used: Approx 2 Tons

PERFORATION RECORD

Type/Size
From 60 ft. To 150 ft.
From _____ ft. To _____ ft.
From _____ ft. To _____ ft.

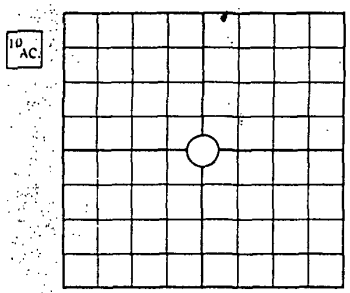
9. WELL TEST DATA

Static Water Level Below Land Surface 50 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 6½-7 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



NW ¼ of NW ¼ of NE ¼ of SEC 25 ;
TWP 18 N; RGE 8 E (Circle One) EIM WIM ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Gillen Baker License # WD 178
Address 4741 Depew Okla 74028 Phone # 918-924-5465
Signed Gillen Baker Date 5-5-86

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000366

White — Water Resources Board
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MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

2-31

#12406

1. OWNER (b) (6) ADDRESS Kingston Okla

PHONE _____

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM

SW ¼ of SW ¼ of SW ¼ of sec. 25 ; TWP. 16 (N) S; RGE 8 ECM; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☒ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top Soil	0	2	
Sand rock	2	15	
red bed	15	20	
Sand rock	20	24	
red bed	24	84	
Sand rock	84	100	
Water Sand	100	135	✓

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NOV 6 1985
O. Water Res. Bd.

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 10-16-85 Completed 10-16-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 135 ft.

CASING RECORD

	Diameter	From	To
Inside	4½ in.	2' ↑ ground ft.	135 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: portland Cement Depth of Seal: 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 135 ft.
Amount Used: Approx 1½ Ton

PERFORATION RECORD

Type/Size
From 95 ft. To 135 ft.
From _____ ft. To _____ ft.
From _____ ft. To _____ ft.

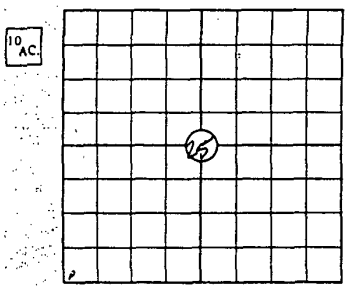
9. WELL TEST DATA

Static Water Level Below Land Surface 75 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 10 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SW ¼ of SW ¼ of SW ¼ of SEC 25 ;
WP 16 (N) S; RGE 8 (Circle One) EIM WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD170
Address Rt 1 Box 293 Depew Okla 74028 Phone # 918-324-5465
Signed Allen Baker Date 10-16-85

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000367

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10TH STREET, P.O. BOX 53585
OKLAHOMA CITY, OKLAHOMA 73152

MULTI-PURPOSE WATER WELL REPORT

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

#12047
12407

OWNER (b) (6) ADDRESS (b) (6) Bristow, Oklahoma 74010 PHONE (b) (6)

LEGAL DESCRIPTION OF WELL (EIM) WIM

NE ¼ of SE ¼ of SW ¼ of sec. 25 ; TWP. 16 (N) S; Rge. 8 ECM; COUNTY Creek

TYPE OF WORK	4. PROPOSED / PAST USE	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic ☐ Irrigation ☐ Stock	☒ Rotary ☐ Rev. Rotary
☐ Reconditioning ☐ Work ☐ Test	☐ Municipal ☐ Industrial ☐ Test	☐ Cable ☒ Other Air

Material	From	To	Saturated ✓
rown & red sandy clay opsoil	0	5	
an to red sandstone /red clayey shale ayers	5	50	
ed soft sandstone	50	55	X
ed sandy shale dry /red sandstone layers	55	95	
ed to tan sandstone /red sandy shale ayers, dry	95	130	
ed clayey shale, dry	130	150	
ed to tan sandstone w/ ray sandy shale ayers (water)	150	190	X
ed sandy shale	190	195	
an sandstone (water)	195	235	X
ed sandy shale	235	238	
an sandstone w/red andstone & red shale ayers	238	273	X
an sandstone	273	290	X
ed sandstone & shale	290	293	
an sandstone	293	300	
ed shaley sandstone	300	310	
an sandstone	310	321	X
ed sandy shale	321	325	

Dates: Started 4/19/85 Completed 4/25/85
Contractor Stewart, White & Associates, Inc.
Driller Bob Knopf
Diameter Hole 8 in. Total Depth 320 ft.

CASING RECORD

Diameter	From	To
5 in.	-0- ft.	320 ft.
5 1/2 in.	--- ft.	--- ft.

Surface Seal: ☒ Yes ☐ No Type: Cement
Depth of Seal: 10 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 320 ft.
Amount Used: 2000 lbs.

PERFORATION RECORD

Type	5" PVC Pipe	From 0 ft.	To	160	ft.
Size	5" PVC Screen	From 160 ft.	To	200	ft. ✓
"	5" Pipe PVC	From 200 ft.	To	260	ft.
	5" PVC Screen	260		320	✓

Static Water Level Below Land Surface 49 ft.
If Artesian: Flows --- gpm.
Water Temp. _____ °c/f Quality _____

BAILER TEST

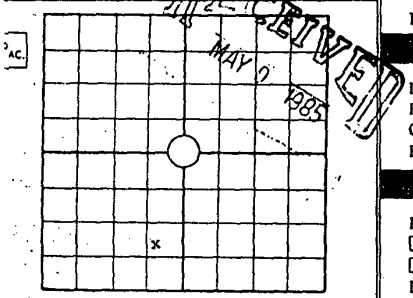
Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.
Size of Bailer: _____ gal.

PUMPING TEST

Approximate Yield 100 GPM

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

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MAY 0 1985



E ¼ of SE ¼ of SW ¼ of SEC 25 ;
P 16N (N) S; RGE 8 EIM WIM ECM

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

Pump Type By Others
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Glen Pryor License # WD 141
Address 1716 E. 7th, Tulsa, OK 74101 Phone # 918-584-3681

Signed Glen Pryor Date 5/6/85

USE ADDITIONAL SHEETS IF NECESSARY

000368

White — Water Resources Board
Canary — Driller's Copy
Pink — Driller's Copy

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Oklahoma Water Resources Board

#12408

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

1. OWNER (b) (6) ADDRESS Kingston Okla -
PHONE _____

2. LEGAL DESCRIPTION OF WELL (EIM) (WIM)
SE ¼ of NE ¼ of NW ¼ of sec. 25 ; TWP. 16 N S; Rge. 8 ECM; COUNTY Creek

3. TYPE OF WORK
☒ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☐ Rotary ☐ Rev. Rotary
☒ Cable ☐ Other _____

6. FORMATION LOG

Material	From	To	Satu-rated ✓
top soil	1	3	
Red bed	3	35	
Sand rock	35	37	
Red bed	37	55	
Sand rock	55	60	
Red bed	60	80	
Water Sand	80	95	
Red bed	95	110	
Water Sand	110	138	

7. NEW WELL CONSTRUCTION DATA
Dates: Started 1-3-84 Completed 1-6-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¼ in. Total Depth 138 ft.

CASING RECORD

Diameter	From	To
4½ in.	15" T ground ft.	138 ft.
in.	ft.	ft.

Surface Seal: ☑ Yes ☐ No Type: portland cement
Depth of Seal: 12 ft.
Gravel Packed:
Gravel Packed From 12 ft. to 138 ft.
Amount Used: Approx 1½ Ton

PERFORATION RECORD
Type _____ From 80 ft. To 138 ft.
Size _____ From _____ ft. To _____ ft.
" _____ From _____ ft. To _____ ft.

8. NEW WELL TEST DATA
Static Water Level Below Land Surface 88 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality Good

BAILER TEST
Drawdown _____ ft. After Pumping _____ hrs. At 15 gpm.
Size of Bailer: 10 gal.

PUMPING TEST
Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT OF WELL

10 AC.

SE ¼ of NE ¼ of NW ¼ of SEC _____;
TP _____ N S; RGE _____ EIM,WIM,ECM

12. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Depew, Okla 74028 Phone # 918-324-5465

Signed Allen Baker Date _____

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-(0.7)

000369

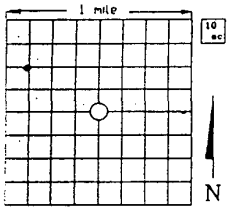
28566

1-21

MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

Please plot well location



Legal Description

NW 1/4 SW 1/4 1/4 NW 1/4 of Sec. 05 Twp. 16 N Rge. 8 E

County [illegible] Well No: _____

Well Owner (b) (6) Phone (b) (6)

Address (b) (6) Bristow OK 74010

Finding location Bristow N. Hwy. 16 - take 1st left turn after crossing Sand Creek 1/10 M. - 2nd side of rd.

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other Water Well

G.W. Use

- ☑ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☑ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	30	
Water Sand Did not include in well	30	40	
Red Clay	40	80	
Water Sand Did not include in well	80	95	
Red Clay	95	135	
Water Sand	135	160	✓

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of lands not to exceed 3 acres.)

Permit No: _____

New Boring or Well Construction Data

Date: Started 7-27-92 Completed 7-31-92

Firm Moore Waterwell Drilling

Operator Harvey (Mickey) Moore

Type of Construction ☐ Open Hole ☑ Cased Hole

Hole Diameter 6½ inches total depth 16 feet

Hole Diameter _____ inches total depth _____ feet

CASING RECORD

	diameter		from ground	to
Surface pipe	_____	inches	_____ feet	_____ feet
Well casing	4½	inches	12" feet	160 feet
Well casing	_____	inches	_____ feet	_____ feet
Well casing	_____	inches	_____ feet	_____ feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from	to
¼ Drilled	135 feet	162 feet
_____	_____ feet	_____ feet
_____	_____ feet	_____ feet

GRAVEL PACK

Type and Size	from	to
¼ Limestone	20 feet	162 feet
_____	_____ feet	_____ feet
_____	_____ feet	_____ feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from	to
Type of Surface Seal Portland	0 feet	20 feet
Aquifer Seal Type _____	_____ feet	_____ feet
_____	_____ feet	_____ feet

HYDROLOGIC DATA

First Water Zone Encountered 32 ft.

Approximate Yield 32 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged _____

Backfilled From _____ feet _____ feet Type _____

Cement Grouted From _____ feet _____ feet

Reconditioning Work

Replaced Casing/Screen From _____ feet _____ feet

Deepened Well From _____ feet _____ feet

Redeveloped Well By

Certification

The work described above was done under my supervision. This report is correct to the best of my knowledge. ✓

Name Harvey Moore Jr. Lic. No. [illegible]

Address Rt. 1 Box 32 Depew Phone 367-3137

Signed Harvey Moore Jr. Date 8-10-92

RECEIVED
OCT 29 1992
Oklahoma Water Resources Board

*See Pump Installers Form On Back

000370

#28838

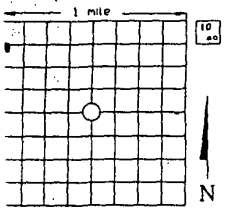
1-21

MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

FEB 10 1993

Please plot well location



Legal Description

SW 1/4 NW 1/4 NW 1/4 of Sec. 25 Twp. 16N Rge. 8E

County Creek Well No:

Well Owner (b) (6) Phon (b) (6)

Address (b) (6) Bristow, OK 74010

Finding location From Bristow, Hwy 16 N. Take 1st rd. to the left after crossing the turnpike 1½ Mi on left side

Type of work

- Geotechnical Boring
- G.W. Heat Pump Well
- Monitor Well
- Observation Well
- Piezometer
- Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other Water Well

G.W. Use

- ☒ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☒ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	30	
Water Sand	30	40	✓
Red Clay	40	80	
Water Sand	80	95	✓
Red Clay	95	135	
Water Sand	135	160	✓

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to exceed 3 acres.)

Permit No:

New Boring or Well Construction Data

Date: Started 7-26-92 Completed 7-31-92

Firm Moore Water Wells

Operator Harry Moore Sr.

Type of Construction ☐ Open Hole ☒ Cased Hole

Hole Diameter 6½ inches total depth 160 feet

Hole Diameter ____ inches total depth ____ feet

CASING RECORD

	diameter		from ground		to	
Surface pipe		inches		feet		feet
Well casing	4½	inches	12"	feet	160	feet
Well casing		inches		feet		feet
Well casing		inches		feet		feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from	to
¼" Drilled	135 feet	160 feet
	feet	feet
	feet	feet

GRAVEL PACK

Type and Size	from	to
¼" Limestone	0 feet	160 feet
	feet	feet
	feet	feet

SEAL

Cement Grout Surface Seal Installed ☒ Yes ☐ No

	from	to
Type of Surface Seal Portland	0 feet	95 feet
Aquifer Seal Type	feet	feet
	feet	feet

HYDROLOGIC DATA

First Water Zone Encountered 30 ft.

Approximate Yield 25 GPM Artesian ☐ Yes ☒ No

Plugging Data

Date Plugged

Backfilled From ____ feet ____ feet Type ____

Cement Grouted From ____ feet ____ feet

Reconditioning Work

Replaced Casing/Screen From ____ feet ____ feet

Deepened Well From ____ feet ____ feet

Redeveloped Well By

Certification

The work described above was done under my supervision. This report is correct to the best of my knowledge.

Name Harry Moore Lic. No. DPC 0140

Address Rt 1 Box 632 Depew 74028 Phone 367-9137

Signed Harry Moore Date 2-3-93

*Can Pump Installers Form On Back

000371

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA

MULTI-PURPOSE WATER WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

RECEIVED
NOV 1 1988
Oklahoma Water Resources Board

3-4'

#12410

1. WELL OWNER (b) (6)

EIM (Circle One) WIM

2. LEGAL DESCRIPTION SE ¼ of NE ¼ of SW ¼ of sec. 27 TWP. 16 N S. RGE 8 ECM COUNTY Creek

FINDING LOCATION _____
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

LITHOLOGIC LOG

Material	From	To	Saturated
top Soil	0	2	
Sand rock	2	27	
red bed	27	40	
Iron rock	40	45	
Water Sand	45	107	✓
red bed	107	111	

SKETCH MAP

10 ac

LOCATION OF WELL

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. _____

DRILLING DATA

DATES: Started 9-19-88 Completed 9-20-88
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¼ in. Total Depth 111 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	____ in.	____ ft.	____ ft.
Well Casing	4½ in.	18" Ground ft.	111 ft.

Cement Grout Surface Seal? ☐ Yes ☐ No
Type of Surface Seal Portland Depth of Seal: 12 ft.
GRAVEL PACK: Concrete
Gravel Packed From 12 ft. to 111 ft.
Amount Used: Approx 1 3/4 Ton

PERFORATION RECORD

Type/Size
_____ From 21 ft. To 111 ft.
_____ From ____ ft. To ____ ft.
_____ From ____ ft. To ____ ft.

WELL TEST DATA

Static Water Level Below Land Surface 70 ft.
Approximate Yield 10 gpm.
If Artesian: Flows ____ gpm.

Pump Type _____
Power Source X
Rated Capacity ____ gpm.
Depth of Bowls or Cylinder ____ ft.

PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To ____ ft.
Grouted or Cemented From X Ft. To ____ ft.

WELL CONDITIONING WORK

Date Completed _____
Replaced Casing From ____ ft. To ____ ft.
Replaced Screen From X ft. To ____ ft.
Deepened Well From ____ ft. To ____ ft.
Redeveloped Well By _____

CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-1170
Address RT 1 Box 293 Drumright Okla Phone # 324-9465
Signed Allen Baker Date 9/20/88

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000372

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Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____ (Official Use Only)

#12414

3-4

1. OWNER (b) (6) ADDRESS Bristow Okla
PHONE Creek
2. LEGAL DESCRIPTION OF WELL (EIM) (Circle One) WIM
SW ¼ of SW ¼ of NE ¼ of sec. 34 ; TWP. 16 S; RGE 8 ECM; COUNTY Creek

3. TYPE OF WORK
☒ New Well ☐ Plugging
☐ Reconditioning Work
☐ Test/Monitoring

4. USE
☒ Domestic
☐ Stock
☐ Test Monitoring

NON-DOMESTIC
☐ Irrigation
☐ Municipal
☐ Industrial
☐ Commercial
☐ Other

5. DRILLING METHOD
☒ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other
☐ Air

6. LOG

Material	From	To	Saturated
top soil	0	4	
Red Sand	4	18	
Sand rock	18	29	
iron rock	29	40	
red Rock	40	43	
iron rock	43	45	
red sand	45	55	
Water Sand	55	105	

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Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 5-20-85 Completed 5-20-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 105 ft.

CASING RECORD

	Diameter	From	To
Inside	4 ½ in.	18" Ground ft.	105 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: Portland cement Depth of Seal: 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 105 ft.
Amount Used: Approx 1¼ ton

PERFORATION RECORD

Type	Size		
		From 45 ft.	To 105 ft.
		From ft.	To ft.
		From ft.	To ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 60 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 12 gpm.

10. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.

W ¼ of SW ¼ of NE ¼ of SEC 34 ;
TWP 16 (N) S; RGE 8 (Circle One) EIM,WIM,ECM

12. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 283 Depew Okla 74028 Phone # 918-339-5965
Signed Allen Baker Date 5-20-85

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000373

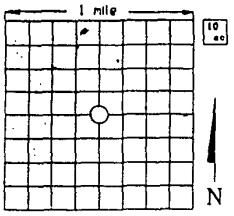
2-31

29930

MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

Please plot well location



Legal Description

NE 1/4 NE 1/4 NW 1/4 of Sec. 35 Twp. 16N Rge. 7E

County _____ Well No: _____

Well Owner (b) (6) Phone (b) (6)

Address (b) (6)

Finding location [illegible]

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other

G.W. Use

- ☑ Domestic
- ☐ Non-Domestic: Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☑ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
[illegible]	0	1	
[illegible]	1	25	
[illegible]	25	81	

0 ft. to 12 ft. I believe a seal would be the surface casing wouldn't it? You couldn't cement up any further than the surface would you?

JUL 30 1993

NOV [illegible] Oklahoma Water Resources Board

*See Pump Installers Form On Back

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to exceed 3 acres.)

Permit No: _____

New Boring or Well Construction Data

Date: Started 6-28-93 Completed 6-29-93

Firm Wilson Drilling

Operator [illegible]

Type of Construction ☐ Open Hole ☑ Cased Hole

Hole Diameter 7 7/8 inches total depth 81 feet

Hole Diameter _____ inches total depth _____ feet

CASING RECORD

	diameter		from	to
Surface pipe		inches	feet	feet
Well casing	4 1/2	inches	25" feet	81 feet
Well casing		inches	feet	feet
Well casing		inches	feet	feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from	to
[illegible]	25 feet	81 feet
	feet	feet
	feet	feet

GRAVEL PACK

Type and Size	from	to
10/20 Sandtrol	12 feet	81 feet
	feet	feet
	feet	feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from	to
Type of Surface Seal Bentonite	8 feet	12 feet
Aquifer Seal Type	feet	feet
	feet	feet

HYDROLOGIC DATA

First Water Zone Encountered _____ ft.

Approximate Yield 1 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged _____

Backfilled From _____ feet _____ feet Type _____

Cement Grouted From _____ feet _____ feet

Reconditioning Work

Replaced Casing/Screen From _____ feet _____ feet

Deepened Well From _____ feet _____ feet

Redeveloped Well By

Certification

The work described above was done under my supervision. ✓
This report is correct to the best of my knowledge.

Name [illegible] Lic. No. [illegible]

Address [illegible] Phone [illegible]

Signed [illegible] Date [illegible]

000374

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

#22443

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER (b) (6) PHONE (b) (6)
EIM (Circle One) WIM ECM
2. LEGAL DESCRIPTION NW ¼ of NW ¼ of NE ¼ of sec. 36 ; TWP. 16N N S; RGE 8E COUNTY Creek
FINDING LOCATION
Blocks or distance(s) from given point(s)

3. TYPE OF WORK
- ☒ New Well
- ☐ Plugging
- ☐ Reconditioning Work
- ☐ Monitoring
- ☐ Test Hole
- ☐ Other

4. USE
- ☒ Domestic
- ☐ Stock
- ☐ Monitoring
- ☐ Test Hole
- ☐ Other

NON-DOMESTIC
- ☐ Irrigation
- ☐ Municipal
- ☐ Industrial
- ☐ Commercial
- ☐ Other

5. DRILLING METHOD
- ☐ Fluid Rotary
- ☐ Rev. Rotary
- ☐ Cable
- ☐ Other
- ☑ Air Rotary
- ☐ H.S. Auger

6. FORMATION RECORD

Material	From	To	Saturated
Top soil	0	1	
Clay	1	7	
Sand rock	7	10	
Clay	10	14	
Sand rock	14	18	
Clay	18	24	
Shale	24	26	
Sand rock	26	30	
Clay	30	31	
Sand rock	31	44	1 gpm
Clay	44	48	
Sand rock	48	55	
Clay	55	63	
Gray iron rock	63	70	
Clay	70	100	
Sand rock	100	127	39 gpm
Iron rock	127	129	
Sand rock	129	134	
Iron rock	134	135	
Clay	135	140	

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Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA
DATES: Started 11-26-90 Completed 11-26-90
Contractor Knott's Water Well Drilling
Driller Dalae Knott
Diameter Hole 8 in. Total Depth 140 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	5" in.	140 ft.	+2 ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 10 ft.
GRAVEL PACK:
Gravel Packed From 140 ft. to 10 ft.
Amount Used: 1½T

PERFORATION RECORD
Type/Size 1/32" slotted From 137 ft. To 100 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA
Static Water Level
Below Land Surface 50 ft.
Approximate Yield 40 gpm.
If Artesian: Flows gpm.
75 mg/l salt; 50g hard;

10. PUMP INFORMATION
Pump Type Submersible
Power Source Electric
Rated Capacity 10 gpm.
Depth of Bowls or Cylinder 130 ft.

11. PLUGGING DATA
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK
Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. DRILLING CONTRACTOR CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Name Kathleen Knott License # WD 74
Address Rt. 1, Terlton, Ok, 74081 Phone # 865-3546
Signed Kathleen Knott Date 11-28-90

14. LOCATION SKETCH
10 ac

Form 424-0887
USE ADDITIONAL SHEETS IF NECESSARY

1-2

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

30241

1. WELL OWNER (b) (6) PHONE (b) (6)
EIM (Circle One) WIM ECM
2. LEGAL DESCRIPTION NW ¼ of NW ¼ of NE ¼ of sec 36 ; TWP. 16 N S; RGE 8E COUNTY Creek
FINDING LOCATION W on 66 from Bristow to Glen Acres turn R 1/4 mi on R.
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☐ New Well ☐ Plugging	☐ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LOG

Material	From	To	Saturated
Top Soil	0	1	
Red Clay + Sand Rock	1	50	
Water Sand	50	90	✓
Red Clay	90	110	
Water Sand	110	123	
Red Clay	123	128	

JAN 18 1994
Oklahoma Water Resources Board

7. LOCATION OF WELL
If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA
DATES: Started 10-28-93 Completed 10-30-93
Contractor Harvey Moore Sr
Driller Harvey Moore Sr
Diameter Hole 6 3/4 in. Total Depth 128 ft.

CASING RECORD

	Diameter		From ground		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4½	in.	12"	ft.	128	ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 10 ft.
GRAVEL PACK:
Gravel Packed From 10 ft. to ~~30~~ 128 ft.
Amount Used:

PERFORATION RECORD

Type/Size				
¼" Drilled	From 50 ft.	To 90 ft.		
"	From 110 ft.	To 123 ft.		
	From ft.	To ft.		

9. WELL TEST DATA
Static Water Level Below Land Surface 50 ft.
Approximate Yield 15 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION
Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK
Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT
10 ac

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge. ✓

Name Harvey Moore Sr License # OPC 0140
Address Rt 1 Box 632 Depew 74028 Phone # 367-3137
Signed Harvey Moore Sr Date 10-31-93

Form 424-0887
USE ADDITIONAL SHEETS IF NECESSARY

000376

Reference 13

MEMORANDUM

December 7, 1994

From: David Cates, Environmental Specialist, DEQ, Superfund (Site Assessment Unit).

To: Wilcox Oil Company Site Preliminary Assessment (PA)

Re: Public Water Supply near Bristow, Oklahoma.

Much of the following information was obtained during a telephone conversation on 11/28/94 with Danny Trout of the Bristow, Oklahoma, Public Works Department. The City of Bristow municipal water supply system has eight active wells which are connected via a distribution network to four water storage towers. The towers and wells are interconnected forming a blended system with line taps occurring before and after the towers. The system serves 4,300 people in Bristow and 119 people in Slick, Oklahoma. Water supply to the system is obtained from wells only. The water is chlorinated at the well head.

Three of Bristow's eleven wells reported to be active on the public water supply database (#'s 3, 7 & 21) are no longer part of the system (References A; B; C;). Well #7 which is incorrectly located on the database has been plugged and abandoned as a result of deactivating an underground water storage system to which it was connected. The correct location of this well was in the NE/4 SE/4 NE/4 of Section 30-T16N-R9E instead of R8E, which puts it about one quarter mile southwest of the site. Well #3 is apparently plugged and abandoned, also. Well #21 was given to Mid-America Cafe who presumably is using it for water supply.

Well #18 is incorrectly located on the public water supply database also. It should be in the SW/4 SW/4 SE/4 of Section 25-T16N-R8E instead of in the SW/4 SW/4 SW/4 of the section, which puts it within the 2 mile radius of the site. All the wells except #14 are located in the 1 to 2 mile radius zone. Well #14 is within the one half to 1 mile radius zone.

A hand dug well which has the dimensions of 30 feet in diameter by 200 feet deep was reported to be located in the NW/4 NE/4 NE/4 of Section 31-T16N-R9E. This municipal water supply well has the capability of producing but is currently shut down. An industrial well about 200 feet deep which supplies drinking water to the employees of the McAdams Pipeline Company was reported in the SE/4 SE/4 of Section 19-T16N-R9E. This well is not shown on any of the public information because apparently it was drilled in the 1950's prior to record keeping. Well #15 which was located in the SW/4 NE/4 SE/4 of Section 30-T16N-R9E, about one half mile southwest of the site, was supposedly plugged and abandoned because of diesel contamination following a train derailment. No other wells have been reported to be contaminated or abandoned because of contamination.

Three of Bristow's water supply wells are high capacity wells (#'s 20, 22, & 23), producing 200 gpm each. The other five wells (#'s 14, 16, 17, 18, 19) are small capacity wells which produce at rates from 50 gpm to 90 gpm. Not all of the wells are produced at once. Instead, two large capacity wells and one small capacity well are pumped together on a daily basis. The specific wells in this production scheme are changed periodically.

Records indicate there are two mobile home parks which have their own public water supply wells. Fogle Mobile Home Park is currently on city water and their well is reported to be inactive. It is unknown whether or not this well has been plugged and abandoned. The records show that a water supply well 120 feet deep serves 50 people of the Evergreen trailer park.

Apportionment of the population to the wells for Bristow's water supply system is based on the relative contribution of each well to the system, considering individual well capacities. The following reasons are given to support this type of apportionment: the wells are part of a blended system, they lie within two radius categories, and one well produces more than forty per cent of the daily water supply according to the production scheme cited above. Also, since annual production data is lacking, it is assumed that the large capacity wells operate for 120 days each and the small capacity wells operate for 73 days each. However, considering these durations and individual well capacities, no one well contributes more than forty per cent of the total capacity of all wells on an annual basis. The table below shows the apportionment for the total population of 4416 people (4300 from Bristow plus 116 from Slick).

POPULATION SERVED BY WELLS

WELLS ID	CAPACITY (DAILY)	EST.PROD. (ANNUAL)	POP. FRACTION	POP. SERVED
# 14	72,000	5,256,000	0.0374	165.16
# 16	72,000	5,256,000	0.0374	165.16
# 17	100,800	7,358,400	0.0524	231.40
# 18	129,600	9,460,800	0.0673	297.20
# 19	129,600	9,460,800	0.0673	297.20
# 20	288,000	34,560,000	0.2460	1086.34
# 22	288,000	34,560,000	0.2460	1086.34
# 23	288,000	34,560,000	0.2460	1086.34
Totals	1,368,000	140,472,000	0.9998	4415.14

The population served by well #14 is assigned to the 1/2 to 1 mile radius zone. Since the other wells are situated in the one to two mile zone, the remaining apportioned population is placed within this zone.

REFERENCES

A. Stegmann, S., DEQ, *Letter of Request for Public Water Supply information: Mike Harrell, Water Quality Division.* August 5, 1994. (Response attached).

B. Oklahoma Department of Environmental Quality. *Public Water Supply Reports.* 1988.

C. Oklahoma Department of Environmental Quality. *Public Water Supply Database Computer Printout.* June 26, 1992.

MEMORANDUM

August 5, 1994

To: Mike Harrell, Water Quality Division

From: Scott Stegmann, Site Assessment, Waste Management Division

Subject: Request for Public Water Supply information

The following request is for Public Water Supply information concerning the attached sites. The information provided by your division will be used in partial completion of Superfund preliminary assessments of these sites.

The following sections with the accompaning township and ranges is the area of study for this project. The following fields for each public water supply are needed from your division: pwsid #, system name, source, aquifer, location, activity, type, and population served.

Your assistance is greatly appreciated by me and our division. If you have any questions, please call me at 271-7049.

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WATER QUALITY

SITE NAME	Sections	Township	Range	County
AT & SF Roundhouse	1, 10-15, 21-28, 33-36	10 N	3 E	Pottawatomie
	5-10, 14-23, 26-35	10 N	4 E	
	1-4, 10-14	9 N	3 E	
	2-10, 16-18	9 N	4 E	
Ben Franklin Refining Company	9-17, 20-36	4 S	4 W	Jefferson
	7, 8, 16-21, 28-33	4 S	3 W	
	1-6, 8-16, 22-24	5 S	4 W	
	4-9, 17, 18	5 S	3 W	
Chicago, Rock Island, & Pacific Roundhouse	35, 36	11 N	3 E	Pottawatomie
	31-33	11 N	4 E	
	1-3, 9-16, 21-28, 33-36	10 N	3 E	
	3-10, 14-23, 26-34	10 N	4 E	
	1-3, 11, 12	9 N	3 E	
	3-8.	9 N	4 E	
Mercury Oil Refining Company	7, 17-21, 28-33	11 N	2 W	Oklahoma
	9-17, 19-36	11 N	3 W	
	4-8, 17, 18	10 N	2 W	
	1-17, 21-24	10 N	3 W	
Rock Island Roundhouse - Haileyville	10-16, 20-29, 32-36	5 N	16 E	Pittsburg
	7, 17-21, 28-33	5 N	17 E	
	1-5, 8-17, 21-24	4 N	16 E	
	4-9, 16-20	4 N	17 E	
10th Street Sludge	10-16, 21-28, 33-36	12 N	3 W	Oklahoma
	7-9, 15-22, 26-35	12 N	2 W	
	1-4, 9-15, 24	11 N	3 W	
	2-10, 16-19	11 N	2 W	
Tide Water Associated Oil Company	25, 26, 35, 36	18 N	6 E	Creek
	19-22, 26-36	18 N	7 E	
	1-3, 10-15, 23-26, 36	17 N	6 E	
	1-24, 26-34	17 N	7 E	
United States Smelting	13, 23-26, 35, 36	12 N	16 E	McIntosh
	4, 7-36	12 N	17 E	
	18, 19, 30, 31	12 N	18 E	
	1, 2, 12	11 N	16 E	
	1-18.	11 N	17 E	
	6	11 N	18 E	
Victory Metals	13, 22-27, 33-36	12 N	12 E	Okmulgee
	17-22, 26-35	12 N	13 E	
	1-4, 9-16, 22-26	11 N	12 E	
	2-11, 14-22, 28-30	11 N	13 E	
Wilcox Oil Company	1-2, 10-15, 22-27, 34-36	16 N	8 E	Creek
	3-11, 13-36	16 N	9 E	
	1-3, 11, 12	15 N	8 E	
	2-10, 17, 18	15 N	9 E	

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AUG - 8 1994
WATER QUALITY
DIVISION

PWSID	SYSTEM	SOURCEID	SOURCE	AQUIFER	DEPTH	LOCATION	ACTIVITY	TYPE	
2001955	CAMP BRISTOW	01	WELL 1	UNKNOWN		SW4NW4NW4S05T16NR09EIM	A	N	3-4
2001940	COUNTRY HILLS MHP #2 N	01	WELL 2	VAMOOSA	00220	SE4SW4SE4S07T16NR09EIM	A	T	2-3
2001941	MACK'S COUNTRY STORE	01	WELL 1	UNKNOWN		SW4NW4NW4S08T16NR09EIM	A	N	2-3
2001904	COUNTRY HILLS MHP #1 S	01	WELL 1	VAMOOSA	00220	NE4NE4NW4S18T16NR09EIM	A	T	2-3
2001964	FOOD DISTRIBUTORS	01	WELL 1	UNKNOWN		NE4NW4NE4S20T16NR09EIM	A	S	1-2
2001910	BRISTOW	09	WELL 14	VAMOOSA	00200	SE4NE4SW4S30T16NR09EIM	A	C	1/2-1
2001905	FOGLE MHP	01	WELL 1	VAMOOSA	00120	SE4NE4NW4S31T16NR09EIM	I	C	1-2
2001910	BRISTOW	07	WELL 3	VAMOOSA	00100	NW4SE4NE4S31T16NR09EIM	A	C	1-2
2001910	BRISTOW	01	WELL 16	VAMOOSA	00200	NE4NE4NE4S32T16NR09EIM	A	C	1-2

PWSID	SYSTEM	SOURCEID	SOURCE	AQUIFER	DEPTH	LOCATION	ACTIVITY	TYPE
2001910	BRISTOW	05	WELL 22	ADA-VAMOOSA	00545	NW4SE4NE4S24T16NR08EIM	A	C
2001910	BRISTOW	06	WELL 23	ADA-VAMOOSA	00545	NE4NW4NE4S24T16NR08EIM	A	C
2001910	BRISTOW	11	WELL 21	ADA-VAMOOSA	00545	NW4NE4SE4S24T16NR08EIM	A	C
2001973	MID-AMERICA CAFE	01	WELL 1		00545	NE4NE4SE4S24T16NR08EIM	A	N
2001910	BRISTOW	02	WELL 18	VAMOOSA	00200	SW4SW4SW4S25T16NR08EIM	A	C
2001910	BRISTOW	03	WELL 19	VAMOOSA	00200	SW4SE4SE4S25T16NR08EIM	A	C
2001910	BRISTOW	04	WELL 20	ADA-VAMOOSA	00450	NW4NE4NE4S25T16NR08EIM	A	C
2001910	BRISTOW	10	WELL 17	VAMOOSA	00200	SE4SW4SE4S25T16NR08EIM	A	C
2001910	BRISTOW	08	WELL 7	VAMOOSA	00200	NE4SE4NE4S30T16NR08EIM	A	C
3001937	KUYKENDALL MHP	01	BRISTOW	UNKNOWN		NE4SW4NW4S31T16NR08EIM	A	N
2001906	EVERGREEN TP	01	WELL 1	VAMOOSA	00120	NW4SE4NW4S36T16NR08EIM	A	C
2001976	BRISTOW ELKS LODGE #1614	01				SE4SE4NE4S36T16NR08EIM	A	N

PUBLIC WATER SUPPLY REPORT

FACILITY: BRISTOW
OPERATOR: BRISTOW
ADDRESS : 110 WEST 7TH STREET
BRISTOW OK 74010
PHONE : 918 3672454
SYSTEMS SERVED:
3001921 SLICK

MSIS-NUMBER : 2001910
COUNTY : CREEK
POPULATION SERVED: 5000

SOURCE OF WATER:	LEGAL DESCRIPTION	DEPTH
WELL 16	NE4SW4SW4S32T16NR08EIM	00200
WELL 18	SW4SW4SW4S25T16NR08EIM	00200
WELL 19	SW4SE4SE4S25T16NR08EIM	00200

STORAGE CAPACITY : 1500000 GALLONS
AVERAGE PRODUCTION: 400000 GALLONS/DAY
PRODUCTION CAPACITY: 1152000 GALLONS/DAY

TREATMENT:
DISINFECTION - CHLORINE GAS

PARAMETERS	UNITS	1986	1983		
HARDNESS,CALCIUM	MG/L	98.2			
CHLORIDE	MG/L	20	58		
FLUORIDE TOTAL	MG/L	0.14	0.56		
NITRITE-NITRATE AS N	MG/L	< 0.5	1.0		
PH (LAB)	STD UNIT	7.30	7.05		
SULFATE	MG/L	< 20	< 20		
SOLIDS,TOTAL DISS	MG/L	292	256		
ALKALINITY,TOTAL	MG/L	248.0	141		
HARDNESS,TOTAL	MG/L	286	124		
TURBIDITY	NTU	< 1.00	3		
WATER TEMPERATURE	DEG CELS	19.0			
ARSENIC-TOTAL	UG/L	< 10	< 10		
BARIUM TOTAL	UG/L	310	< 200		
CADMIUM-TOTAL	UG/L	< 2	< 2		
CHROMIUM-TOTAL	UG/L	< 10	< 10		
COPPER-TOTAL	UG/L	22	27		
IRON-TOTAL	UG/L	< 100	1580		
LEAD-TOTAL	UG/L	< 20	< 20		
MANGANESE-TOTAL	UG/L	< 20	< 20.0		
MERCURY-TOTAL	UG/L	< 0.5	< 0.5		
SELENIUM-TOTAL	UG/L	< 5	< 5		
SILVER-TOTAL	UG/L	< 3	< 3.0		
SODIUM-TOTAL	MG/L	30	56.00		
ZINC-TOTAL	UG/L	29	72		
CORROSIVITY	(CALC)	- 0.33			

000385

PUBLIC WATER SUPPLY REPORT

FACILITY: FOGLE MHP
OPERATOR: FOGLE MHP
ADDRESS : PO BOX 630 BRISTOW OK 74010
PHONE : 918 3673427

MSIS-NUMBER : 2001905
COUNTY : CREEK
POPULATION SERVED: 50

SOURCE OF WATER:	LEGAL DESCRIPTION	DEPTH
WELL 1	SE4NE4NE4S31T16NR09EIM	00120

STORAGE CAPACITY : GALLONS
AVERAGE PRODUCTION: GALLONS/DAY
PRODUCTION CAPACITY: GALLONS/DAY

PARAMETERS	UNITS	1986	1983
HARDNESS,CALCIUM	MG/L	172.5	
CHLORIDE	MG/L	15	14
FLUORIDE TOTAL	MG/L	< 0.10	0.56
NITRITE-NITRATE AS N	MG/L	4.1	5.8
PH (LAB)	STD UNIT	7.20	6.43
SULFATE	MG/L	43	48
SOLIDS,TOTAL DISS	MG/L	410	387
ALKALINITY,TOTAL	MG/L	279.0	262
HARDNESS,TOTAL	MG/L	299	283
TURBIDITY	NTU	< 1.00	< 1
WATER TEMPERATURE	DEG CELS	16.5	
ARSENIC-TOTAL	UG/L	< 10	< 10
BARIUM TOTAL	UG/L	350	< 200
CADMIUM-TOTAL	UG/L	< 2	< 2
CHROMIUM-TOTAL	UG/L	< 10	< 10
COPPER-TOTAL	UG/L	10	39
IRON-TOTAL	UG/L	< 100	< 100
LEAD-TOTAL	UG/L	< 20	< 20
MANGANESE-TOTAL	UG/L	< 20	< 20.0
MERCURY-TOTAL	UG/L	< 0.5	< 0.5
SELENIUM-TOTAL	UG/L	< 5	< 5
SILVER-TOTAL	UG/L	< 3	< 3.0
SODIUM-TOTAL	MG/L	36	37.00
ZINC-TOTAL	UG/L	79	180
CORROSIVITY	(CALC)	- 0.08	

000386

PUBLIC WATER SUPPLY REPORT

FACILITY: EVERGREEN TP
OPERATOR: EVERGREEN TP
ADDRESS : RT 1 BOX 77
BRISTOH OK 74010
PHONE : 918 3672692

MSIS-NUMBER : 2001906
COUNTY : CREEK
POPULATION SERVED: 50

SOURCE OF WATER:	LEGAL DESCRIPTION	DEPTH
WELL 1	NW4SE4SE4S36T16NR08EIM	00120

STORAGE CAPACITY : 4900 GALLONS
AVERAGE PRODUCTION: GALLONS/DAY
PRODUCTION CAPACITY: GALLONS/DAY

PARAMETERS	UNITS	1986	1983
HARDNESS,CALCIUM	MG/L	98.2	
CHLORIDE	MG/L	21	28
FLUORIDE TOTAL	MG/L	0.13	0.60
NITRITE-NITRATE AS N	MG/L	1.2	1.7
PH (LAB)	STD UNIT	6.80	7.05
SULFATE	MG/L	< 20	< 20
SOLIDS,TOTAL DISS	MG/L	226	239
ALKALINITY,TOTAL	MG/L	169.0	164
HARDNESS,TOTAL	MG/L	191	173
TURBIDITY	NTU	< 1.00	< 1
WATER TEMPERATURE	DEG CELS	16.5	
ARSENIC-TOTAL	UG/L	< 10	< 10
BARIUM TOTAL	UG/L	300	242
CADMIUM-TOTAL	UG/L	< 2	< 2
CHROMIUM-TOTAL	UG/L	10	< 10
COPPER-TOTAL	UG/L	4	4
IRON-TOTAL	UG/L	< 100	< 100
LEAD-TOTAL	UG/L	< 20	< 20
MANGANESE-TOTAL	UG/L	< 20	< 20.0
MERCURY-TOTAL	UG/L	< 0.5	< 0.5
SELENIUM-TOTAL	UG/L	< 5	< 5
SILVER-TOTAL	UG/L	< 3	< 3.0
SODIUM-TOTAL	MG/L	17	18.00
ZINC-TOTAL	UG/L	34	63
CORROSIVITY	(CALC)	- 0.93	

000387

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10  2001907045                    0190203              9183672454OK
16  2001907050     X
17  2001907055              19        0          0      40000     40000          0      40000
18  2001910001 C0574000050001              SA000000    NBRISTOW
19  2001910005 01WELL 16                G       PVAM00354955096243O                 00000000000G       01
20  2001910005 01VAMOOSA          0005800200                                                            02
21  2001910005 01                                                          NE4NE4NE4S32T16NR09EIM03
22  2001910005 02WELL 18                G       OVAM00354955096243O                 00000000000G       01
23  2001910005 02VAMOOSA          0005800200                                                            02
24  2001910005 02                                                          SW4SW4SW4S25T16NR08EIM03
25  2001910005 03WELL 19                G       PVAM00354955096243O                 00000000000G       01
26  2001910005 03VAMOOSA          0005800200                                                            02
27  2001910005 03                                                          SW4SE4SE4S25T16NR08EIM03
28  2001910005 04WELL 20                G       PADA-03549550962430                 00000000000G       01
29  2001910005 04ADA-VAMOOSA      0004200450                                                            02
30  2001910005 04                                                          NW4NE4NE4S25T16NR08EIM03
31  2001910005 05WELL 22                G       PADA-03549550962430                 00000000000G       01
32  2001910005 05ADA-VAMOOSA      0004200545                                                            02
33  2001910005 05                                                          NW4SE4NE4S24T16NR08EIM03
34  2001910005 06WELL 23                G       PADA-03549550962430                 00000000000G       01
35  2001910005 06ADA-VAMOOSA      0004200545                                                            02
36  2001910005 06                                                          NE4NW4NE4S24T16NR08EIM03
37  2001910005 07WELL 3                 G       OVAM00354955096243O                 00000000000G       01
38  2001910005 07VAMOOSA          0005800100                                                            02
39  2001910005 07                                                          NW4SE4NE4S31T16NR09EIM03
40  2001910005 08WELL 7 capped          G       RVAM00354955096243O                 00000000000G       01
41  2001910005 08VAMOOSA          0005800200                                                            02
42  2001910005 08                                                          NE4SE4NE4S30T16NR08EIM03
43  2001910005 09WELL 14                G       OVAM00354955096243O                 00000000000G       01
44  2001910005 09VAMOOSA          0005800200                                                            02
45  2001910005 09                                                          SE4NE4SW4S30T16NR09EIM03
46  2001910005 10WELL 17                G       OVAM00354955096243O                 00000000000G       01
47  2001910005 10VAMOOSA          0005800200                                                            02
48  2001910005 10                                                          SE4SW4SE4S25T16NR08EIM03
49  2001910005 11WELL 21                G       RADA-03549550962430                 00000000000G       01
50  2001910005 11ADA-VAMOOSA      0004200545                                                            02
51  2001910005 11                                                          NW4NE4SE4S24T16NR08EIM03
52  2001910025 BRISTOW
53  2001910030 100 W 7TH ST                                BRISTOW              OK74010     M
54  2001910035 BRISTOW                                     % WATER DEPARTMENT
55  2001910040 110 WEST 7TH STREET                         BRISTOW              OK74010
56  2001910045                    0190203              9183672454OK
57  2001910050     X
    2001910055              1980   1845     400000     500000   1152000          0    1500000
    2001911001 C0574000002501              SA000000      NSHAMROCK
    2001911005 01WELL 1                 G       PVAM00355450096351S                 100000000001       01
    2001911005 01VAMOOSA          0005800485                                                            02
    2001911005 01ADDRESS CHANGED 27MAR90 FAB                               NE4SE4NE4S32T17NR07EIM03
    2001911005 02WELL 2                 G       RVAM00355450096351S                 100000000001       01
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2001903035 DEPEW
2001903040 PO BOX 357                          DEPEW                OK74028
2001903045                  0190203                 91832452510K
2001903050     X
2001903055              140     250     75000     432000        0        0     50000
2001904001 NC6770000000121          SA0000DD      NCOUNTRY HILLS MHP #1 S
2001904005 01WELL 1           G     PVAMO                                Y     01
2001904005 01VAMOOSA          0005800220                                       02
2001904005 01                                                NE4NE4NW4S18T16NR09EIM03
2001904025 COUNTRY HILLS MHP #1 SOUTH
2001904030 RT 3 BOX 63                         BRISTOW              OK74010    I
2001904035 COUNTRY HILLS MHP #1 SOUTH
2001904040 RT 3 BOX 63                         BRISTOW              OK74010
2001904045                  0190203                 91836792340K
2001904050        X
2001904055              9       0       0         0         0        0        0
2001905001 C06770000000501          SA000000      NFOGLE MHP
2001905005 01WELL 1           G     PVAM00360500096245O          100000000000     01
2001905005 01VAMOOSA          0005800120                                       02
2001905005 01                                                SE4NE4NW4S31T16NR09EIM03
2001905025 FOGLE MHP
2001905030 PO BOX 630                          BRISTOW              OK74010    I
2001905035 FOGLE MHP                           % RAY FOGLE
2001905040 PO BOX 630                          BRISTOW              OK74010
2001905045                  0190203                 91836734270K
2001905050        X
2001905055              14      0       0                  0        0        0
2001906001 C06770000000501          SA000000      NEVERGREEN TP
2001906005 01WELL 1           G     PVAM00355415096270O          100000000000     01
2001906005 01VAMOOSA          0005800120                                       02
2001906005 01                                                NW4SE4NW4S36T16NR08EIM03
2001906025 EVERGREEN TP
2001906030 RT 1 BOX 77                         BRISTOW              OK74010    I
2001906035 EVERGREEN TP                        % RONALD BOYD
2001906040 RT 1 BOX 77                         BRISTOW              OK74010
2001906045                  0190203                 91836726920K
2001906050        X
2001906055              21      0       0         0         0        0     4900
2001907001 C06770000000501          SA000000      NCREEK COUNTY RWD #10
2001907005 01BIG WELL         G     PVAM00360500096301O          100000000000     01
2001907005 01VAMOOSA          00058                                            02
2001907005 01                                                NE4SW4NE4S08T18NR09EIM03
2001907005 02LITTLE WELL      G     PVAM00360500096301O          100000000000     01
2001907005 02VAMOOSA          00058                                            02
2001907005 02                                                SE4SE4NW4S08T18NR09EIM03
2001907025 CREEK COUNTY RWD #10
2001907030 RT 2, BOX 942                       MANNFORD             OK74044    I
2001907035 CREEK COUNTY RWD #10                JOSEPHINE PATKOFF
2001907040 RT 2 BOX 964                        MANNFORD,            OK74044
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2001971045                    019                                    OK
2001971050              X
2001971055                    2        0        0        0        0        0        0
2001972001 N029100000000251           SA                  MIDAMERICA CAFE
2001972005 01WELL 1                                                                  01
2001972005 01                                                                        02
2001972005 01                                                          S  T  R    M03
2001972025 MIDAMERICA  CAFE
2001972030 PO BOX 900                          BRISTOW,              OK74010    I
2001972035 MIDAMERICA CAFE
2001972040 PO BOX 900                          BRISTOW               OK74010
2001972045                    019                    91836723000K
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2001972055                    1        0        0        0        0        0        0
2001973001 NC391000000000251          SA                  MID-AMERICA CAFE
2001973005 01WELL 1           G                                                      01
2001973005 01                          00545                                         02
2001973005 01                                                  NE4NE4SE4S24T16NR08EIM03
2001973025 MID-AMERICA CAFE
2001973030 BOX 900                             BRISTOW               OK74010    I
2001973035 MID-AMERICA CAFE
2001973040 BOX 900                             BRISTOW               OK74010
2001973045                    019                    91836723000K
2001973050              X
2001973055                    5        0        0        0        0        0        0
2002001001 C061200000014751           SA000000      NTHOMAS PWA
2002001005 01WELL 1           G       PRUSH03544000984350       100000000000G      01
2002001005 01RUSH SPRINGS SS00000200220                                              02
2002001005 01                                                  NW4NW4NE4S32T15NR14WIM03
2002001005 02WELL 2           G       PRUSH03544000984350       100000000000G      01
2002001005 02RUSH SPRINGS SS00000200220                                              02
2002001005 02                                                  NW4NW4SE4S32T15NR14WIM03
2002001005 03WELL 3           G       PRUSH03544000984350       100000000000G      01
2002001005 03RUSH SPRINGS SS00000200220                                              02
2002001005 03                                                  NW4NW4SE4S32T15NR14WIM03
2002001005 04WELL 4           G       PRUSH03544000984350       100000000000G      01
2002001005 04RUSH SPRINGS SS00000200185                                              02
2002001005 04                                                  NW4SE4SE4S32T15NR14WIM03
2002001005 05WELL #5          G       PRUSH                                          01
2002001005 05RUSH SPRINGS SS00002                                                    02
2002001005 05                                                  NW4SE4SE4S32T15NR14W M03
2002001025 THOMAS
2002001030 BOX 250                             THOMAS                OK73669    I
2002001035 THOMAS PWA
2002001040 BOX 250                             THOMAS                OK73669
2002001045                    0200405                4056612502OK
2002001050     X
2002001055                525      525     110000     160000     400000         0     355000
2002002001 C06770000095001            SA000000      NWEATHERFORD PWA
```

Reference 14

Table 1. Selected Population and Housing Characteristics: 1990
Creek County, Oklahoma

The population counts set forth herein are subject to possible correction for undercount or overcount. The United States Department of Commerce is considering whether to correct these counts and will publish corrected counts, if any, not later than July 1, 1991.

Total population	60,915
SEX	
Male	29,609
Female	31,306
AGE	
Under 5 years	4,432
5 to 17 years	12,661
18 to 20 years	2,512
21 to 24 years	2,714
25 to 44 years	18,028
45 to 54 years	7,087
55 to 59 years	2,881
60 to 64 years	2,682
65 to 74 years	4,416
75 to 84 years	2,662
85 years and over	840
Median age	34.2
Under 18 years	17,093
Percent of total population	28.1
65 years and over	7,918
Percent of total population	13.0
HOUSEHOLDS BY TYPE	
Total households	22,470
Family households (families)	17,336
Married-couple families	14,544
Percent of total households	64.7
Other family, male householder	676
Other family, female householder	2,116
Nonfamily households	5,134
Percent of total households	22.8
Householder living alone	4,662
Householder 65 years and over	2,411
Persons living in households	60,273
Persons per household	2.68
GROUP QUARTERS	
Persons living in group quarters	642
Institutionalized persons	611
Other persons in group quarters	31
RACE AND HISPANIC ORIGIN	
White	53,522
Black	1,918
Percent of total population	3.1
American Indian, Eskimo, or Aleut	5,128
Percent of total population	8.4
Asian or Pacific Islander	142
Percent of total population	0.2
Other race	205
Hispanic origin (of any race)	660
Percent of total population	1.1

Total housing units	25,143
OCCUPANCY AND TENURE	
Occupied housing units	22,470
Owner occupied	17,440
Percent owner occupied	77.6
Renter occupied	5,030
Vacant housing units	2,673
For seasonal, recreational, or occasional use	161
Homeowner vacancy rate (percent)	3.2
Rental vacancy rate (percent)	12.8
Persons per owner-occupied unit	2.69
Persons per renter-occupied unit	2.65
Units with over 1 person per room	802
UNITS IN STRUCTURE	
1-unit, detached	18,214
1-unit, attached	267
2 to 4 units	665
5 to 9 units	468
10 or more units	406
Mobile home, trailer, other	5,123
VALUE	
Specified owner-occupied units	11,076
Less than $50,000	6,402
$50,000 to $99,999	3,921
$100,000 to $149,999	558
$150,000 to $199,999	141
$200,000 to $299,999	40
$300,000 or more	14
Median (dollars)	44,500
CONTRACT RENT	
Specified renter-occupied units paying cash rent	4,181
Less than $250	2,576
$250 to $499	1,529
$500 to $749	69
$750 to $999	6
$1,000 or more	1
Median (dollars)	223
RACE AND HISPANIC ORIGIN OF HOUSEHOLDER	
Occupied housing units	22,470
White	20,124
Black	725
Percent of occupied units	3.2
American Indian, Eskimo, or Aleut	1,520
Percent of occupied units	6.8
Asian or Pacific Islander	34
Percent of occupied units	0.2
Other race	67
Hispanic origin (of any race)	187
Percent of occupied units	0.8

The user should note that there are limitations to many of these data. Please refer to the technical documentation provided with Summary Tape File 1A for a further explanation on the limitations of the data.

Reference 15

MARK S. COLEMAN
Executive Director

DAVID WALTERS
Governor

State of Oklahoma

DEPARTMENT OF ENVIRONMENTAL QUALITY

August 5, 1994

Site
Wilcox oil company
NO INTAKES

Gene Dousett
Stream Water Division
Oklahoma Water Resources Board
6000 North Harvey
P.O. Box 150
Oklahoma City, Oklahoma 73101

Dear Mr. Dousett:

The purpose of this letter is to request any information regarding surface water intakes that may be located within 15 miles downstream from the point of entry (PPE) into perennial waters. Enclosed is the list of sites and the legal location of the **PPE** and **15-mile end.** The information provided by your office will be used to partly describe surface water targets in preliminary site assessments conducted by the DEQ (Superfund), as authorized through a cooperative agreement with the U.S. Environmental Protection Agency.

Your assistance is greatly appreciated by me and our division. If you have any questions, please call me at 271-7049.

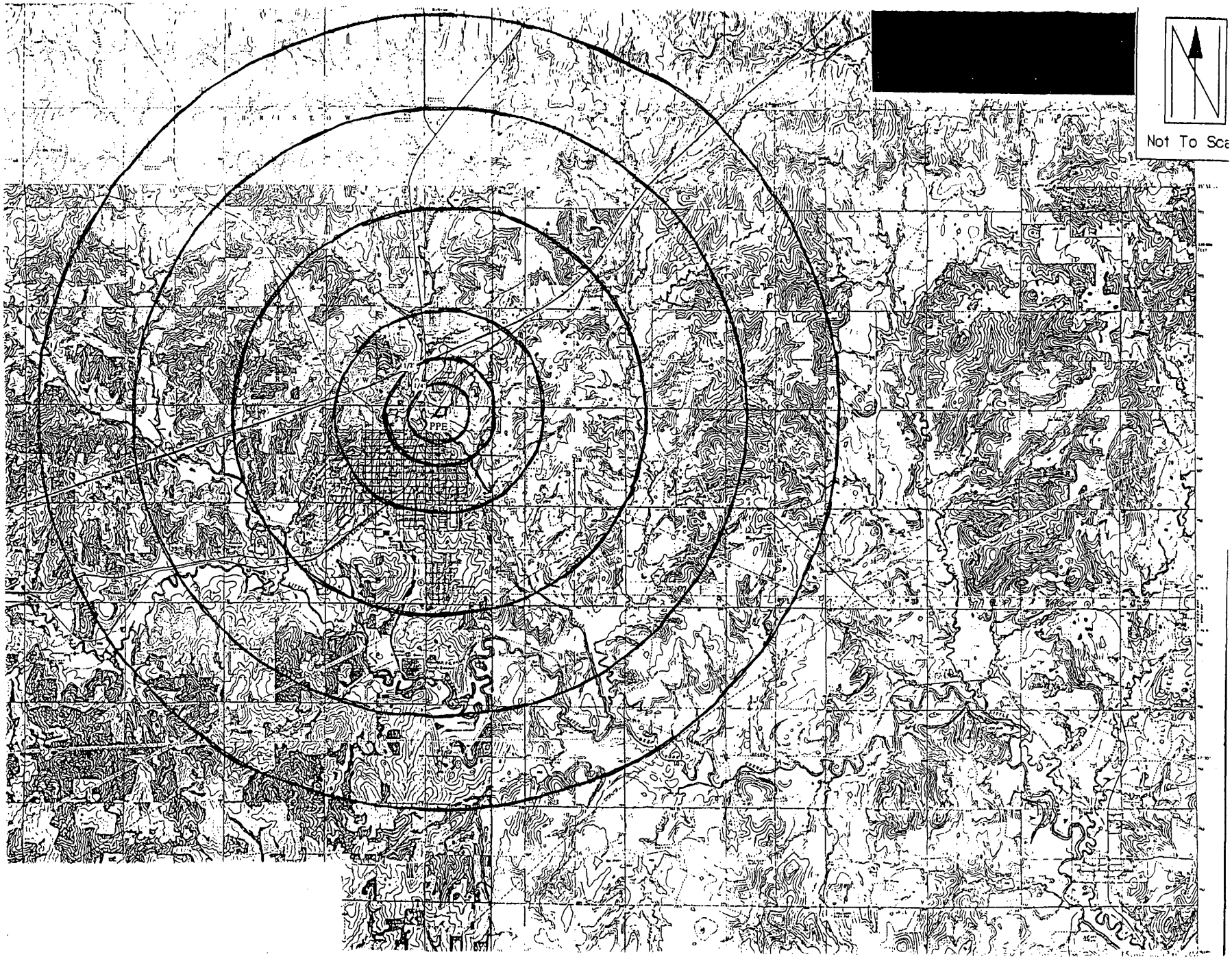
Sincerely,

Scott Stegmann

Scott Stegmann
Site Assessment Unit
Waste Management Division

Attachment

Reference 16


[redacted]
Not To Sca
PPE

Reference 17

STATISTICAL SUMMARIES OF STREAMFLOW RECORDS IN OKLAHOMA AND PARTS OF ARKANSAS, MISSOURI, AND TEXAS THROUGH 1984

RECEIVED
SEP 26 1988
Waste Management Service

By David C. Heimann and Robert L. Tortorelli

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations Report 87-4205

Prepared in cooperation with the
OKLAHOMA WATER RESOURCES BOARD



Oklahoma City, Oklahoma
1988

000398

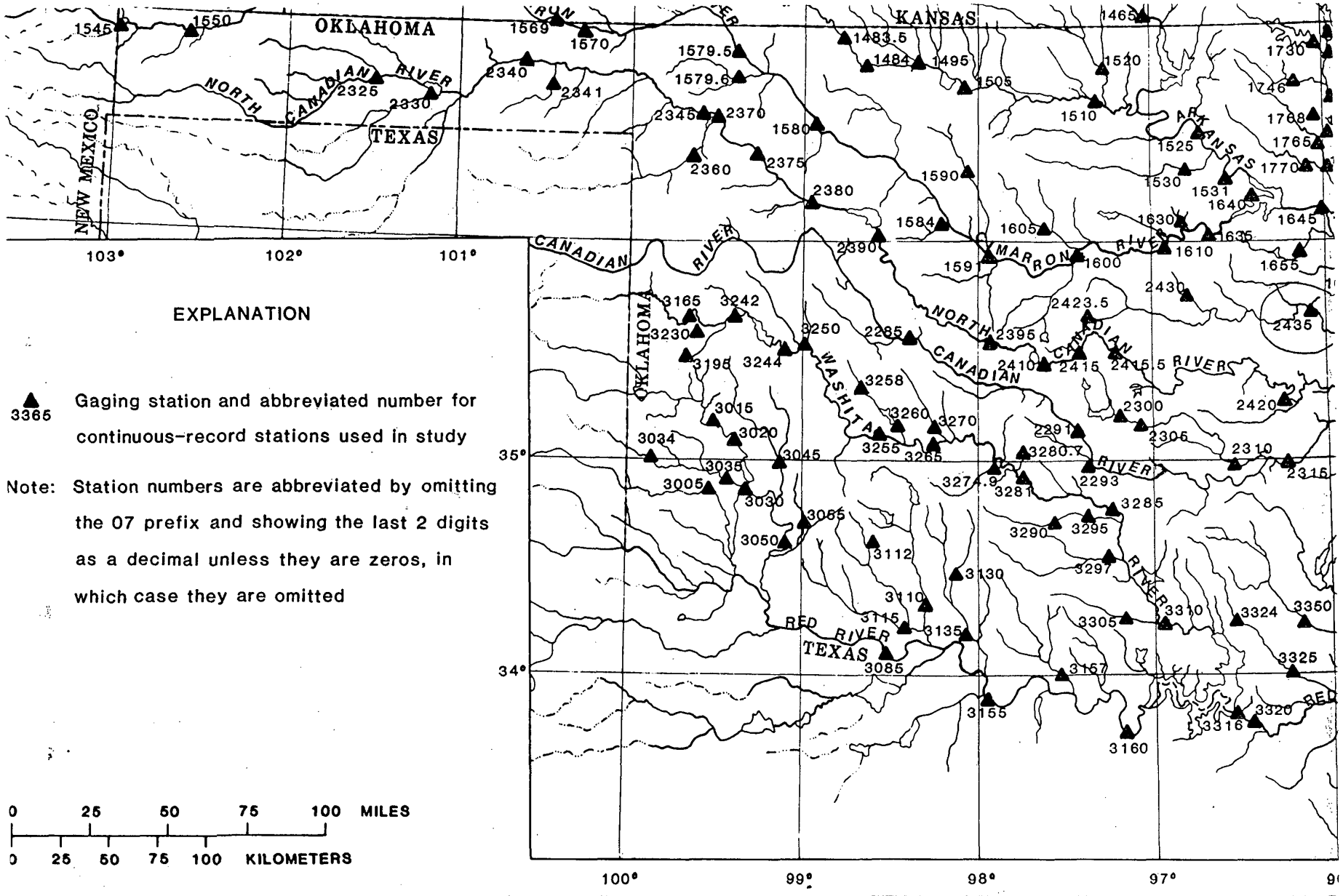


Figure 1.--Location of streamflow gaging stations.

000399

07243500 DEEP FORK NEAR BEGGS, OK

LOCATION.--Lat 35°40'31", long 96°03'55", NW 1/4 SW 1/4 sec.20, T.14 N., R.12 E., Okmulgee County, Hydrologic Unit 11100303, on right bank 1,000 ft downstream from county road bridge, 2.8 mi upstream from Adams Creek, 4.0 mi south of Beggs, 8.2 mi downstream from Flat Rock (Checkerboard) Creek, and at mile 84.8.

DRAINAGE AREA.--2,018 mi^2.

PERIOD OF RECORD.--September 1938 to current year.

REMARKS.--Flow regulated since 1968 by numberous floodwater-retarding structures.

STREAMFLOW UNREGULATED

MONTHLY AND ANNUAL MEAN DISCHARGES 1939-67

MONTH	MAXIMUM (CFS)	MINIMUM (CFS)	MEAN (CFS)	STANDARD DEVIATION (CFS)	COEFFICIENT OF VARIATION	PERCENT OF ANNUAL RUNOFF
OCTOBER	5460	0.00	613	1390	2.3	6.3
NOVEMBER	5980	0.00	477	1140	2.4	4.9
DECEMBER	1220	0.51	252	343	1.4	2.6
JANUARY	1190	7.7	206	286	1.4	2.1
FEBRUARY	1850	20	309	411	1.3	3.2
MARCH	4490	9.6	584	890	1.5	6.0
APRIL	9520	37	1570	2160	1.4	16.3
MAY	12500	178	2350	2850	1.2	24.4
JUNE	8900	59	1820	2340	1.3	18.9
JULY	3950	5.7	830	975	1.2	8.6
AUGUST	1770	3.3	276	393	1.4	2.9
SEPTEMBER	1300	0.00	364	423	1.2	3.8
ANNUAL	2450	114	806	602	0.75	100

MAGNITUDE AND PROBABILITY OF ANNUAL LOW FLOW
BASED ON PERIOD OF RECORD 1940-67

PERIOD (CONSECUTIVE DAYS)	DISCHARGE, IN CFS, FOR INDICATED RECURRENCE INTERVAL, IN YEARS, AND NON-EXCEEDANCE PROBABILITY, IN PERCENT			
	2 50%	5 20%	10 10%	20 5%
1	7.9	1.2	0.00	0.00
3	8.8	1.4	0.00	0.00
7	10	1.6	0.00	0.00
14	14	2.0	0.30	0.00
30	22	4.3	1.0	0.00
60	44	11	3.0	0.00
90	72	15	4.8	0.96
120	107	19	5.4	1.6
183	142	34	14	6.3

MAGNITUDE AND PROBABILITY OF INSTANTANEOUS PEAK FLOW
BASED ON 29 YEARS OF RECORD

DISCHARGE, IN CFS, FOR INDICATED RECURRENCE INTERVAL IN YEARS, AND EXCEEDANCE PROBABILITY, IN PERCENT					
2 50%	5 20%	10 10%	25 4%	50 2%	100 1%
9440	22600	36900	63700	91900	129000

OKLAHOMA WEIGHTED SKEW = 0.335

MAGNITUDE AND PROBABILITY OF ANNUAL HIGH FLOW
BASED ON PERIOD OF RECORD 1939-67

PERIOD (CONSECUTIVE DAYS)	DISCHARGE, IN CFS, FOR INDICATED RECURRENCE INTERVAL, IN YEARS, AND EXCEEDANCE PROBABILITY, IN PERCENT					
	2 50%	5 20%	10 10%	25 4%	50 2%	100 1%
1	9070	21400	34100	57000	80200	110000
3	8330	18800	29200	47200	64800	86600
7	6970	15100	22700	35400	47300	61400
15	4730	9850	14500	22000	28900	36900
30	2990	6370	9480	14500	19100	24500
60	2010	4200	6150	9190	11900	15000
90	1640	3340	4740	6780	8460	10300

DURATION TABLE OF DAILY MEAN FLOW FOR PERIOD OF RECORD 1939-67

DISCHARGE, IN CFS, WHICH WAS EQUALED OR EXCEEDED FOR INDICATED PERCENT OF TIME																
1%	5%	10%	15%	20%	30%	40%	50%	60%	70%	80%	90%	95%	98%	99%	99.5%	99.9%
11900	3790	2180	1260	702	333	194	124	81	51	28	13	5.1	0.20	0.05	0.03	0.00

000400

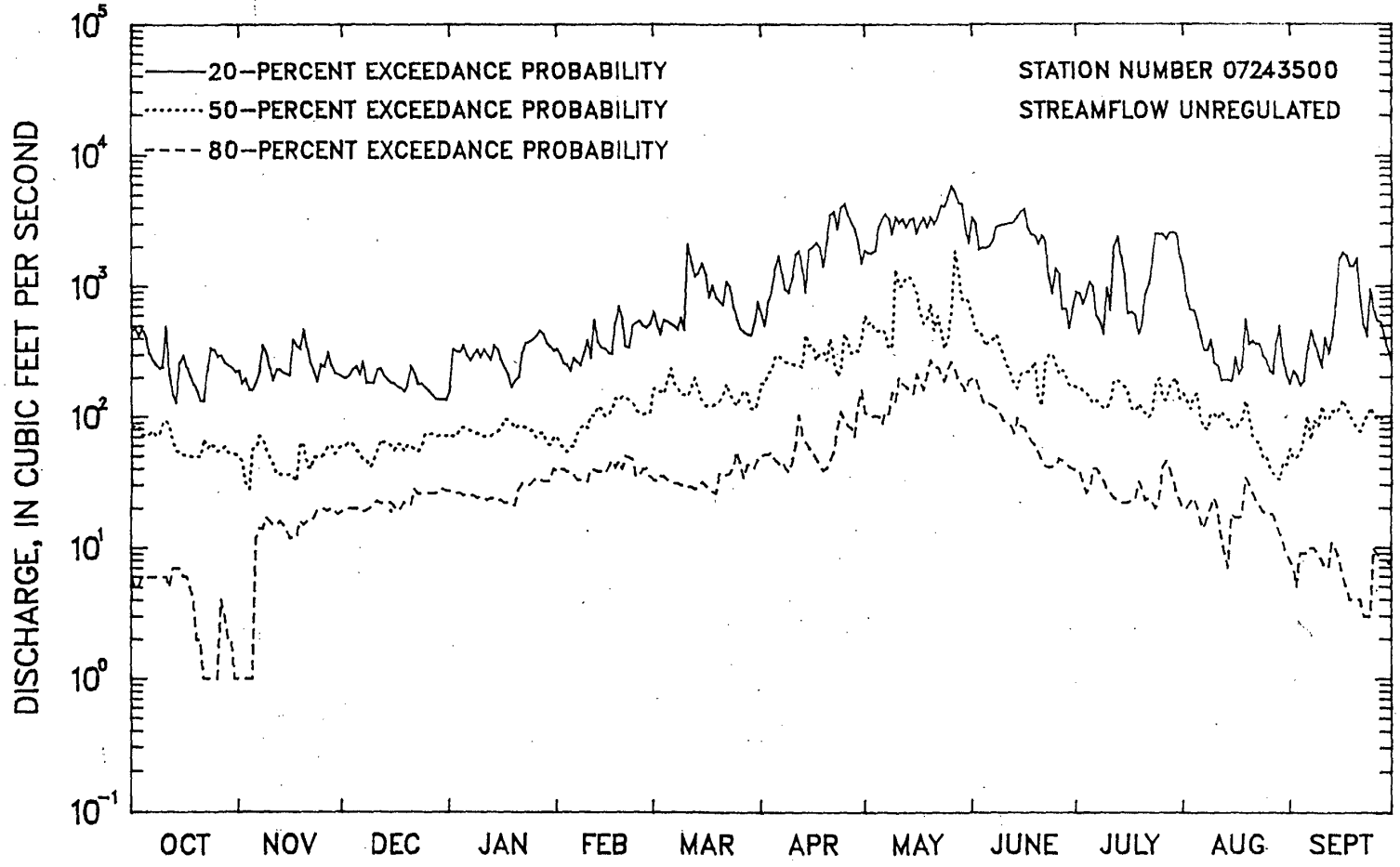
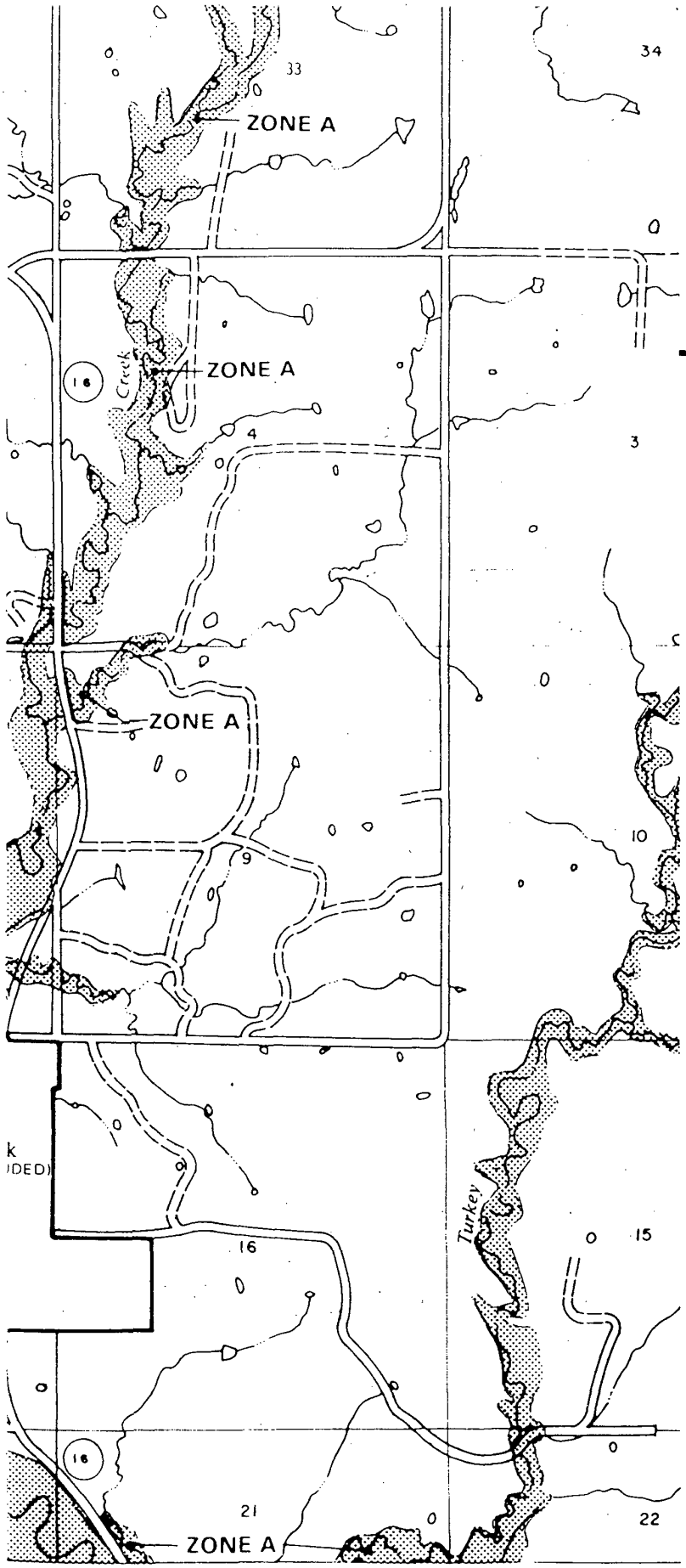


Figure 103.--Duration hydrographs of daily discharge values for Deep Fork near Beggs, Oklahoma, water years 1949–1967 (streamflow unregulated).

000401

Reference 18



APPROXIMATE SCALE

2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CREEK COUNTY, OKLAHOMA

UNINCORPORATED AREA

PANEL 7 OF 10

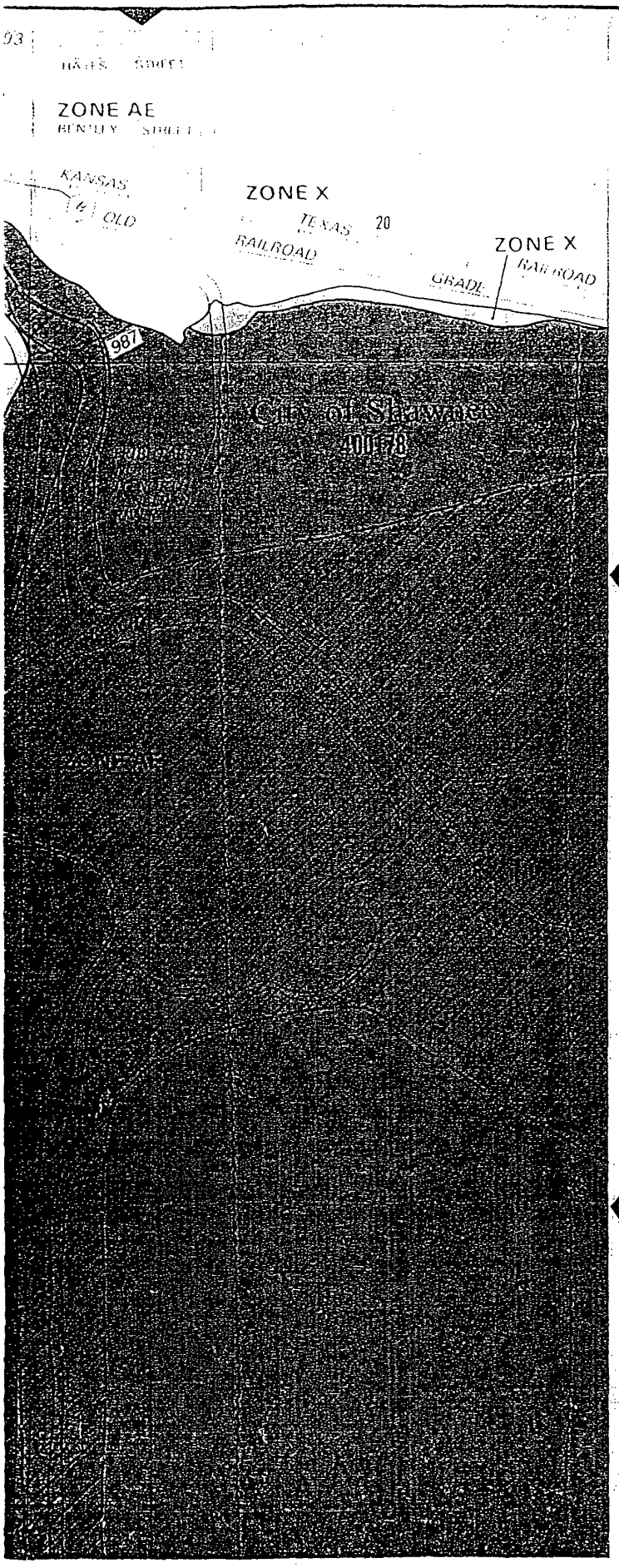
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
400490 0007 B

EFFECTIVE DATE:
JUNE 1, 1987

federal emergency management agency
federal insurance administration

000403



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100 YEAR FLOOD

- ZONE A — No base flood elevations determined
- ZONE AE — Base flood elevations determined
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined; for areas of alluvial fan flooding, velocities also determined
- ZONE A99 — To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined
- ZONE V — Coastal flood with velocity hazard (wave action); no base flood elevations determined
- ZONE VE — Coastal flood with velocity hazard (wave action); base flood elevations determined

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- ZONE X — Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- ZONE X — Areas determined to be outside 500-year floodplain.
- ZONE D — Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones
- 513 — Base Flood Elevation Line; Elevation in Feet*
- D — D — Cross Section Line
- (EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone*
- RM7X — Elevation Reference Mark
- •M1.5 — River Mile

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

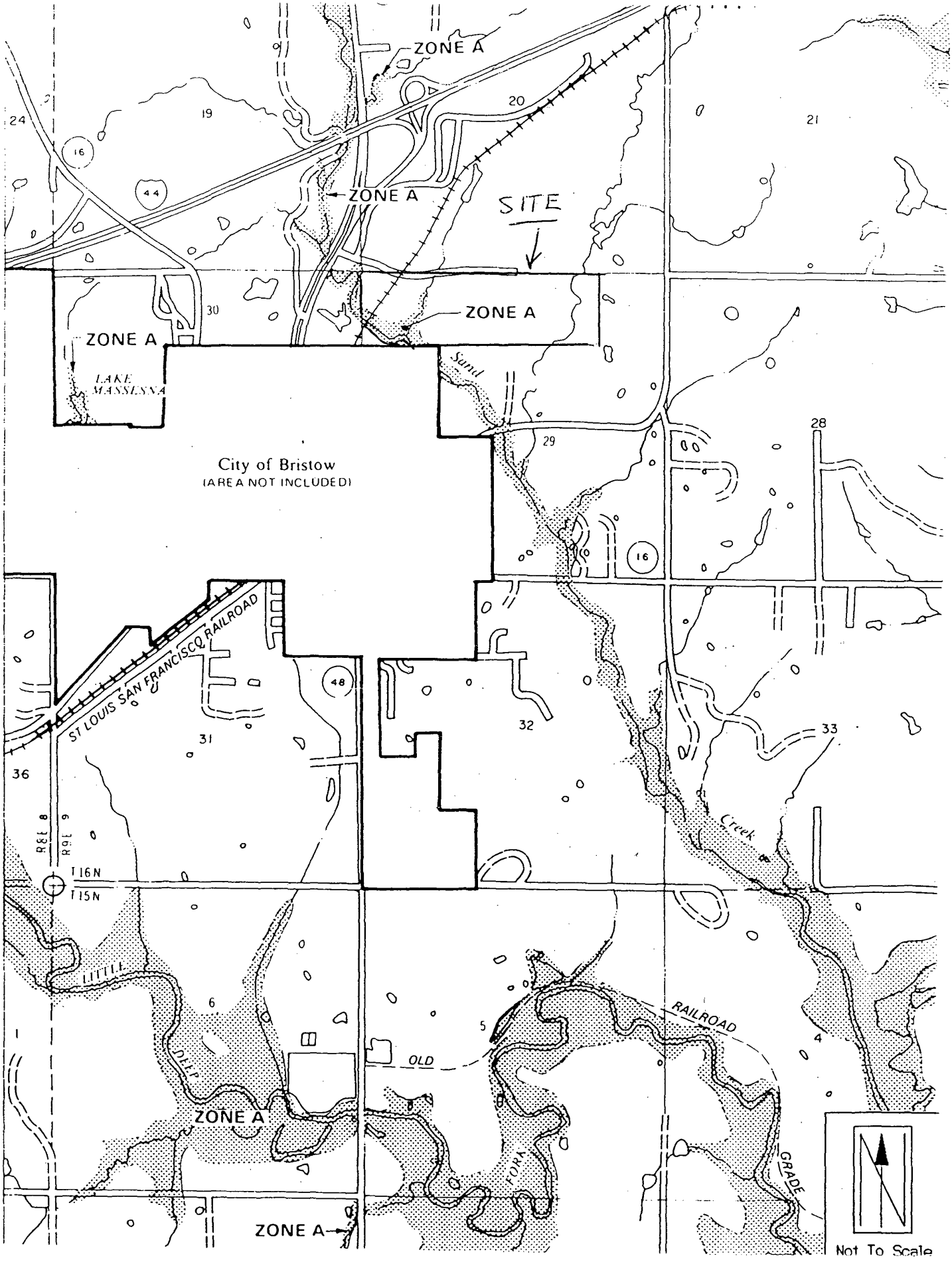
Coastal base flood elevations apply only landward of 0.0 NGVD, and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.


ZONE A
ZONE A
SITE
ZONE A
ZONE A
LAKE MASSENNA
Sand
City of Bristow
(AREA NOT INCLUDED)
ST LOUIS SAN FRANCISCO RAILROAD
RAILROAD
OLD
ZONE A
ZONE A
Creek
FORK
GRADE
Not To Scale

000405

Reference 19

OKLAHOMA WATER RESOURCES BOARD

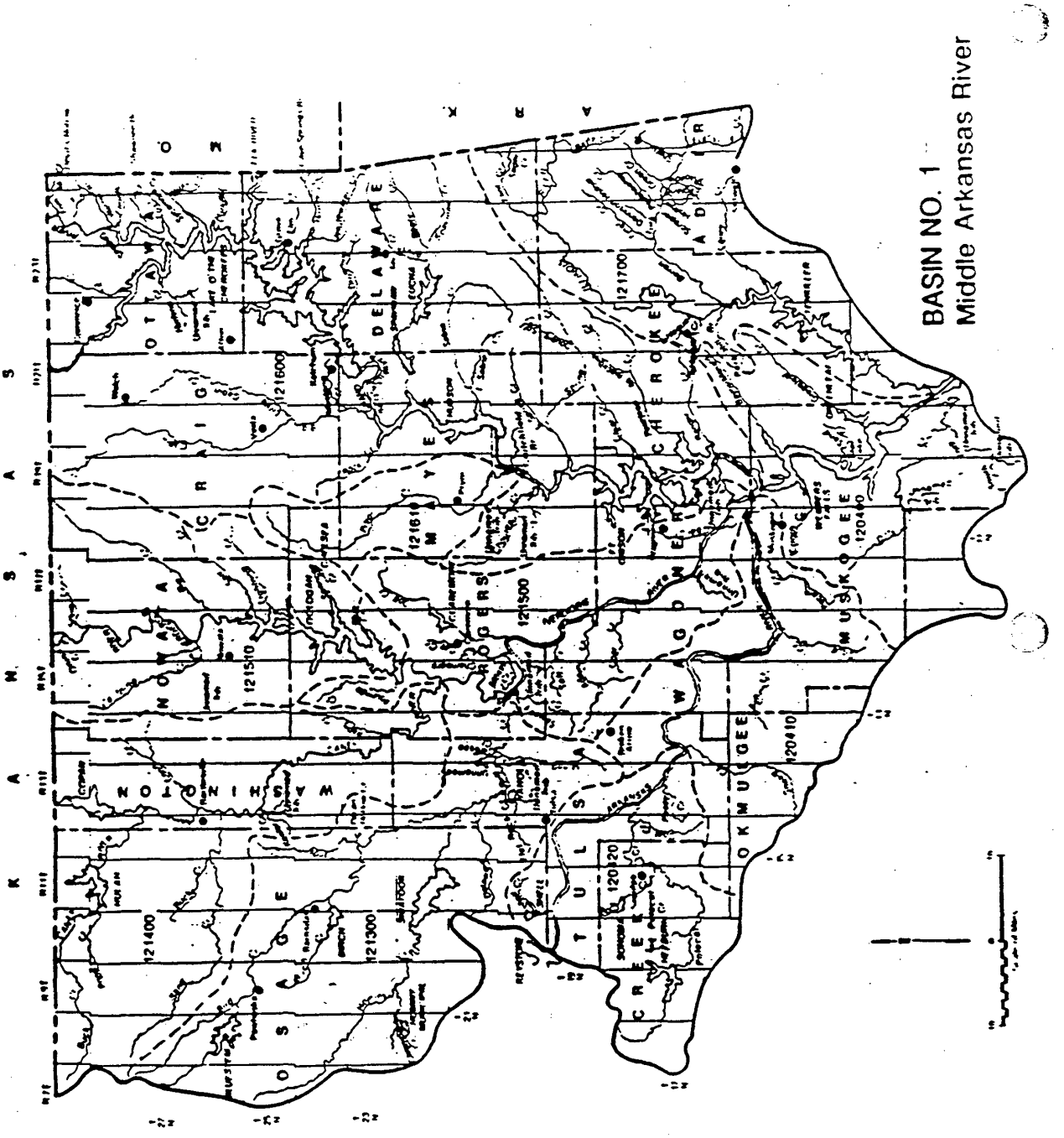
WATER QUALITY STANDARDS

Oklahoma Administrative Code (OAC) Title 785

AS AMENDED THROUGH JUNE 13, 1994

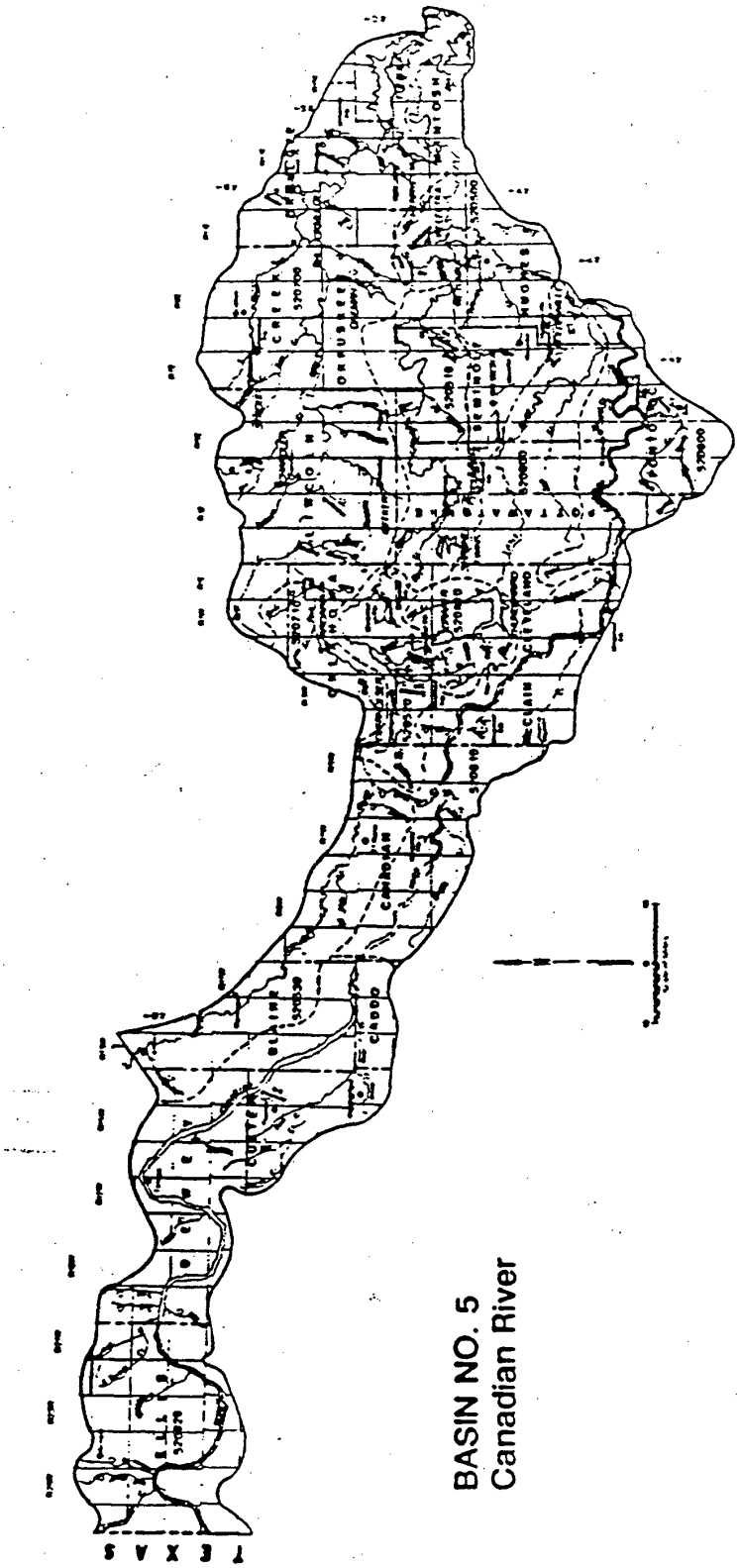
Note:

Chapter 40 - Pollution Remedies was revoked by the Oklahoma Water Resources Board. The revocation was approved by the Governor and Oklahoma Legislature, however, the Code documents were not accepted by the Office of Administrative Rules. Therefore, the revocation procedures are not final. Subject matter from Chapter 40 was transferred to the Department of Environmental Quality by state law effective July 1, 1993.


BASIN NO. 1
Middle Arkansas River
OKMULGEE
DELAWARE
CHEROKEE
ROGERS
MUSKOGEE
TULSA
CREEK
OSAGE
PAWNEE
NOBLE
KAY
GRANT
NOWATA
WASHINGTON
121600
121700
121610
121500
121510
120410
120420
121400
121300

Basin 1 Page 2

Waterbody Name and Sequence	WQM Segment	Water Supply	F&W Prop.	Ag.	H.P.	M&I	Rec.	Nav.	Aes.	Limit-ations	Remarks
Barren Fork from Hwy. 59 to Arkansas State Line	121700	PPWS	CWAC	1			PBCR		●	ORW	
Evansville Creek	121700	PPWS	CWAC	●			PBCR		●	ORW	
Upper Illinois River upstream of Barren Fork confluence	121700	PPWS	CWAC	1			PBCR		●	ORW	Scenic River
Tahlequah Creek	121700	PPWS	CWAC	●			PBCR		●	ORW	
Flint Creek	121700	PPWS	CWAC	●			PBCR		●	ORW	Scenic River
Sager Creek	121700	PPWS	CWAC	1			PBCR		●	ORW	
Ballard Creek	121700	PPWS	CWAC	●			PBCR		●	ORW	
Greenleaf Creek including Greenleaf Lake and Watershed	120400	PPWS	WWAC	●		●	PBCR		●	SWS	
Star Lake	120400		WWAC	●		●	PBCR		●		
Sand Creek	120400		HLAC	●		●	SBCR		●		
Bayou Manard	120400	PPWS	WWAC	●		●	PBCR		●		
Coody Creek	120400	PPWS	WWAC	●		●	PBCR		●		
Grand River Main Stem (Grand Neosho River) from mouth to Kansas State Line, including Fort Gibson Reservoir, Lake Hudson, and (Grand) Lake O' the Cherokees	121600	PPWS	WWAC	1	●	●	PBCR		●		
Ranger Creek	121600	PPWS	WWAC	●		●	PBCR		●		
Fourteen Mile Creek	121600	PPWS	CWAC	●		●	PBCR		●	HQW	
Black Bird Creek	121600	PPWS	CWAC	●		●	PBCR		●		
Clear Creek	121600	PPWS	CWAC	●		●	PBCR		●		
Spring Creek	121600	PPWS	CWAC	●		●	PBCR		●	HQW	
Little Spring Creek	121600	PPWS	CWAC	●		●	PBCR		●	HQW	
Double Spring Creek	121600	PPWS	CWAC	●		●	PBCR		●		
Chouteau Creek	121600	PPWS	WWAC	●		●	PBCR		●		
Tributary at SE 1/4, Sec. 13, T20N, R18E, IM	121600		WWAC	●		●	SBCR		●		
Tributary at SE 1/4, Sec. 29, T20N, R19E, IM	121600		HLAC	●		●	SBCR		●		



BASIN NO. 5
Canadian River

OKLAHOMA WATER RESOURCES BOARD
OAC 785:45
Appendix A, p33

APPENDIX A OF OKLAHOMA'S WATER QUALITY STANDARDS 1991
DESIGNATED BENEFICIAL USES OF SURFACE WATER
BASIN 5 PAGE 1

Waterbody Name and Sequence	WQM Segment	Water Supply	F&W Prop.	Ag.	H.P.	M&I	Rec.	Nav.	Aes.	Limit-ations	Remarks
North Canadian River from Canadian River to S.H. 99 bridge	520500 & 520510	PPWS	WWAC	●		●	PBCR		●		
Deep Fork of Canadian River downstream from Arcadia Reservoir	520700	PPWS	WWAC	2		●	PBCR		●		
Wolf Creek downstream from Lake Henryetta	520700		WWAC	●		●	PBCR		●		
Coal Creek	520700	EWS	WWAC	●		●	SBCR		●		
Henryetta Lake and Watershed	520700	PPWS	WWAC	●		●	PBCR		●	SWS	
Moore Creek	520700		WWAC	●		●	PBCR		●		
Cussetah Creek	520700		WWAC	●		●	PBCR		●		
Tributary at NE 1/4, Sec. 12, T13N, R13E, IM	520700		HLAC	●		●	SBCR		●		
Salt Creek downstream from Lake Okmulgee	520700	PPWS	WWAC	●		●	PBCR		●		
Okmulgee Lake and Watershed	520700	PPWS	WWAC	●		●	PBCR		●	SWS	
Flat Rock Creek	520700	PPWS	WWAC	●		●	PBCR		●		
Little Deep Fork Creek downstream from Sand Creek	520700		WWAC	●		●	PBCR		●		
Little Deep Fork Creek upstream from Sand Creek to State Hwy. 48 Bridge	520700	PPWS	HLAC	●		●	SBCR		●		
Little Deep Fork Creek upstream from State Hwy. 48 Bridge	520700	PPWS	WWAC	●		●	PBCR		●		
Tributary at SE 1/4, Sec. 06, T15N, R08E, IM	520700		HLAC	●		●	SBCR		●		
Nuyaka Creek	520700	PPWS	WWAC	1		●	PBCR		●		
Buckeye Creek	520700	PPWS	WWAC	1		●	PBCR		●		
Okemah Lake and Watershed	520700	PPWS	WWAC	●		●	PBCR		●	SWS	
Salt Creek	520700	PPWS	WWAC	●		●	PBCR		●		
Camp Creek downstream from Stroud Lake	520700	PPWS	WWAC	●		●	PBCR		●		

APPENDIX A.
DESIGNATED BENEFICIAL USES FOR SURFACE WATERS

(a) **Beneficial uses.** Beneficial uses are designated for specific waterbodies in the charts that follow.

(b) **Criteria and water quality management segments.** The criteria to protect the beneficial uses are assigned in Subchapter 5, SURFACE WATER QUALITY STANDARDS. WQM Segments refer to one of the fifty-nine (59) water quality management segments in the seven (7) planning basins found in this appendix.

(c) **Beneficial Use Codes.** The following codes are given in Appendix A and denote specific beneficial uses applicable to a specific waterbody.

(1) EWS - Emergency Water Supply beneficial use

(2) PPWS - Public and Private Water Supply beneficial use

(3) F&W Prop. - Fish and Wildlife Propagation beneficial use

- (i) WWAC - Warm Water Aquatic Community subcategory
- (ii) HLAC - Habitat Limited Aquatic Community subcategory
- (iii) CWAC - Cool Water Aquatic Community subcategory
- (iv) Trout - Trout Fishery (put and take) subcategory

(4) Ag. - Agriculture beneficial use

- (i) 1 - Class I Irrigation
- (ii) 2 - Class II Irrigation
- (iii) 3 - Class III Irrigation

(5) H.P. - Hydropower beneficial use

(6) M&I - Industrial and Municipal process and cooling water

(7) Rec. - Recreation beneficial use

- (i) PBCR - Primary Body Contact beneficial use
- (ii) SCBR - Secondary Body Contact beneficial use

(8) Nav. - Navigation beneficial use

(9) Aes. - Aesthetics beneficial use

(d) **Limitations for Additional Protection.**

(1) Limitations for additional protection are described in 785:45-5-25.

(2) The following symbols are used in the limitations column of the beneficial use charts in Appendix A to indicate the applicability of 785:45-5-25 for specific waters:

(A) "ORW" - indicating waters designated Outstanding Resource Waters;

(B) "HQW" - indicating waters designated High Quality Waters; and

(C) "SWS" - indicating waters designated Sensitive Public and Private Water Supplies.

(e) **Remarks used in Appendix A.** The following footnotes appear under "Remarks" in Appendix A and denote special circumstances which are associated with a specific waterbody.

waters include streams designated "Scenic River" or "ORW" in Appendix A of this Chapter, and waters of the State located within watersheds of Scenic Rivers. Additionally, these may include waters located within National and State parks, forests, wilderness areas, wildlife management areas, and wildlife refuges, and waters which contain species listed pursuant to the federal Endangered Species Act as described in 785:45-5-25(c)(2)(A). No degradation of water quality shall be allowed in these waters.

(b) **Application to high quality waters (HQW).** It is recognized that certain waters of the state possess existing water quality which exceeds those levels necessary to support propagation of fishes, shellfishes, wildlife, and recreation in and on the water. These high quality waters shall be maintained and protected.

(c) **Application to beneficial uses.** No water quality degradation which will interfere with the attainment or maintenance of an existing or designated beneficial use shall be allowed.

(d) **Application to improved waters.** As the quality of any waters of the state improve, no degradation of such improved waters shall be allowed.

(e) **Application to thermal discharge.** In cases where potential water quality impairment associated with a thermal discharge is involved, the anti-degradation policy and implementation method shall be consistent with Section 316 of Public Law 92-500 as amended.

[Source: Amended at 9 Ok Reg 1889, eff 5-26-92, and 9 Ok Reg 2625, eff 6-25-92]

SUBCHAPTER 5.
SURFACE WATER QUALITY STANDARDS

PART 1.
GENERAL PROVISIONS

Section

785:45-5-1. Declaration of policy
785:45-5-2. Beneficial uses: existing and designated
785:45-5-3. Unlisted surface waters
785:45-5-4. Applicability of narrative and numerical criteria

PART 3.
BENEFICIAL USES AND CRITERIA TO PROTECT USES

785:45-5-10. Public and private water supplies
785:45-5-11. Emergency public and private water supplies
785:45-5-12. Fish and wildlife propagation
785:45-5-13. Agriculture: livestock and irrigation
785:45-5-14. Hydroelectric power generation
785:45-5-15. Industrial and municipal process and cooling water
785:45-5-16. Primary Body Contact Recreation

000413

785:45-5-17. Secondary Body Contact Recreation
785:45-5-18. Navigation
785:45-5-19. Aesthetics

PART 5.
SPECIAL PROVISIONS

785:45-5-25. Limitations for additional protection
785:45-5-26. Mixing zones and zones of passage
785:45-5-27. [REVOKED]

[Source: Amended at 9 Ok Reg 2625, eff 6-25-92]

PART 1.
GENERAL PROVISIONS

785:45-5-1. Declaration of policy

Title 82 O.S. 1981, §926.2, provides as follows: *Whereas the pollution of the waters of this state constitute a menace to public health and welfare, creates public nuisances, is harmful to wildlife, fish and aquatic life, and impairs domestic, agricultural, industrial, recreational and other legitimate beneficial uses of water, and whereas the problem of water pollution in this state is closely related to the problem of water pollution in adjoining states, it is hereby declared to be the public policy of this state to conserve the waters of the state and to protect, maintain and improve the quality thereof for public water supplies, for propagation of wildlife, fish and aquatic life and for domestic, industrial, recreational and other legitimate beneficial uses; to provide that no waste be discharged into any waters of the state without first being given the degree of treatment necessary to protect the legitimate beneficial uses of such waters; to provide for the prevention, abatement and control of new or existing water pollution...*

785:45-5-2. Beneficial uses: existing and designated

Beneficial uses are designated for all waters of the state. Such uses are protected through the restrictions imposed by the antidegradation policy statement, narrative criteria and numerical standards. Some uses require higher quality water than others. When multiple uses are assigned to the same waters, all such uses shall be protected. Beneficial uses are also protected by permits or other authorizations issued to meet these Standards for point sources and through practical management or regulatory programs for nonpoint sources. The criteria to protect the beneficial uses designated in 785:45-5-3 or in Appendix A of this Chapter for certain surface waters of the state are described in the following sections:

000414

beneficial use of Public and Private Water Supply. Water column criteria to protect human health for the consumption of fish flesh only may be found in 785:45-5-12(9).

Water Column Numerical Criteria
to Protect Human Health for the Consumption of Fish Flesh And Water

Substances (total recoverable)	Criteria (µg/L)
Aldrin	0.001273
Arsenic	0.175
Benzene	11.87
Chlordane	0.00575
Dieldrin	0.001352
DDT	0.005876
Gamma BHC (Lindane)	0.1458
Heptachlor	0.00208
Hexachlorobenzene	0.009026
Carbon Tetrachloride	2.538
Chloroform	56.69
PCB	0.00079
2,3,7,8-TCDD (Dioxin)	0.00000013
1-1-1 TCE	3094.0
Cadmium	14.49
Chromium (Total)	166.3
Endrin	0.7553
Ethylbenzene	3120.0
Lead	5.0
Mercury	0.5563
Nickel	607.2
Pentachlorophenol	1014.0
Phenol	20900.0
Silver	104.8
Toluene	10150.0

[**Source:** Amended at 9 Ok Reg 1889, eff 5-26-92]

785:45-5-11. Emergency public and private water supplies
(a) During emergencies, those waters designated Emergency Public and Private Water Supplies may be put to use.
(b) Each emergency will be handled on a case-by-case basis, and be thoroughly evaluated by the appropriate State agencies and/or local health authorities.

785:45-5-12. Fish and wildlife propagation
(a) The narrative and numerical criteria in this section are designated to promote fish and wildlife propagation for the fishery classifications of Habitat Limited Aquatic Community, Warm Water Aquatic Community, Cool Water Aquatic Community (Excluding Lake Waters), and Trout Fishery (Put and Take).
(b) Habitat limited aquatic community means a subcategory of the beneficial use "Fish and Wildlife Propagation" where the water chemistry and habitat are not adequate to support a "Warm Water

000415

Aquatic Community" because:

(1) Naturally occurring water chemistry prevents the attainment of the use; or

(2) Naturally occurring ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of a sufficient volume of effluent to enable uses to be met; or

(3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

(4) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the waterbody to its original condition or to operate such modification in a way that would result in the attainment of the use; or

(5) Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of the "Warm Water Aquatic Community" beneficial use.

(c) Cool Water Aquatic Community means a subcategory of the beneficial use category "Fish and Wildlife Propagation" where the water quality, water temperature and habitat are adequate to support cool water intolerant climax fish communities and includes an environment suitable for the full range of cool water benthos. Typical species may include smallmouth bass, certain darters and stoneflies.

(d) Warm Water Aquatic Community means a subcategory of the beneficial use category "Fish and Wildlife Propagation" where the water quality and habitat are adequate to support intolerant climax fish communities and includes an environment suitable for the full range of warm water benthos.

(e) The narrative and numerical criteria shall include:

(1) Dissolved oxygen.

(A) Dissolved oxygen (DO) criteria are designed to protect the diverse aquatic communities of Oklahoma.

(B) Allowable loadings are designed to attain these criteria. For streams with sufficient historical data, the allowable load shall be based on meeting the dissolved oxygen concentration standard at the seven-day, two-year low flow and the appropriate seasonal temperatures. For streams lacking sufficient historical data, or when the appropriate flow is less than one (1) cubic foot per second (cfs), the allowable load shall be based on meeting the dissolved oxygen concentration standard at one (1) cfs and the appropriate seasonal temperature.

(C) Except for naturally occurring conditions, the dissolved oxygen criteria are set forth in the following table.

000416

In cases where mineral content varies within a segment, the most pertinent data available should be used.

[Source: Amended at 9 Ok Reg 1889, eff 5-26-92]

785:45-5-14. Hydroelectric power generation

This beneficial use is not generally dependent upon water quality.

785:45-5-15. Industrial and municipal process and cooling water

(a) Quality criteria for water used for process or cooling purposes vary with the type of industrial or municipal processes involved.

(b) This use will be protected by application of the criteria for other beneficial uses.

785:45-5-16. Primary Body Contact Recreation

(a) Primary Body Contact Recreation involves direct body contact with the water where a possibility of ingestion exists. In these cases the water shall not contain chemical, physical or biological substances in concentrations that are irritating to skin or sense organs or are toxic or cause illness upon ingestion by human beings.

(b) In waters designated for Primary Body Contact Recreation the following limits for bacteria set forth in (c) of this section shall apply only during the recreation period of May 1 to September 30. The criteria for Secondary Body Contact Recreation will apply during the remainder of the year.

(c) Compliance with 785:45-5-16 shall be based upon meeting the requirements of one of the three (3) options specified below for bacteria. Upon selection of one (1) group or test method, said method shall be used exclusively over that thirty (30) day period.

(1) Coliform Bacteria: The bacteria of the fecal coliform group shall not exceed a monthly geometric mean of 200/100 ml, as determined by multiple-tube fermentation or membrane filter procedures based on a minimum of not less than five (5) samples collected over a period of not more than thirty (30) days. Further, in no more than 10% of the total samples during any thirty (30) day period shall the bacteria of the fecal coliform group exceed 400/100 ml.

(2) Escherichia coli (E. coli): E. coli shall not exceed a monthly geometric mean of 126/100 ml based upon a minimum of not less than five (5) samples collected over a period of not more than thirty (30) days. No sample shall exceed a 75% one-sided confidence level of 235/100 ml in lakes and high use waterbodies and the 90% one-sided confidence level of 406/100 ml in all other Primary Recreation beneficial use areas. These values are based upon all collected samples. Analysis procedures shall follow EPA-600/4-85/076, "Test Methods for Escherichia coli and Enterococci in Water by the Membrane Filter Procedure."

(3) Enterococci: Enterococci shall not exceed a monthly geometric mean of 33/100 ml based upon a minimum of not less

000417

than five (5) samples collected over a period of not more than thirty (30) days. No sample shall exceed a 75% one-sided confidence level of 61/100 ml in lakes and high use waterbodies and the 90% one-sided confidence level of 108/100 ml in all other Primary Recreation beneficial use areas. These values are based upon all collected samples. Analysis procedures shall follow EPA-600/4-85/076, "Test Methods for Escherichia coli and Enterococci in Water by the Membrane Filter Procedure."

[Source: Amended at 9 Ok Reg 1889, eff 5-26-92]

785:45-5-17. Secondary Body Contact Recreation

(a) The water quality requirements for Secondary Body Contact Recreation are usually not as stringent as for Primary Body Contact Recreation.

(b) The Secondary Body Contact Recreation beneficial use is designated where ingestion of water is not anticipated.

(c) Associated activities may include boating, fishing or wading.

(d) Waters so designated shall be maintained to be free from human pathogens in numbers which may produce adverse health effect in humans.

785:45-5-18. Navigation

This beneficial use is generally more dependent upon quantity than quality of water.

785:45-5-19. Aesthetics

(a) To be aesthetically enjoyable, the surface water of the State must be free from floating materials and suspended substances that produce objectionable color and turbidity.

(b) The water must also be free from noxious odors and tastes, from materials that settle to form objectionable deposits, and discharges that produce undesirable effects or is a nuisance to aquatic life.

(c) The following criteria apply to protect this use:

(1) **Color.** Surface waters of the State shall be virtually free from all coloring materials which produce an aesthetically unpleasant appearance. Color producing substances, from other than natural sources, shall be limited to concentrations equivalent to 70 Platinum-cobalt color units.

(2) **Nutrients.** Nutrients from point source discharges or other sources shall not cause excessive growth of periphyton, phytoplankton, or aquatic macrophyte communities which impairs any existing or designated beneficial use.

(3) **Solids (suspended and/or settleable).** The surface waters of the State shall be maintained so as to be essentially free of floating debris, bottom deposits, scum, foam and other materials, including suspended substances of a persistent nature, from other than natural sources.

(4) **Taste and Odor.** Taste and odor producing substances from other than natural origin shall be limited to concentrations that will not interfere with the production of a potable water

000418

Reference 20

OKLAHOMA FEDERAL LISTED, PROPOSED,
AND CANDIDATE (Cat. 1 & 2) T/E SPECIES

January 1994

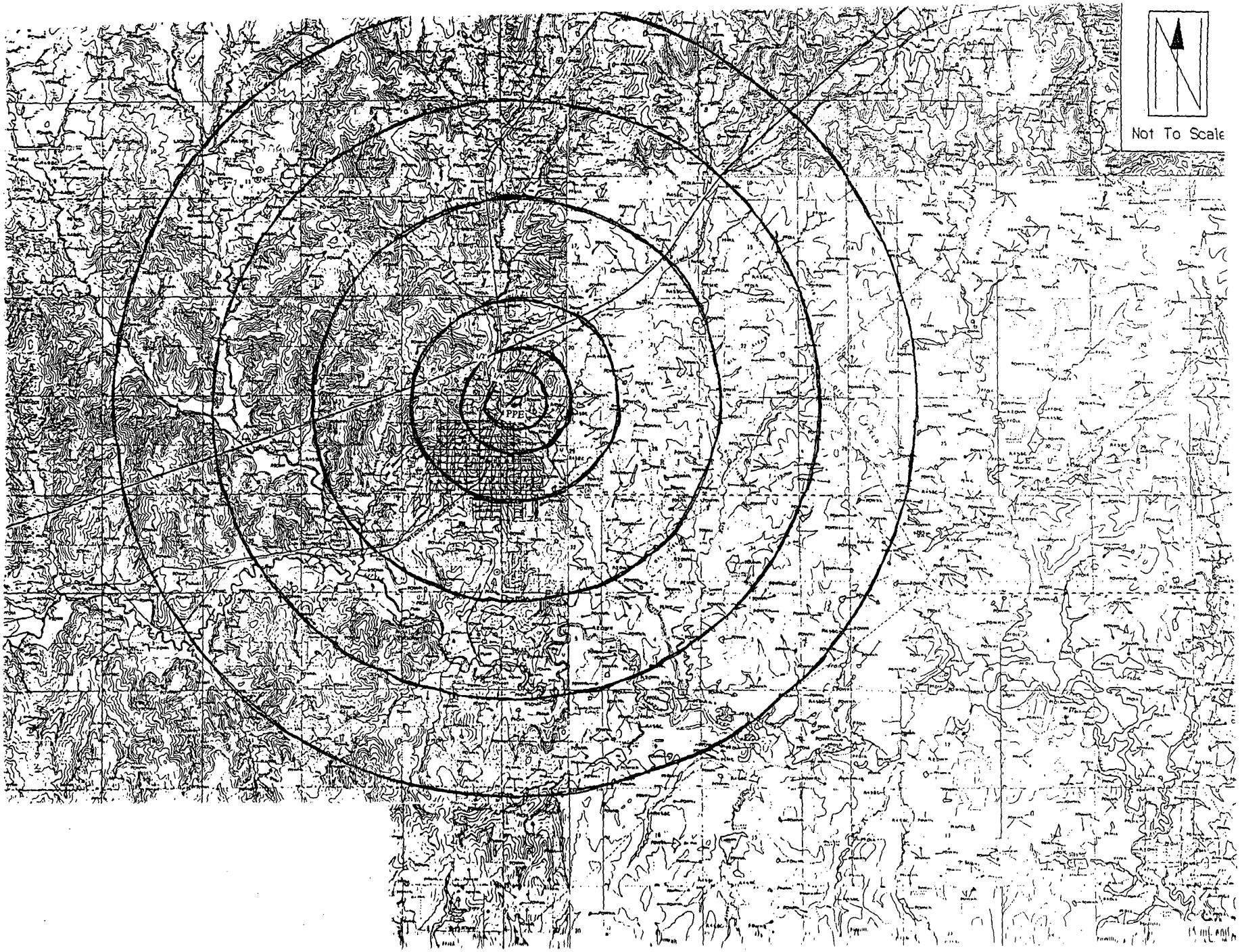
COUNTY	SPECIES	CLASSIFICATION
Adair	Bald eagle	Endangered
	Gray bat	Endangered
	Indiana bat	Endangered
	Ozark big-eared bat	Endangered
	Peregrine falcon	Endangered
	Bat Cave isopod	Category 2 Candidate
	Eastern small-footed bat	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Ozark chinquapin (*Castanea pumila* var. ozarkensis)	Category 2 Candidate
	Royal catchfly (*Silene regia*)	Category 2 Candidate
Alfalfa	Bald eagle	Endangered
	Interior least tern	Endangered
	Peregrine falcon	Endangered
	Whooping crane C/H	Endangered
	Piping plover	Threatened
	Arkansas River speckled chub	Category 2 Candidate
	Ferruginous hawk	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Mountain plover	Category 2 Candidate
	Northern goshawk	Category 2 Candidate
	Swift fox	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
	White-faced ibis	Category 2 Candidate
Atoka	Bald eagle	Endangered
	Piping plover	Threatened
	Alligator snapping turtle	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Cumberland sand grass (*Calamovilfa arcuata*)	Category 2 Candidate
	Small-headed pipewort (*Eriocaulon kornickianum*)	Category 2 Candidate
Beaver	Bald eagle	Endangered
	Interior least tern	Endangered
	Peregrine falcon	Endangered
	Whooping crane	Endangered
	Arkansas darter	Category 1 Candidate
	Arkansas River shiner	Category 1 Candidate
	Arkansas River speckled chub	Category 2 Candidate
	Black rail	Category 2 Candidate
	Ferruginous hawk	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Mountain plover	Category 2 Candidate
	Swift fox	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
	White-faced ibis	Category 2 Candidate
Beckham	Whooping crane	Endangered
	Ferruginous hawk	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
	White-faced ibis	Category 2 Candidate

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Superfund Program

Comanche	Bald eagle	Endangered
	Black-capped vireo	Endangered
	Interior least tern	Endangered
	Peregrine falcon	Endangered
	Whooping crane	Endangered
	Piping plover	Threatened
	Ferruginous hawk	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Mountain plover	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
	White-faced ibis	Category 2 Candidate
	Fissa sedge (*Carex fissa*)	Category 2 Candidate
	Slender dodder (*Cuscuta attenuata*)	Category 2 Candidate
Cotton	Bald eagle	Endangered
	Interior least tern	Endangered
	Whooping crane	Endangered
	Ferruginous hawk	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Prairie mole cricket	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Texas kangaroo rat	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
Craig	Peregrine falcon	Endangered
	Neosho madtom	Threatened
	Western prairie fringed orchid	Threatened
	Arkansas darter	Category 1 Candidate
	Alligator snapping turtle	Category 2 Candidate
	Blue sucker	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Neosho mucket	Category 2 Candidate
	Paddlefish	Category 2 Candidate
	Prairie mole cricket	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
Creek	Bald eagle	Endangered
	Interior least tern	Endangered
	Peregrine falcon	Endangered
	Piping plover	Threatened
	Cerulean warbler	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Prairie mole cricket	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
	Fissa sedge (*Carex fissa*)	Category 2 Candidate
Custer	Bald eagle	Endangered
	Interior least tern	Endangered
	Peregrine falcon	Endangered
	Whooping crane	Endangered
	Arkansas River speckled chub	Category 2 Candidate
	Ferruginous hawk	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
	White-faced ibis	Category 2 Candidate

Ark River S. Chub

Reference 21


PPE
Not To Scale

Reference 22

MEMORANDUM

December 14, 1994

To: File
Wilcox Oil Company, Bristow, Creek Co.

From: Hal Cantwell
Env. Spec. Supr. 4

Re: Population Data for Site

Wednesday, December 14, 1994 I accessed the GEMS database to extract the census population data for the area surrounding the Wilcox Oil Company, Bristow, Creek County . The data is from the 1983 data set as this was the most recent year available.

The site coordinates used were:
Latitude: 35°50'31"
Longitude: 96°23'02"

The extract data is as follows:

0-¼ mile	¼-½ mile	½-1 mile	1-2 mile	2-3 mile	3-4 mile	TOTAL
0	0	1,836	2,691	1,017	517	6,061

Reference 23

Oklahoma Biological Survey
Oklahoma Natural Heritage Inventory

OKLAHOMA BIOLOGICAL SURVEY
111 E. Chesapeake Street
Norman, Oklahoma 73019-0575, USA
(405) 325-1985
FAX: (405) 325-7702

RECEIVED
SEP 0 9 1994
Superfund Program

Scott Stegmann
Department of Enviromental Quality
1000 Northeast Tenth Street
Oklahoma City, OK 73117-1212

September 7,1994

Dear Mr. Stegmann,

This letter is in response to your request for information on possible endangered species or other elements of biological significance at the following sites:

AT & SF Roadhouse
Ben Franklin Refining Company
Chicago, Rock Island, & Pacific Roadhouse
Mercury Oil Refining Company
M&M Plating Company
Rock Island Roadhouse - Haileyville
10th Street Sludge
Tide Water Associated Oil Company
United States Smelting
Victory Metals
Wilcox Oil Company

The Oklahoma Natural Heritage Inventory maintains a database on the status and location of rare species and significant ecological communities in Oklahoma. We have reviewed the information currently in the Heritage Inventory database and found no records of on site-elements. However, elements were found within a five mile radius from the sites. These are listed on the attached table.

The Heritage Inventory database is the most current comprehensive one available on the rare biota of Oklahoma. However, such a database is only as complete as the information that has been collected. For this reason, we cannot state for certain whether or not a given site harbors rare species or significant communities. We suggest you also contact the Environmental Division of the Oklahoma Department of Wildlife Conservation, as they may have site specific information of which we are unaware.

Additional information from our databases is available on the internet through *ftp* at *obssunϕ2.uoknor.edu*. Login user *ftpuser*, password *ftpuser*, then cd pub/heritage.

Thank you for the opportunity to respond to your request.

Sincerely,

for Ian H. Butler
Data Coordinator

IHB.bas

cc: Ron Suttles, Okla. Dept. of Wildlife Conservation, Oklahoma City
Supervisor, U.S. Fish and Wildlife Service, Tulsa

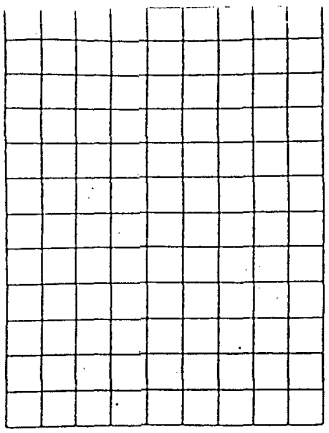
Attachments: area map of the occurence

OKLAHOMA NATURAL HERITAGE INVENTORY
TABLE OF PROXIMAL ELEMENT OCCURRENCES

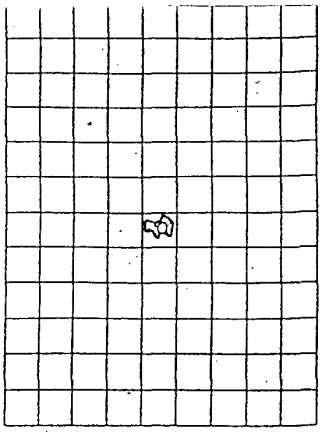
REQUESTED BY: Department of Enviromental Quality
DATE OF REQUEST: August 9, 1994

SITE SPECIES NAME	STATUS FED	 STATE	ONHI RANK GLOBAL	 STATE	LAST SEEN
SITE NAME: Mercury Oil Refining Company					
Phrynosoma cornutum (Texas Horned Lizard)	C2	P	G5	S2S3	1993
SITE NAME: 10th Street Sludge					
Phrynosoma cornutum (Texas Horned Lizard)	C2	P	G5	S2S3	1993

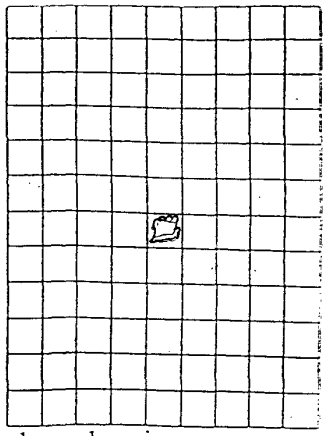
Reference 24



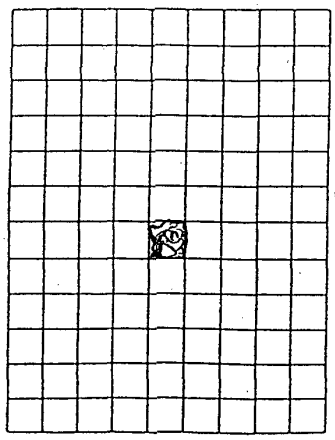
On-site



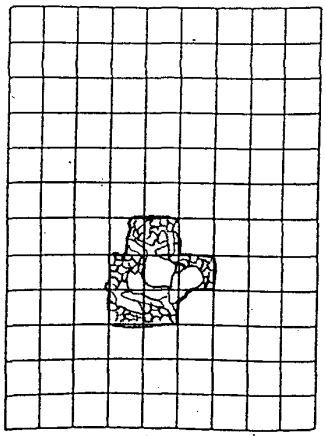
0 - ¼ mi. about 4.5 acres



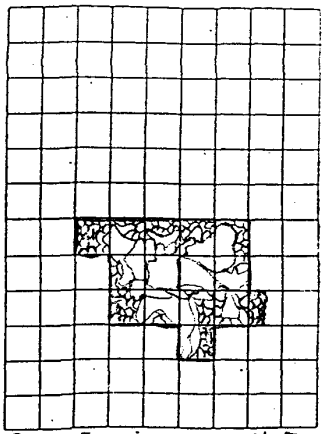
¼ - ½ mi. about 7 acres



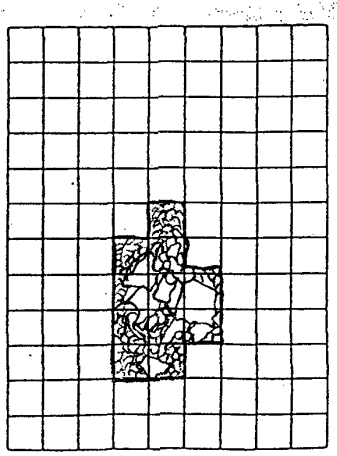
½ - 1 mi. about 9 acres



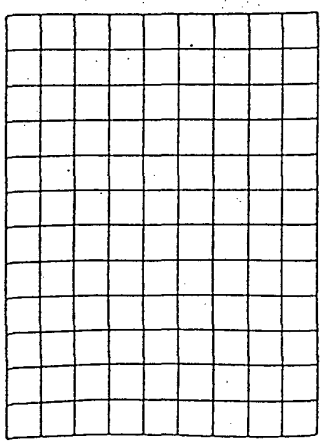
1 - 2 mi. about 65 acres

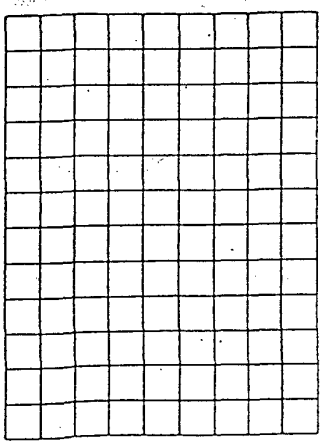


2 - 3 mi. about 145 acres



3 - 4 mi. about 112 acres





SITE NAME: Wilcox Oil Co.

DATE COMPLETED: 08.08.94.

COMPILED BY: Karen Khalafian

½ cm^2 = 10 acres

Form for determining area of wetlands on 50% copy of USGS maps.

3'-4'

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

26623

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION SW ¼ of NW ¼ of SW ¼ of sec. 8; TWP. 15 N S; RGE 9 E IM (Circle One) W IM ECM COUNTY Creek
FINDING LOCATION From Bristow City limit S. on 48 Hwy 3 Mi House on E. side of Rd.
Blocks or distance(s) from given point(s).

3. TYPE OF WORK
- [x] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

4. USE
- [x] Domestic
- [ ] Stock
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [ ] Fluid Rotary
- [ ] Rev. Rotary
- [x] Cable
- [ ] Other
- [ ] Air Rotary
- [ ] H.S. Auger

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Clay	1	5	
Sand Rock	5	15	
Red Clay	15	25	
Sand Rock	25	55	
Water Sand	55	99	✓

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
- [ ] Yes
- [ ] No
Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 12-3-91 Completed 12-5-91
Contractor Harvey Moore Sr.
Driller Harvey Moore Sr.
Diameter Hole 6 3/4 in. Total Depth 99 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4 ½ in.	12" ground ft.	99 ft.

Cement Grout Surface Seal? [x] Yes [ ] No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 99 ft.
Amount Used: Appx 1 T.

PERFORATION RECORD

Type/Size		
¼" Drilled	From 55 ft. To 99	ft.
	From ft. To	ft.
	From ft. To	ft.

9. WELL TEST DATA
Static Water Level
Below Land Surface 60 ft.
Approximate Yield 30 gpm.
If Artesian: Flows _____ gpm.

10. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

11. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK
Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

RECEIVED
JAN 10 1992
Oklahoma Water Resources Board

13. PLAT
10 ac

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # DPC 0140
Address Rt 1 Box 632 Phone # _____
Depew, Ok 74028
Signed Harvey Moore Date 1-4-92

Form 424-0887
USE ADDITIONAL SHEETS IF NECESSARY

000432

3-4'

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

#24499

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER (b) (6) PHONE

2. LEGAL DESCRIPTION SE ¼ of SE ¼ of SE ¼ of sec. 6 ; TWP. 16 N S; RGE 9 E/W/M (Circle One) ECM COUNTY Creek

FINDING LOCATION From Bristow Hwy 48 & 66 junction go ½ Mi. N. house on L. side rd, in a low area
Blocks or distance(s) from given point(s).

3. TYPE OF WORK
- ☑ New Well
- ☐ Plugging
- ☐ Reconditioning Work
- ☐ Monitoring
- ☐ Test Hole
- ☐ Other

4. USE
- ☑ Domestic
- ☐ Stock
- ☐ Monitoring
- ☐ Test Hole
- ☐ Other

NON-DOMESTIC
- ☐ Irrigation
- ☐ Municipal
- ☐ Industrial
- ☐ Commercial
- ☐ Other

5. DRILLING METHOD
- ☐ Fluid Rotary
- ☐ Rev. Rotary
- ☑ Cable
- ☐ Other
- ☐ Air Rotary
- ☐ H.S. Auger

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	20	
Red Clay	20	60	
Rock	60	61	
Red Clay + Blue Shale	61	140	
Sand Rock	140	155	
Red Clay + Blue Shale	155	230	
Water Sand	230	245	✓
Red Clay	245	251	

RECEIVED
APR 3 1991
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 3-21-91 Completed 3-26-91
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6 3/4 in. Total Depth 251 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4½	in.	12" above ground	ft.	251	ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK: Cement
Gravel Packed From 0 ft. to 251 ft.
Amount Used: Approx 2¼ Ton

PERFORATION RECORD

Type/Size 1/4" Drilled From 230 ft. To 245 ft.
From ft. To ft.
From ft. To ft.

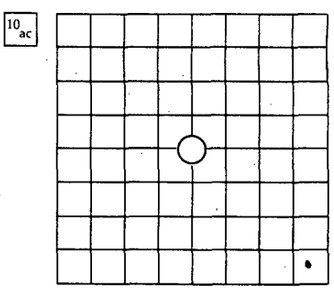
9. WELL TEST DATA
Static Water Level
Below Land Surface ft.
Approximate Yield gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION
Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK
Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 157
Address Rt 1 Box 632 Phone # 367 3137
Depew, Ok 74028
Signed Harvey Moore Date 3-29-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000433

3-4'

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

12425

1. OWNER (b) (6) [redacted] ADDRESS Kiston Okla

PHONE _____

2. LEGAL DESCRIPTION OF WELL (EIM) (Circle One) WIM ECM

SW ¼ of SW ¼ of SW ¼ of sec. 6 ; TWP. 16 (N) S; RGE 9 ; COUNTY Creek

3. TYPE OF WORK
- ☑ New Well ☐ Plugging
- ☐ Reconditioning Work
- ☐ Test/Monitoring

4. USE
- ☑ Domestic
- ☐ Stock
- ☐ Test Monitoring

NON-DOMESTIC
- ☐ Irrigation
- ☐ Municipal
- ☐ Industrial
- ☐ Commercial
- ☐ Other

5. DRILLING METHOD
- ☐ Rotary ☐ Rev. Rotary
- ☑ Cable ☐ Other _____
- ☐ Air

6. LOG

Material	From	To	Saturated
Clay	0	2	
Sand rock	2	18	
Clay	18	28	
Water sand	28	35	
red bed	35	85	
Water sand	85	90	
red bed	90	110	
Iron rock	110	120	
Red bed	120	125	
Iron rock	125	155	
Clay	155	169	
Blue Shale	169	170	

RECEIVED
APR 3 1986
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 3-4-86 Completed 3-6-86
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 ¼ in. Total Depth 170 ft.

CASING RECORD

	Diameter	From	To
Inside	4 ½ in.	4' Aground ft.	170 ft.
Outside	_____ in.	_____ ft.	_____ ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 170 ft.
Amount Used: Approx 1½ ton

PERFORATION RECORD

Type/Size
_____ From 25 ft. To 90 ft.
_____ From _____ ft. To _____ ft.
_____ From _____ ft. To _____ ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 20 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 5 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.

SW ¼ of SW ¼ of SW ¼ of SEC 6 ;
TWP 16 (N) S; RGE 9 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Depew Okla 74028 Phone # 918-324-5461
Signed Allen Baker Date 3-6-86

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000434

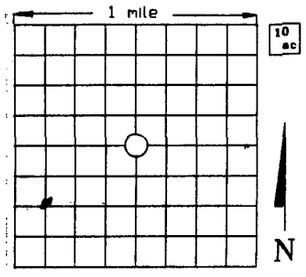
29931

3-41

MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

Please plot well location



Legal Description

NE 1/4 NW 1/4 SW 1/4 of Sec. 5 Twp. 16 N Rge. 9 E

County Cotton Well No:

Well Owner (b) (6) Phone (b) (6)

Address (b) (6) Chattanooga Ok

Finding location N 3/4 Mi on 48 from 48 & 66 junction E. on N side of rd.

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other
- ☐ Water Well

G.W. Use

- ☑ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☑ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	5	
Sand Rock	5	7	
Red Clay	7	12	
Water Sand	12	25	✓
Red Clay	25	50	

I think this is self explanatory.

JUL 30 1993

NOV - 3 1993

Oklahoma Water Resources Board

*See Pump Installers Form On Back

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to excede 3 acres.)

Permit No:

New Boring or Well Construction Data

Date: Started 5-31-93 Completed 5-31-93

Firm Moore Water Wells

Operator Micky Moore

Type of Construction ☐ Open Hole ☑ Cased Hole

Hole Diameter 6 3/4 inches total depth 50 feet

Hole Diameter ____ inches total depth ____ feet

CASING RECORD

	diameter		from	to
Surface pipe		inches	ground feet	feet
Well casing	4 1/2	inches	12 feet	50 feet
Well casing		inches	feet	feet
Well casing		inches	feet	feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from	to
14" drilled	12 feet	25 feet
	feet	feet
	feet	feet

GRAVEL PACK

Type and Size	from	to
1/4 Limestone	12' 5 feet	50 feet
	feet	feet
	feet	feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from	to
Type of Surface Seal Portland	0 feet	12 feet
Aquifer Seal Type	feet	feet
	feet	feet

HYDROLOGIC DATA

First Water Zone Encountered 12 ft.

Approximate Yield 20 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged

Backfilled From feet feet Type

Cement Grouted From feet feet

Reconditioning Work

Replaced Casing/Screen From feet feet

Deepened Well From feet feet

Redeveloped Well By

Certification

The work described above was done under my supervision.
This report is correct to the best of my knowledge.

Name Harry Moore Sr. Lic. No. DPC 0140

Address PO Box 632 Dupree Phone 367-3137

Signed Harry Moore Sr. Date 6-31-93

000435

3-4'

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12424

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1. OWNER (b) (6) [redacted] **ADDRESS** Bristow Okla - **PHONE**

2. LEGAL DESCRIPTION OF WELL (EIM) (Circle One) WIM

NE ¼ of SW ¼ of SE ¼ of sec. 5 ; TWP. 16 (N) S; RGE 9 ECM; **COUNTY** Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work
☐ Test/Monitoring

4. USE
☑ Domestic
☐ Stock
☐ Test Monitoring

NON-DOMESTIC
☐ Irrigation
☐ Municipal
☐ Industrial
☐ Commercial
☐ Other

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other _____
☐ Air

6. LOG

Material	From	To	Saturated
top Soil	0	8	
Clay	8	20	
Sand rock	20	30	
Water Sand	30	42	
lime	42	44	
Shale	44	50	
lime	50	51	
Shale	51	88	
Red bed	88	135	
Water Sand	135	150	✓
Red bed	150	165	
Shale	165	173	
red bed	173	180	
water sand	180	225	

RECEIVED
MAY 8 1985
Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 4-10-85 Completed 4-11-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 225 ft.

CASING RECORD

	Diameter	From	To
Inside	4 1/2 in.	2' ↑ ground ft.	225 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: Approx 14 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 225 ft.
Amount Used: Approx 2 ½ ton

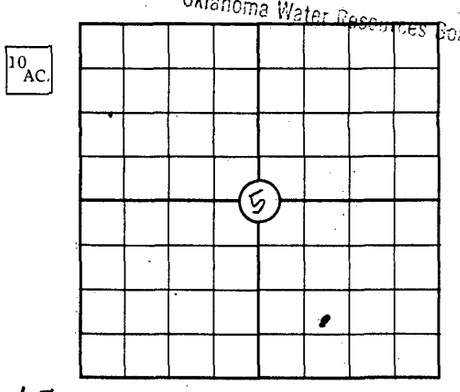
PERFORATION RECORD

Type/Size		
_____	From 135 ft.	To 225 ft.
_____	From _____ ft.	To _____ ft.
_____	From _____ ft.	To _____ ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 100 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 18 gpm.

10. PLUGGING DATA
Date Plugged _____
Backfilled With X Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



NE ¼ of SW ¼ of SE ¼ of SEC 5 ;
TWP 16 (N) S; RGE 9 (Circle One) EIM,WIM,ECM

12. PUMP INFORMATION
Pump Type _____
Power Source X
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From X ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 223 Depew OK 74028 Phone # 918-324-5462
Signed Allen Baker Date 4-11-85

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000436

3-4'

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

MULTI-PURPOSE WATER WELL REPORT

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

#12423

Tulsa

1. OWNER [redacted] ADDRESS Bristow Okla. 74010

5 mi N of Bristow Okla on Hiway 66 PHONE [redacted]

2. LEGAL DESCRIPTION OF WELL

SW ¼ of NE ¼ of NE ¼ of sec. 5 ; TWP. 16N S; Rge. 9E EIM WIM ECM; COUNTY Creek

3. TYPE OF WORK	4. PROPOSED / PAST USE	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic ☐ Irrigation ☐ Stock	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work ☐ Test	☐ Municipal ☐ Industrial ☐ Test	☑ Cable ☐ Other _____

6. LOG

Material	From	To	Saturated ✓
top soil	0	10	
Clay	10	20	
Quick Sand	20	30	
Clay	30	45	
Water Sand	45	55	
Blue Shale	55	64	

RECEIVED
JUL 25 1983
Oklahoma Water Resources Board

RECEIVED
JUL 15 1983
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA

Dates: Started 6-20-83 Completed 6-21-83
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4" in. Total Depth 64 ft.

CASING RECORD

Diameter		From		To	
4½	in.	18" above ground	ft.	64	ft.
	in.		ft.		ft.

Surface Seal: ☑ Yes ☐ No Type: Steel Pipe - Cement
Depth of Seal: 30 ft.
Gravel Packed:
Gravel Packed From 20 ft. to 64 ft.
Amount Used: Approx. 1800 #

PERFORATION RECORD

Type		From	ft.	To	ft.
Size	4½" PVC	From	45 ft.	To	55 ft.
"		From	ft.	To	ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 45 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality Good

BAILER TEST

Drawdown _____ ft. After Pumping _____ hrs. At 8 gpm.
Size of Bailer: 10 gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT

10 AC.

SW ¼ of NE ¼ of NE ¼ of SEC 5 ;
TWP 16 N S; RGE 9E EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address RR 1 Depew OK 74025 Phone # 918-324-5463
Signed Allen Baker Date 6-21-83

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000437

3-4'

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

#12421

1. OWNER (b) (6) [redacted] **ADDRESS** Bristow Okla

PHONE

2. LEGAL DESCRIPTION OF WELL EIM (Circle One) WIM ECM;

NW ¼ of NW ¼ of SW ¼ of sec. 5 ; TWP. 16 N S; RGE 9 **COUNTY** Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work
☐ Test/Monitoring

4. USE
☑ Domestic
☐ Stock
☐ Test Monitoring

NON-DOMESTIC
☐ Irrigation
☐ Municipal
☐ Industrial
☐ Commercial
☐ Other

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other _____
☐ Air

6. LOG

Material	From	To	Saturated
top soil	0	5	
Clay	5	10	
Sand rock	10	30	
Water Sand	30	35	✓
Red bed	35	45	
Shale	45	55	
Red bed	55	70	
Shale	70	80	
lime	80	82	
Shale	82	90	
lime	90	94	
Shale	94	125	
Red bed	125	140	
Water Sand	140	150	✓
Red bed	150	156	

RECEIVED AUG 7 1985 Oklahoma Water Resources Bd.

7. LOCATION PERMIT
If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 7-22-85 Completed 7-23-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 156 ft.

CASING RECORD

	Diameter	From	To
Inside	4 1/2 in.	18" ↑ ground ft.	156 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 10 ft.
GRAVEL PACKED:
Gravel Packed From 10 ft. to 156 ft.
Amount Used: Approx 1½ ton

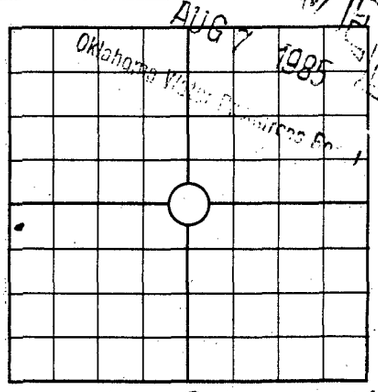
PERFORATION RECORD

Type/Size		
From 116 ft.	To 156 ft.	
From 30 ft.	To 70 ft.	
From ft.	To ft.	

9. WELL TEST DATA
Static Water Level Below Land Surface 26 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 9 gpm.

10. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



NW ¼ of NW ¼ of SW ¼ of SEC 5 ;
TWP 16 N S; RGE 9 (Circle One) EIM,WIM,ECM

12. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD 170
Address Rt 1 Depew Okla Phone # 918-324-5466
Signed Allen Baker Date 9/23-85

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000438

3541

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

#12420

1. OWNER (b) (6) **ADDRESS** (b) (6) **PHONE** (b) (6)
BRISTOW OK 74012

2. LEGAL DESCRIPTION OF WELL
EIM (Circle One)
WIM
SW ¼ of SE ¼ of NE ¼ of sec. 5 ; TWP. 16 N RGE 9 ECM; **COUNTY** CREEK

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work
☐ Test/Monitoring

4. USE
☑ Domestic
☐ Stock
☐ Test Monitoring

NON-DOMESTIC
☐ Irrigation
☐ Municipal
☐ Industrial
☐ Commercial
☐ Other

5. DRILLING METHOD
☐ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other _____
☑ Air

6. LOG

Material	From	To	Saturated
SURFACE	0	3	
CLAY	3	6	
SAND ROCK	6	19	
RED CLAY	19	24	
LIME	24	28	
RED CLAY (GGPM)	28	37	✓
LIME	37	38	
RED CLAY	38	43	
SHALE	43	53	
LIME	53	57	
SHALE	57	65	
RED CLAY	65	127	
LIME	127	130	
RED CLAY	130	146	
LIME	146	149	
SHALE	149	155	
SAND	155	171	✓
LIME	171	182	
RED CLAY	182	188	
LIME	188	193	
WATER SAND	193	210	✓
SHALE	210	213	

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NOV 8 1985
Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 20 OCT 85 Completed 22 OCT 85
Contractor WAGNER WATER WELLS
Driller CK WAGNER
Diameter Hole 6 ½ in. Total Depth 213 ft.

CASING RECORD

	Diameter		From		To	
Inside	4 ½	in.	0	ft.	213	ft.
Outside	6	in.	0	ft.	19	ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: _____ Depth of Seal: 19 ft.
GRAVEL PACKED:
Gravel Packed From 65 ft. to 213 ft.
Amount Used: 150 GAL

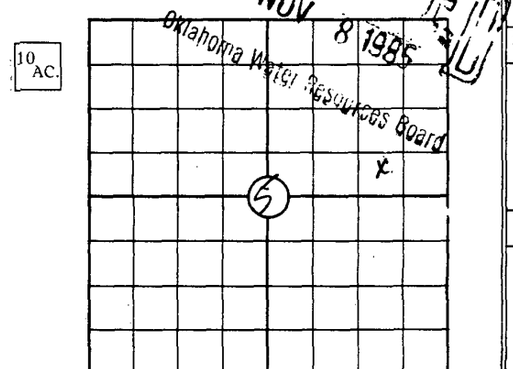
PERFORATION RECORD

Type	Size				
¼" SLOT		From 133	ft. To 213	ft.
		From	ft. To	ft.
		From	ft. To	ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 62 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 10 gpm.

10. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SW ¼ of SE ¼ of NE ¼ of SEC 5 ;
TWP 16 N RGE 9 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name CK WAGNER License # WD 209
Address SAPULPA OK Phone # 224-3257
Signed CK Wagner Date 29 OCT 85

Form 424-0684
USE ADDITIONAL SHEETS IF NECESSARY

000439

3-41

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

#12419

STATE OF OKLAHOMA

MULTI-PURPOSE WATER WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

NOTICE BEFORE USE OF THIS WELL: It shall be the responsibility of the well owner to have the water tested for quality by any Oklahoma Water Resources Board certified laboratory and supply copy of these results to the Oklahoma Water Resources Board.

1. **WELL OWNER** (b) (6) [redacted] **PHONE** _____

2. **LEGAL DESCRIPTION** SE ¼ of SW ¼ of SE ¼ of sec. 5 ; TWP. 16 (N) S; RGE 9 (EIM) (WIM) (ECM) (Circle One) **COUNTY** Creek

FINDING LOCATION _____
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other _____
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other _____	☐ Other _____	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
top soil	0	3	
clay	3	12	
shale	12	35	
limestone	35	40	
water sand	40	47	✓
red shale	47	74	

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APR 13 1988
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 3-30-88 Completed 4-5-88
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 1/2 in. Total Depth 74 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe	_____	in.	_____	ft.	_____	ft.
Well Casing	4 1/2	in.	18" Aground	ft.	74	ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 10 & 25 ft.
GRAVEL PACK:
Gravel Packed From 10 ft. to 74 ft.
Amount Used: approx 1 Ton

PERFORATION RECORD

Type/Size				
_____	From 25 [redacted]	ft. To	54	ft.
_____	From _____	ft. To	_____	ft.
_____	From _____	ft. To	_____	ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 30 ft.
Approximate Yield _____ gpm.
If Artesian: Flows _____ gpm.

10. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

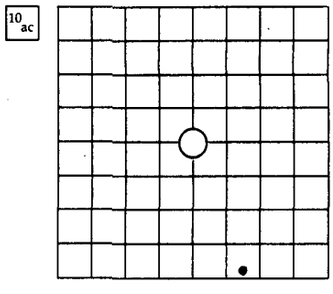
11. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # OD-120
Address RR1 Box 293 - Depew 74028 Phone # 324-5465
Signed Allen Baker Date 4-5-88

Form 424-0487

USE ADDITIONAL SHEETS IF NECESSARY

000440

5-Y

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12415

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1. OWNER (b) (6) **ADDRESS** (b) (6)
Bristow OK 74010 **PHON** (b) (6)

2. LEGAL DESCRIPTION OF WELL EIM (Circle One) WIM
SE ¼ of NW ¼ of NW ¼ of sec. 4; TWP. 16 N. S; RGE 9E ECM; **COUNTY** Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work
☐ Test/Monitoring

4. USE
☑ Domestic
☐ Stock
☐ Test/Monitoring

NON-DOMESTIC
☐ Irrigation
☐ Municipal
☐ Industrial
☐ Commercial
☐ Other

5. DRILLING METHOD
☐ Rotary ☐ Rev. Rotary
☑ Cable ☐ Other _____
☐ Air

6. LOG

Material	From	To	Saturated
Top Soil	0	2	
Red Clay	2	6	
Sand Rock	6	15	
Red Clay	15	24	
Wate Sand	24	65	✓
Red Clay	65	82	

RECEIVED
JUN 15 1987
Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 6-8-87 Completed 6-9-87
Contractor Mickey Moore
Driller _____
Diameter Hole 6 1/2 in. Total Depth 82 ft.

CASING RECORD

	Diameter		From		To	
Inside	4 1/2	in.	18"	Ground ft.	82	ft.
Outside		in.		ft.		ft.

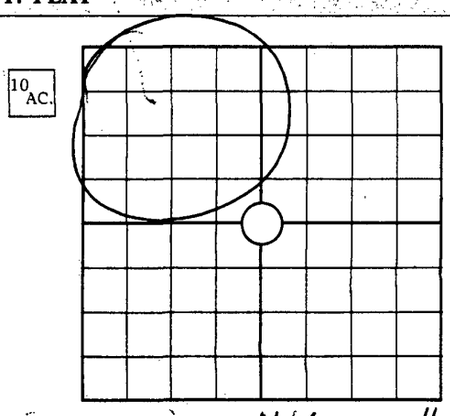
Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal Portland Cement Depth of Seal: 10 ft.
GRAVEL PACKED:
Gravel Packed From 0 ft. to 82 ft.
Amount Used: 1 Sack

PERFORATION RECORD
Type/Size
From 20 ft. To 65 ft.
From _____ ft. To _____ ft.
From _____ ft. To _____ ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 24 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 10 gpm.

10. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



_____ ¼ of _____ ¼ of NW ¼ of SEC 4;
TWP 16 (N) S; RGE 9E (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Mickey Moore License # WD197
Address RT 1 Box 632 Phone # 367-3133
Depew Ok 74028
Signed Mickey Moore Date 6-11-87

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000441

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA

MULTI-PURPOSE WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

30242

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION SW ¼ of SW ¼ of NW ¼ of sec. 4 ; TWP. 16 N S; RGE 9E EIM (Circle One) WIM ECM COUNTY Creek

FINDING LOCATION NE Bristow to State Barn on 66 go NE to 1st Rd on R Mo 1/4 mi S E side of Rd
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☒ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Red Clay	1	200	
Sandstone & Limestone			
Water Sand	200	220	✓

JAN 18 1994
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-18-93 Completed 9-20-93
Contractor Harvey Moore Sr
Driller Harvey Moore Sr.
Diameter Hole 6 3/4 in. Total Depth 220 ft.

CASING RECORD

	Diameter	From ground	To
Surface Pipe	_____ in.	12" ft.	_____ ft.
Well Casing	4 1/2 in.	_____ ft.	220 ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 10 ft.
GRAVEL PACK:
Gravel Packed From 10 ft. to 220 ft.
Amount Used: _____

PERFORATION RECORD

Type/Size 1/4" drilled From 200 ft. To 220 ft.
_____ From _____ ft. To _____ ft.
_____ From _____ ft. To _____ ft.

9. WELL TEST DATA

Static Water Level
Below Land Surface _____ ft.
Approximate Yield 15 gpm.
If Artesian: Flows _____ gpm.

10. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

11. PLUGGING DATA

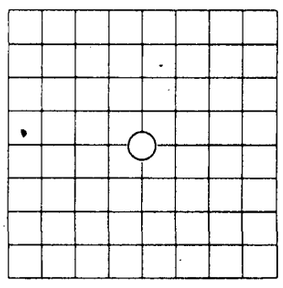
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT

10 ac



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge. ✓

Name Harvey Moore Sr. License # DP 0140
Address Rt 1 Box 632 Depew Phone # 367-3137
74028
Signed Harvey Moore Sr. Date 11-20-93

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

KW

000442

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

26618

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. **WELL OWNER** (b) (6) [redacted] **PHONE** (b) (6) [redacted]

2. **LEGAL DESCRIPTION** NW ¼ of SW ¼ of NW ¼ of sec. 12 ; TWP. 15 N ; RGE 8 E/W/WM/ECM **COUNTY** Creek

FINDING LOCATION From Bristow Airport go S. ¼ Mi. Trailer House on L. side of Rd.
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Sand Rock	1	20	
Red Clay	20	40	
Red Rock	40	45	
Red Clay	45	50	
Red Rock	50	55	
Red Clay	55	70	
Red Rock	70	75	
Clay	75	120	
Water Sand	120	140	✓
Red Clay	140	150	

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JAN 29 1992
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 12-5-91 Completed 12-7-91
Contractor Harvey Moore Sr.
Driller Harvey Moore Sr.
Diameter Hole 6 3/4 in. Total Depth 150 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	_____ in.	_____ ft.	_____ ft.
Well Casing	4 1/2 in.	12" ground ft.	150 ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 150 ft.
Amount Used: 4yd 1 1/2 T

PERFORATION RECORD

Type/Size		
1/4" drilled	From 120 ft.	To 140 ft.
_____	From _____ ft.	To _____ ft.
_____	From _____ ft.	To _____ ft.

9. WELL TEST DATA

Static Water Level
Below Land Surface 105 ft.
Approximate Yield 15 gpm.
If Artesian: Flows _____ gpm.

10. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

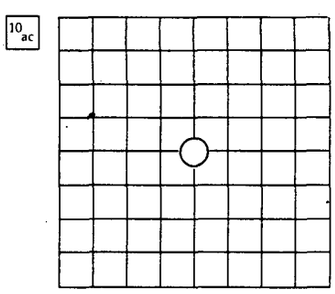
11. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore Sr. License # DPC 0140
Address Rt 1 Box 632 Phone # 367-3137
Pegaw, Ok 74028
Signed Harvey Moore Date 1-3-92

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

3'-4'

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

12334

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

1. OWNER (b) (6) [redacted] ADDRESS Drew

PHONE _____

2. LEGAL DESCRIPTION OF WELL (EIM) WIM

NE ¼ of SE ¼ of SE ¼ of sec. 12 ; TWP. 15 (N) S; Rge. 8 ECM; COUNTY Creek

3. TYPE OF WORK	4. PROPOSED / PAST USE	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic ☐ Irrigation ☐ Stock	☒ Rotary ☐ Rev. Rotary
☐ Reconditioning Work ☐ Test	☐ Municipal ☐ Industrial ☐ Test	☐ Cable ☐ Other _____

6. LOG

Material	From	To	Saturated ✓
Top Soil	0	3	
Sand Rock	3	20	
Red Bed	20	40	
limestone	40	42	
Red Bed	42	50	
lime stone	50	51	
Red Bed	51	84	
Shale	84	98	
Sand	98	115	✓
Red Bed	115	123	

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NOV 13 1985
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA

Dates: Started 11-7-85 Completed 11-7-85
Contractor Spess Water Well
Driller Gary Spess
Diameter Hole 8 in. Total Depth 123 ft.

CASING RECORD

Diameter	From	To
5 in.	2' Above Gl ft.	123 ft.
_____ in.	_____ ft.	_____ ft.

Surface Seal: ☒ Yes ☐ No Type: Cement
Depth of Seal: 15 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 123 ft.
Amount Used: 1½ Ton

PERFORATION RECORD

Type 18" Slots From 113 ft. To 123 ft.
Size 18" From _____ ft. To _____ ft.
" _____ From _____ ft. To _____ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface _____ ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality _____

BAILER TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.
Size of Bailer: _____ gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA

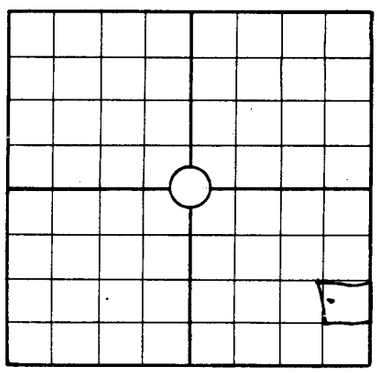
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT

10 AC.



NE ¼ of SE ¼ of SE ¼ of SEC 12 ;
TWP 15 (N) S; RGE 8 (EIM) WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Spess Water Well Svc License # WD 223
Address Mannford Okla. Phone # 918-865-421
Signed _____ Date 11-8-85

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000444

3L-41

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12335

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1. OWNER (b) (6) [redacted] **ADDRESS** Bristow Okla. RR. **PHONE** —

2. LEGAL DESCRIPTION OF WELL (EIM) WIM ECM (Circle One)

SE ¼ of NE ¼ of SE ¼ of sec. 12 ; TWP 15 (N) S; RGE 8 **COUNTY** Creek

3. TYPE OF WORK
- [X] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Test/Monitoring

4. USE
- [X] Domestic
- [ ] Stock
- [ ] Test/Monitoring

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [X] Rotary
- [ ] Rev. Rotary
- [ ] Cable
- [ ] Other _____
- [X] Air

6. LOG

Material	From	To	Saturated
Sand Rock	0	22	
Red Bed	22	30	
limestone	30	31	
Red Bed	31	53	
Sand	53	65	
Shale	65	85	
water Sand	85	95	✓
Shale	95	105	

RECEIVED
NOV 13 1985
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

[ ] Yes [ ] No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 10-31-85 Completed 10-31-85
Contractor Spess Water Well Service
Driller Gary Spess
Diameter Hole 8 in. Total Depth 105 ft.

CASING RECORD

	Diameter		From		To	
Inside	5	in.	2' Above GL	ft.	105	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal [X] Yes [ ] No
Type of Surface Seal: Cement Depth of Seal: 15 ft.
GRAVEL PACKED:
Gravel Packed From ~~105~~ 15 ft. to 105 ft.
Amount Used: 2000#

PERFORATION RECORD

Type/Size
0.125 From 95 ft. To 105 ft.
_____ From _____ ft. To _____ ft.
_____ From _____ ft. To _____ ft.

9. WELL TEST DATA

Static Water Level Below Land Surface _____ ft.
If Artesian: Flows _____ gpm.
Approximate Yield _____ gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.

SE ¼ of NE ¼ of SE ¼ of SEC 12 ;
TWP 15 (N) S; RGE 8 (EIM),WIM,ECM (Circle One)

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
[ ] Replaced Casing From _____ ft. To _____ ft.
[ ] Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name GARY SPESS License # WD 225
Address RT 3 Box 140 Mannford Phone # 918-865-4426
Signed _____ Date _____

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000445

2-31

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

22288

STATE OF OKLAHOMA

MULTI-PURPOSE WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER (b) (6) [redacted] PHONE (b) (6) [redacted]
EIM (Circle One) WIM ECM

2. LEGAL DESCRIPTION SW ¼ of SW ¼ of SW ¼ of sec. 6 ; TWP. 15 N S; RGE 9 E COUNTY Creek

FINDING LOCATION S. from Bristow on 48 Hwy. 3 Mi. turn W. go 1 Mi W
Blocks or distance(s) from given point(s)
look for trailer on R. (N.) side of road.

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	10	
Sand Rock	10	18	
Red Clay	18	25	
Sand Rock	25	35	
Water Sand	35	45	✓
Red Clay	45	55	
Water Sand	55	66	✓

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started Oct 2 '90 Completed Oct 3 1990
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6 3/4 in. Total Depth 66 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	____ in.	12" ground ft.	____ ft.
Well Casing	4 1/2 in.	12" ground ft.	66 ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 66 ft.
Amount Used: 1/2 Ton

PERFORATION RECORD

Type/Size	From	To
1/4" 4 1/2" Drilled	35 ft.	45 ft.
	55 ft.	66 ft.
	____ ft.	____ ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 25 ft.
Approximate Yield 11 gpm.
If Artesian: Flows ____ gpm.

10. PUMP INFORMATION

Pump Type ____
Power Source ____
Rated Capacity ____ gpm.
Depth of Bowls or Cylinder ____ ft.

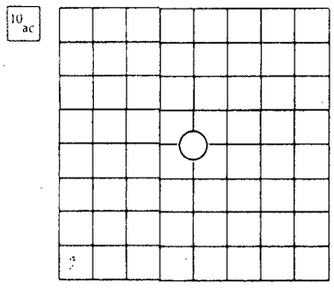
11. PLUGGING DATA

Date Plugged ____
Backfilled With ____ Material To ____ ft.
Grouted or Cemented From ____ Ft. To ____ ft.

12. RECONDITIONING WORK

Date Completed ____
Replaced Casing From ____ ft. To ____ ft.
Replaced Screen From ____ ft. To ____ ft.
Deepened Well From ____ ft. To ____ ft.
Redeveloped Well By ____

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD197
Address RT 1 Box 632 Phone # 367-3137
Depew, Ok
Signed Harvey Moore Date 10-6-90

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000446

21-31

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

#22621

1. WELL OWNER (b) (6) [redacted] PHONE (b) (6) [redacted]
FIM (Circle One) WIM ECM

2. LEGAL DESCRIPTION SW ¼ of NW ¼ of NW ¼ of sec. 5; TWP. 15 (N) S; RGE 9 COUNTY Creek

FINDING LOCATION From County Barn on Hwy 48 in Bristow 1st house on E side of road
Blocks or distance(s) from given point(s).

3. TYPE OF WORK
- [x] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

4. USE
- [x] Domestic
- [ ] Stock
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [ ] Fluid Rotary
- [ ] Rev. Rotary
- [x] Cable
- [ ] Other
- [ ] Air Rotary
- [ ] H.S. Auger

6. FORMATION RECORD

Material	From	To	Saturated
Top Soil	0	1	
Sand Rock	1	14	
Red Clay	14	20	
Water Sand	20	50	–

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
- [ ] Yes
- [ ] No

Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 8-16-91 Completed 8-18-91
Contractor Harvey Moore OP-0220
Driller Harvey Moore
Diameter Hole 6½ in. Total Depth 50 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4½ in.	12" ground ft.	50 ft.

Cement Grout Surface Seal? [ ] Yes [ ] No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 20 ft. to 50 ft.
Amount Used: appx ½ T

PERFORATION RECORD
Type/Size: ¼" drilled From 20 ft. To 50 ft.
From ____ ft. To ____ ft.
From ____ ft. To ____ ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 15 ft.
Approximate Yield 30 gpm.
If Artesian: Flows ____ gpm.

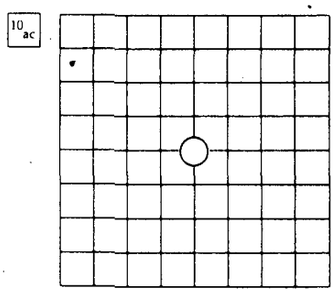
10. PUMP INFORMATION
Pump Type ____
Power Source ____
Rated Capacity ____ gpm.
Depth of Bowls or Cylinder ____ ft.

11. PLUGGING DATA
Date Plugged ____
Backfilled With ____ Material To ____ ft.
Grouted or Cemented From ____ Ft. To ____ ft.

12. RECONDITIONING WORK
Date Completed ____
Replaced Casing From ____ ft. To ____ ft.
Replaced Screen From ____ ft. To ____ ft.
Deepened Well From ____ ft. To ____ ft.
Redeveloped Well By ____

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NOV 15 1991
Oklahoma Water Resources Board

13. PLAT



14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 147 OPC-0140
Address Rt 1 Box 632 Phone # 367-3437
Signed Harvey Moore Date 8-11-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000447

5-4'

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

12350

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1. OWNER (b) (6) **ADDRESS** (b) (6) Bristow, Ok. 74010

PHONE _____

2. LEGAL DESCRIPTION OF WELL

EIM (Circle One)
WIM
ECM; **COUNTY** Creek

NW ¼ of SW ¼ of SE ¼ of sec. 7 ; TWP. 15N N S; RGE 9E

3. TYPE OF WORK
- [X] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Test/Monitoring

4. USE
- [X] Domestic
- [ ] Stock
- [ ] Test Monitoring

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [ ] Rotary
- [ ] Rev. Rotary
- [ ] Cable
- [ ] Other _____
- [X] Air

6. LOG

Material	From	To	Saturated
Top soil	0	1	
Clay	1	15	
Sand rock	15	30	2gpm
Clay	30	40	
Sand rock	40	50	
Water sand	50	80	13gpm

RECEIVED
OCT 1 1985
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

[ ] Yes [ ] No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-10-85 Completed 9-10-85
Contractor Knott's Water Well Drilling
Driller Dale Knott
Diameter Hole 8 in. Total Depth 80 ft.

CASING RECORD

	Diameter		From		To	
Inside	5	in.	80	ft.	+2	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal [X] Yes [ ] No
Type of Surface Seal: portland Depth of Seal: 10 ft.
GRAVEL PACKED:
Gravel Packed From 80 ft. to 10 ft.
Amount Used: 3/4T

PERFORATION RECORD

Type Size				
1/32" slotted	From	60	ft. To	77 ft.
	From		ft. To	ft.
	From		ft. To	ft.

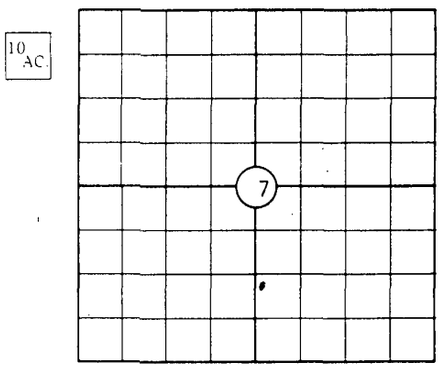
9. WELL TEST DATA

Static Water Level Below Land Surface 30 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 15 gpm.
100 mg/l salt; 10g hard;

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



NW ¼ of SW ¼ of SE ¼ of SEC 7 ;
TWP 15N N S; RGE 9E (Circle One) EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
[ ] Replaced Casing From _____ ft. To _____ ft.
[ ] Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name kathleen Knott License # WD 74
Address Rt. 1, Terlton, Ok. 74081 Phone # WS 74

Signed Kathleen Knott Date 9-15-85

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000448

3-4'

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

12351

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla.

PHONE _____

2. LEGAL DESCRIPTION OF WELL (EIM) WIM ECM (Circle One)

SE ¼ of SW ¼ of SE ¼ of sec. 8 ; TWP. 15 (N) S; RGE 9 COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
[X] New Well [ ] Plugging	[X] Domestic	[ ] Irrigation	[ ] Rotary [ ] Rev. Rotary
[ ] Reconditioning Work	[ ] Stock	[ ] Municipal	[X] Cable [ ] Other _____
[ ] Test/Monitoring	[ ] Test/Monitoring	[ ] Industrial	[ ] Air
		[ ] Commercial	
		[ ] Other	

6. LOG

Material	From	To	Saturated
top soil	0	3	
Quick Sand	3	30	
sand rock	30	37	
water sand	37	65	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

[ ] Yes [ ] No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 8-26-87 Completed 8-28-87
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¼ in. Total Depth 65 ft.

CASING RECORD

	Diameter		From		To	
Inside	4½	in.	12" ↑ ground	ft.	65	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal [X] Yes [ ] No
Type of Surface Seal: Portland cement & Steel Pipe Depth of Seal: 30 ft.
GRAVEL PACKED: Gravel Packed From ground level ft. to 65 ft.
Amount Used: approx 3/4 ton
30' Steel pipe - Cement plug at bottom of pipe + at top of pipe

PERFORATION RECORD

Type	Size				
		From 37	ft. To 65	ft.	
		From	ft. To	ft.	
		From	ft. To	ft.	

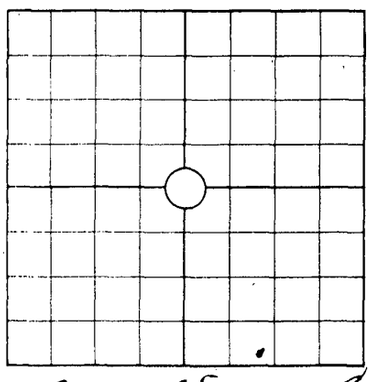
9. WELL TEST DATA

Static Water Level Below Land Surface 10 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 30 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SE ¼ of SW ¼ of SE ¼ of SEC 8 ;
TWP 15 (O) S; RGE 9 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
[ ] Replaced Casing From _____ ft. To _____ ft.
[ ] Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew Okla 74028 Phone (918) 324-5468
Signed Allen Baker Date 8-28-87

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000449

3-4'

White — Water Resources Board
Canary — Driller's Copy
Pink — Drillers Copy

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FEB 2 1984
Oklahoma Water Resources Board

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

#12352

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla

PHONE _____

2. LEGAL DESCRIPTION OF WELL

SW ¼ of SW ¼ of SW ¼ of sec. 8 ; TWP. 15 N S; Rge. 9 EIM WIM ECM; COUNTY Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☐ Rotary ☐ Rev. Rotary
☑ Cable ☐ Other _____

6. LOG

Material	From	To	Saturated ✓
top soil	0	5	
quick sand	5	15	
Sand rock	15	30	
Water Sand.	30	51	

7. NEW WELL CONSTRUCTION DATA

Dates: Started 1-23-84 Completed 1-24-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¾ in. Total Depth 51 ft.

CASING RECORD

Diameter	From	To
4½ in.	18" ↑ ground ft.	51 ft.
_____ in.	_____ ft.	_____ ft.

Surface Seal: ☑ Yes ☐ No Type: Steel pipe & Portland cement.
Depth of Seal: 15 ft.
Gravel Packed:
Gravel Packed From -1' ft. to 51 ft.
Amount Used: _____

PERFORATION RECORD

Type _____ From 30 ft. To 51 ft.
Size _____ From _____ ft. To _____ ft.
" _____ From _____ ft. To _____ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 12 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality good

BAILER TEST

Drawdown _____ ft. After Pumping _____ hrs. At 20 gpm.
Size of Bailer: 10 gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT

10 AC.

SW ¼ of SW ¼ of SW ¼ of SEC 8 ;
TWP 15 N S; RGE 9 EIM WIM ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD 120
Address Rt 1 Depew Okla 74028 Phone # 918-324-5465
Signed Allen Baker Date 1-24-84

USE ADDITIONAL SHEETS IF NECESSARY

FORM 1/4-G 76

000450

3-4'

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

76622

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION SW ¼ of SW ¼ of SE ¼ of sec. 8 ; TWP. 15 N S; RGE 9 E W M (Circle One) COUNTY Creek

FINDING LOCATION S. from Bristow on Hwy. 48 2 Mi, & 1/2 Mi E, on N side of Rd,
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Red Clay + Sand Rock	1	45	
Water Sand	45	75	
Blue Shale Sand Rock Red Clay - all intermitantly	75	135	

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-28-91 Completed 10-1-91
Contractor Harvey Moore
Driller Harvey Moore OP-0220
Diameter Hole 6 1/2 in. Total Depth 135 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4 1/2 in.	12" ground ft.	135 ft.

Cement Grout Surface Seal? ☐ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 135 ft.
Amount Used: Appx 1 ton

PERFORATION RECORD

Type/Size ¼" drilled From 75 ft. To 135 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA

Static Water Level
Below Land Surface 32 ft.
Approximate Yield 5 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

RECEIVED
NOV 15 19
Oklahoma Water Resources Board

13. PLAT

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD197 OPC-0140
Address Rt 1 Box 632 Phone # 367-3137
Depew, OK 74028
Signed Harvey Moore Date 10-9-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000451

3-4'

69-251

25748

WELL INFORMATION

(File one copy for each well within 60 days after completion of well)

Owner Krumme Oil Company

Address Box 749, Bristow, Oklahoma 74010

Well No WS-1 in SE NE ¼ of SE ¼ of Section 6 Township 16N Range 9E

Creek County Elevation 886 Grd. ft.

Distance from nearest town or highway junction:

3½ miles north of Bristow on Highway 48

Intended use (underline): Irrigation, Municipal, Industrial, Other Waterflood

GENERAL DRILLING INFORMATION

(Fill in completely with assistance of well driller)

Contractor Company Tools Address Box 749, Bristow, Okla. 74010

Driller Bill Polm Address 401 E. 8th St. Bristow, Oklahoma 74010

Dates: Started July 25, 1969 Completed August 6, 1969

Type of Rig: Cable tool Yes Rotary _____ Other _____

Size of Hole 10" hole to 107 ft; 8" hole to 400 ft. Total Depth 400 ft.
(Example: 8 in. to 55 ft.)

Water encountered at: 35', 80' ft. 130', 210' ft. 240' ft. 300'

Water stands at 50 feet below the surface.

TESTS

Swab Test ~~Bailer test~~ 90 bbl/Hr. bailers per hour. Size of bailer _____ Gal.

Pump test _____ gallons per minute for _____ hours

Drawdown: 175 feet after ~~pumping or bailing~~ swabbing 10 hrs. at 63 GPM.

Quality of Water: Taste good Odor none Color clear

Hard somewhat Soft _____ Temperature unknown

MATERIAL AND EQUIPMENT

Casing record 8 5/8" to 107 ft cemented to surface, 7" to 400 ft.
(Example: 8 in. to 55 ft.; 6 in. 55 to 227 ft.)

Screen or perforation record 7" perforated with slots from 137 ft. to 295 ft.

Gravel packed No Diameter _____ Amt. of Gravel used _____

Pump Type Pumping Unit Rated Capacity _____ GPM against _____ feet of head.

Rated Capacity: 23 GPM at 18 64inch strokes per minute

Depth to bowls or cylinder _____ ft.

Power: Electric _____ h.p. Gasoline motor 12 h.p.

RECEIVED
SEP 4 - 1969
OKLA. WATER RESOURCES BOARD

D H Krumme
Signature of Owner

7-29-69
Date

(OVER)

9-68

000452

2'-3'

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WATER WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

RECEIVED
NOV 28 1988
Oklahoma Water Resources Board

#12426

1. WELL OWNER (b) (6) [redacted] PHONE (b) (6) [redacted]

2. LEGAL DESCRIPTION SE ¼ of SE ¼ of SE ¼ of sec. 7 ; TWP. 16 N S; RGE 9 EIM (Circle One) WIM ECM COUNTY Creek

FINDING LOCATION 2 Mi. N of Bristow on Hwy 66 E side of New Hwy.
Blocks or distance(s) from given point(s).
Property lies between Old Hwy 66 & New Hwy 66

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	6"	
Sand Rock & Red Clay	6"	50	
Water Sand (Iron & Salt)	50	85	✓
Red Clay	85	125	
Water Sand	125	140	✓
Red Clay	140	155	✓
Water Sand	155	195	✓
Red Clay	195	200	
Water Sand	200	212	✓

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 11-12-88 Completed 11-15-88
Contractor Harvey Moore
Driller Same
Diameter Hole 6 1/2 in. Total Depth 212 ft.

CASING RECORD

	Diameter		From		To
Surface Pipe		in.		ft.	ft.
Well Casing	4 1/2	in.	12" ground	ft.	212 ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 182 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 212 ft.
Amount Used: 1.97 TONS

PERFORATION RECORD

Type/Size				
1/4" Drilled	From	192 ft.	To	212 ft.
	From	ft.	To	ft.
	From	ft.	To	ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 60 ft.
Approximate Yield 5 gpm.
If Artesian: Flows _____ gpm.

10. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

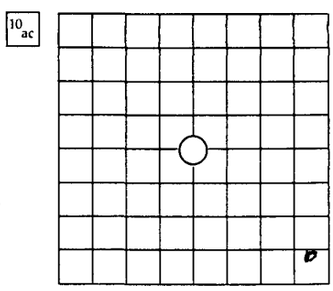
11. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Moore Water Wells License # WD197
Address ~~Rt. 1 Box 632~~ Depew, OK 74028 Phone # 367-3137

Signed Mackey Moore Date 11-15-88

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000453

2-31

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12427

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

1. OWNER (b) (6) ADDRESS Sapulpa Okla
PHONE

2. LEGAL DESCRIPTION OF WELL
SW ¼ of NE ¼ of SE ¼ of sec. 7 ; TWP. 16 N S; Rge. 9 EIM WIM ECM; COUNTY Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other _____

6. LOG

Material	From	To	Saturated ✓
top Soil	0	5	
Quick Sand	5	15	
clay	15	20	
Shale	20	33	
lime	33	35	
Shale	35	74	
Rock	74	90	
Water Land	90	110	✓

RECEIVED
DEC 10 1984
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA

Dates: Started 11-5-84 Completed 11-5-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 110 ft.

CASING RECORD

Diameter	From	To
4 1/2 in.	2' Above ground ft.	110 ft.
in.	ft.	ft.

Surface Seal: ☑ Yes ☐ No Type: Portland Cement + Steel Pipe
Depth of Seal: 15 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 110 ft.
Amount Used: Approx 1 Yard

PERFORATION RECORD

Type _____ From 70 ft. To 110 ft.
Size _____ From _____ ft. To _____ ft.
" _____ From _____ ft. To _____ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 70 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality Good

BAILER TEST

Drawdown _____ ft. After Pumping _____ hrs. At 10 gpm.
Size of Bailer: 12 gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

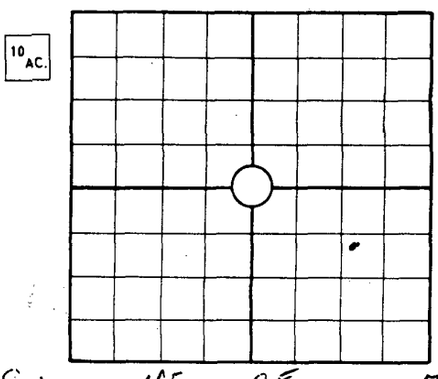
9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT



SW ¼ of NE ¼ of SE ¼ of SEC 7 ;
TWP 16 N S; RGE 9 EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew Okla Phone # 918-324-5465

Signed Allen Baker Date 11-5-84

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000454

21-3'

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA

MULTI-PURPOSE WATER WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

#12428

1. **WELL OWNER** (b) (6) **PHONE** (b) (6)

2. **LEGAL DESCRIPTION** SE COR N½ SE ¼ of NW ¼ of NW ¼ of sec. 8 ; TWP. 16 N S; RGE 9 ECM (EIM / WIM) (Circle One) **COUNTY** Creek

FINDING LOCATION Apx 600' E of Intersection 48 & 66 on 66 Hwy / Access Hwy 4
Blocks or distance(s) from given point(s). FROM MACK'S Country Store.

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	6"	
Red Clay & Limestone Intermixtly	6"	170	
Water Sand	170	180	✓

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-24-88 Completed 9-25-88
Contractor Harvey Moore
Driller Same
Diameter Hole 7 in. Total Depth 180 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4½ in.	12" ground ft.	180 ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From Surface ft. to 180 ft.
Amount Used: 1.7 Tons

PERFORATION RECORD

Type/Size	From	To
Drilled 1/4"	170 ft.	180 ft.
	From ft.	To ft.
	From ft.	To ft.

9. WELL TEST DATA

Static Water Level
Below Land Surface 70 ft.
Approximate Yield 20 gpm.
If Artesian: Flows _____ gpm.

10. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

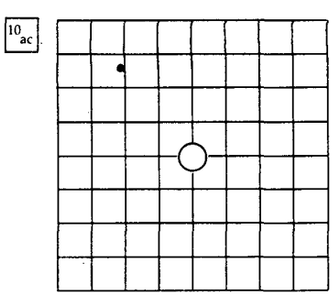
11. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 197
Address Rt 1 Box 632 Phone # 362-3137

Signed Harvey Moore Date 11-15-88

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000455

2'-3'

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

#12429

STATE OF OKLAHOMA
MULTI-PURPOSE WATER WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER ~~Harvey's~~ (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION SW ¼ of NE ¼ of NW ¼ of sec. 8 ; TWP. 16 N S; RGE 9E E/W/M (Circle One) COUNTY Creek
(See Attached:)

FINDING LOCATION
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	30	
Water Sand	30	40	✓
Red Clay	40	80	
Sand Rock	80	105	
Red Clay + limestone Intermitently	105	198	
Water Sand	198	226	✓

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 7-9-88 Completed 7-13-88
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6½ in. Total Depth 226 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4½	in.	12" ground	ft.	226	ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 40 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 226 ft.
Amount Used: 1.4 T cpx.

PERFORATION RECORD

Type/Size Drilled ¼" From 200 ft. To 226 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA

Static Water Level
Below Land Surface 70 ft.
Approximate Yield 15+ gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

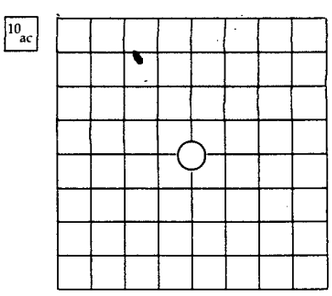
11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 197
Address Rt 1 Box 632 Depew, OK Phone # 367-3137
Signed Harvey Moore Date 8-1-88

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000456

2-31

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

12430

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

Tulsa

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla
PHONE

2. LEGAL DESCRIPTION OF WELL
SW ¼ of SW ¼ of SW ¼ of sec. 8 ; TWP. 16 N S; Rge. 9 EIM WIM ECM; COUNTY Creek

3. TYPE OF WORK	4. PROPOSED / PAST USE	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic ☐ Irrigation ☐ Stock	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work ☐ Test	☐ Municipal ☐ Industrial ☐ Test	☐ Cable ☐ Other _____

6. LOG

Material	From	To	Saturated ✓
top Soil	0	4	
Red bed	4	25	
Shale	25	90	
lime	90	95	
Red bed	95	145	
lime	145	150	
Water Sand	150	176	

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Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA

Dates: Started 9-15-83 Completed 9-16-83
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 176 ft.

CASING RECORD

Diameter	From	To
4 1/2 in.	12" Ground ft.	176 ft.
_____ in.	_____ ft.	_____ ft.

Surface Seal: ☑ Yes ☐ No Type: portland cement
Depth of Seal: 12 ft.
Gravel Packed:
Gravel Packed From 12 ft. to 176 ft.
Amount Used: approx 13/4 ton

PERFORATION RECORD

Type _____ From 146 ft. To 176 ft.
Size _____ From _____ ft. To _____ ft.
" _____ From _____ ft. To _____ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 35 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality good

BAILER TEST

Drawdown 15 ft. After Pumping _____ hrs. At 15 gpm.
Size of Bailer: 10 gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

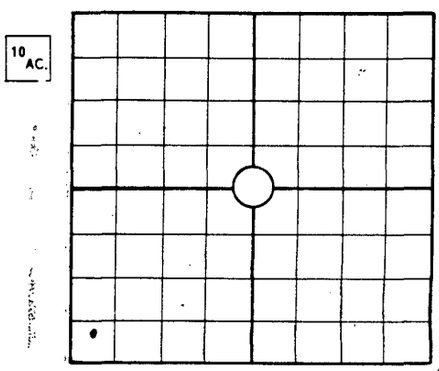
9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT



SW ¼ of SW ¼ of SW ¼ of SEC 8 ;
TWP 16 N S; RGE 9 EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address RR 1 Depew Okla 74028 Phone # 918-324-5465
Signed Allen Baker Date 9-16-83

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000457

2'-3'

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

#12430

1. OWNER (b) (6) [redacted] **ADDRESS** Bristow Okla

PHONE _____

2. LEGAL DESCRIPTION OF WELL (EIM) WIM (Circle One)

SE ¼ of NE ¼ of SE ¼ of sec. 8 ; TWP. 16 (N) S; RGE 9 ECM; **COUNTY** Creek

3. TYPE OF WORK
- ☑ New Well ☐ Plugging
- ☐ Reconditioning Work
- ☐ Test/Monitoring

4. USE
- ☑ Domestic
- ☐ Stock
- ☐ Test/Monitoring

NON-DOMESTIC
- ☐ Irrigation
- ☐ Municipal
- ☐ Industrial
- ☐ Commercial
- ☐ Other

5. DRILLING METHOD
- ☑ Rotary ☐ Rev. Rotary
- ☐ Cable ☐ Other _____
- ☐ Air

6. LOG

Material	From	To	Saturated
Top Soil	0	4	
Sand rock	4	27	
Shale	27	33	
lime	33	35	
Shale	35	50	
red bed	50	58	
lime	58	59	
red bed	59	65	
Water Sand	65	95	
red bed	95	105	
Sand rock	105	112	
iron rock	112	115	
Water Sand	115	120	✓
iron rock	120	140	
Water Sand	140	155	✓
iron rock	155	165	
Water Sand	165	195	✓

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 4-9-84 Completed 7-10-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 195 ft.

CASING RECORD

	Diameter	From	To
Inside	4 1/2 in.	24" above ground	195 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACKED:
Gravel Packed From 15 ft. to 195 ft.
Amount Used: Approx 2 ton -

PERFORATION RECORD

Type/Size
From 115 ft. To 186 ft.
From ____ ft. To ____ ft.
From ____ ft. To ____ ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 105 ft.
If Artesian: Flows ____ gpm.
Approximate Yield 20 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

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Oklahoma Water Resources Board

10 AC.

SE ¼ of NE ¼ of SE ¼ of SEC 8 ;
TWP 16 (N) S; RGE 9 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD 170
Address Rt 1 Depew Okla 74028 Phone # 918-324-5466
Signed Allen Baker Date 7-10-84

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000458

2-3'

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12432

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla
PHONE 8

2. LEGAL DESCRIPTION OF WELL
NE ¼ of SW ¼ of NW ¼ of sec. 8 ; TWP. 16 N S; Rge. 9 EIM WIM ECM; COUNTY Creek.

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other _____

6. LOG

Material	From	To	Saturated ✓
Clay	0	6	
Shale	6	30	
Red bed	30	45	
Water sand	45	85	
Shale	85	92	
Red bed	92	98	
Iron rock	98	100	
Red bed	100	106	

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Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA

Dates: Started 6-2-84 Completed 6-3-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 106 ft.

CASING RECORD

Diameter		From		To	
4 1/2	in.	3'	ft.	106	ft.
	in.		ft.		ft.

Surface Seal: ☑ Yes ☐ No Type: Portland Cement
Depth of Seal: 12 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 106 ft.
Amount Used: _____

PERFORATION RECORD

Type _____ From 46 ft. To 106 ft.
Size _____ From _____ ft. To _____ ft.
" _____ From _____ ft. To _____ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 55 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality good

BAILER TEST

Drawdown _____ ft. After Pumping _____ hrs. At 10 gpm.
Size of Bailer: 10 gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

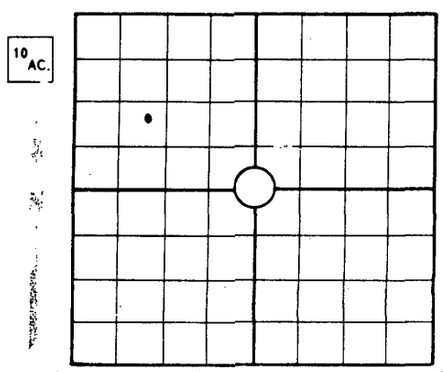
9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT



NE ¼ of SW ¼ of NW ¼ of SEC 8 ;
TWP 16 N S; RGE 9 EIM WIM ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Depew Okla 74028 Phone # 224-5465 (918)
Signed Allen Baker Date 6-3-84

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000459

2'-3'

#25749

WELL INFORMATION

Owner Krumme Oil Company

Address Box 749, Bristow, Oklahoma

Well No. ~~4~~ SE in NW ¼ of SW ¼ of Section 8 Township 16N Range 9E

Creek County Elevation 833 ft.

Distance from nearest town or highway junction:

Three miles north of Bristow

Intended use (underline): Irrigation, Municipal, Industrial, Other Water supply, for waterflood (oil)

GENERAL DRILLING INFORMATION

(File one for each well)

Contractor Company Rig Address

Driller Bill Polm Address 401 East 8th

Dates: Started November 4, 1965 Completed November 11, 1965

Type of Rig: Cable tool X Rotary Other

Size of Hole 10" to 107', 8" to 325' Total Depth 325'

(Example: 8 in. to 55 ft.)

Water encountered at: 15' ft. 60' ft. 90' ft. 107' ft.

Water stands at 60' feet below the surface.

TESTS

Bailer test bailers per hour. Size of bailer Gal.

~~Pump test~~ Swab Test 63 gallons per minute for 2 hours

Drawdown: 60 feet after pumping or bailing 2 hrs. at 63 GPM.

Quality of Water: Taste good Odor good Color clear

Hard Soft X Temperature

MATERIAL AND EQUIPMENT

Casing record 8 5/8" to 107' (cemented), 7" to 325'

(Example: 8 in. to 55 ft.; 6 in. 55 to 227 ft.)

Screen or perforation record 7" casing perforated 125' to 300'

Gravel packed No Diameter Amt. of Gravel used

Pump Type turbine Rated Capacity 50 GPM against 238 feet of head.

Depth to bowls or cylinder 200 ft.

Power: Electric h.p. ~~Gasoline motor~~ Natural gas engine 15 h.p.

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OCT 31 1968
OKLA. WATER RESOURCES BOARD

George Krumme
Signature of Owner

Oct 30, 1968
Date

(OVER)

000460

28006

2-13'

MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

Please plot well location
1 mile
10 ac
N

Legal Description

E 1/2 NW 1/4 NW 1/4 NE 1/4 of Sec. 8 Twp. 16 N Rge. 9E

County Creek Well No:

Well Owner (b) (6) Phone (b) (6)

Address (b) (6) Bristow, Ok 74010

Finding location

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other
- ☐ _____

G.W. Use

- ☑ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☑ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	20	
Blue Shale	20	150	
Red Clay	150	175	
Water Sand	175	197	✓

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to excede 3 acres.)

Permit No: _____

New Boring or Well Construction Data

Date: Started 1-5-92 Completed 1-9-92

Firm Moore Water Well Drilling

Operator Harvey Moore Sr.

Type of Construction ☐ Open Hole ☑ Cased Hole

Hole Diameter 6 1/2 inches total depth 197 feet

Hole Diameter _____ inches total depth _____ feet

CASING RECORD

	diameter		from		to	
Surface pipe		inches		feet		feet
Well casing	4 1/2	inches	12" ground	feet	197	feet
Well casing		inches		feet		feet
Well casing		inches		feet		feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from		to	
1/4" Drilled	175	feet	197	feet
		feet		feet
		feet		feet

GRAVEL PACK

Type and Size	from		to	
3/8" Limestone	0	feet	197	feet
		feet		feet
		feet		feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from		to	
Type of Surface Seal Portland	0	feet	20	feet
Aquifer Seal Type		feet		feet
		feet		feet

HYDROLOGIC DATA

First Water Zone Encountered 175 ft.

Approximate Yield 15 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged _____

Backfilled From _____ feet _____ feet Type _____

Cement Grouted From _____ feet _____ feet

Reconditioning Work

Replaced Casing/Screen From _____ feet _____ feet

Deepened Well From _____ feet _____ feet

Redeveloped Well By

Certification

The work described above was done under my supervision.
This report is correct to the best of my knowledge.

Name Harvey Moore Sr. Lic. No. DPC 014

Address Rt 1 Box 632 Depew Phone 367-3137

Signed Harvey Moore Date 1-30-92

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JUL 18 1992
Oklahoma Water Resources Board

*See Pump Installers Form On Back

000461

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

38007

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

2-3

1. **WELL OWNER** (b) (6) **PHONE**

2. **LEGAL DESCRIPTION** (1/2) NW 1/4 of NW 1/4 of NW 1/4 of sec. 5; TWP. 16 N S; RGE 9 ECM (EIM (Circle One) WIM) **COUNTY** Creek

FINDING LOCATION
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Sand Rock	1	10	
Red Clay	10	35	
Limestone	35	40	
Water Sand	40	50	
Blue Shale & Limestone	50	120	
Red Clay	120	150	
Sand Rock w/Blue Shale	150	190	
Red Clay	190	204	
White Water Sand	204	219	

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JUL 13 1992
Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA
DATES: Started 3-3-92 Completed 3-9-92
Contractor Harvey Moore Jr.
Driller Harvey Moore Jr.
Diameter Hole 6 1/4 in. Total Depth 120 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4 1/2	in.	12" above ground	ft.	120	ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 219 ft.
Amount Used: Sugal 2 Sack

PERFORATION RECORD

Type/Size				
.40" slotted	From	204 ft.	To	219 ft.
	From	ft.	To	ft.
	From	ft.	To	ft.

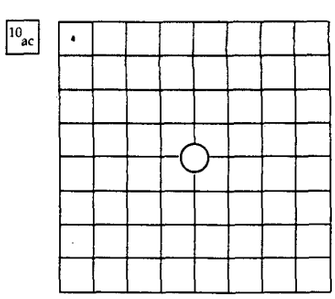
9. WELL TEST DATA
Static Water Level Below Land Surface 137 ft.
Approximate Yield 22 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION
Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK
Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT



14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore Jr. License # 0140
Address RT 1 Box 632 Bristow Phone # 367-3137
Signed Harvey Moore Jr. Date 3-10-92

SEV FW

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000462

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 1-21
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

#12433

1. OWNER (b) (6) [redacted] **ADDRESS** Kiefer Okla **PHONE**

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM ECM

SE ¼ of NE ¼ of SE ¼ of sec. 17 ; TWP. 16 N S; RGE 9 **COUNTY** Creek

3. TYPE OF WORK
- [x] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Test/Monitoring

4. USE
- [x] Domestic
- [ ] Stock
- [ ] Test/Monitoring

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [x] Rotary
- [ ] Cable
- [ ] Air
- [ ] Rev. Rotary
- [ ] Other

6. LOG

Material	From	To	Saturated
top Soil	0	2	
red bed	2	25	
lime	25	27	
shale	27	30	
lime	30	32	
shale	32	45	
red bed	45	70	
shale	70	73	
red bed	73	88	
iron rock	88	90	
red bed	90	120	
water sand	120	177	

RECEIVED
AUG 9 1984
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

- [ ] Yes
- [ ] No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 7-31-84 Completed 8-1-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 177 ft.

CASING RECORD

	Diameter	From	To
Inside	4 1/2 in.	3' ↑ ground ft.	177 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal [x] Yes [ ] No
Type of Surface Seal: portland cement Depth of Seal: 15 ft.
GRAVEL PACKED:
Gravel Packed From 15 ft. to 177 ft.
Amount Used: approx 13/4 ton

PERFORATION RECORD

Type/Size		
	From 120 ft. To 177	ft.
	From ft. To	ft.
	From ft. To	ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 145 ft.
If Artesian: Flows gpm.
Approximate Yield 18 gpm.

10. PLUGGING DATA

Date Plugged
Backfilled With X Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.

SE ¼ of NE ¼ of SE ¼ of SEC 17 ;
TWP 16 N S; RGE 9 (Circle One) EIM WIM ECM

12. PUMP INFORMATION

Pump Type
Power Source X
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK

Date Completed
- [ ] Replaced Casing From X ft. To ft.
- [ ] Replaced Screen From ft. To ft.

Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Depew Okla 74028 Phone # 324-5465 (918)
Signed Allen Baker Date 8-1-8

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000463

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12434

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 1-2
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

1. OWNER (b) (6) [redacted] **ADDRESS** Bristow Okla

PHONE

2. LEGAL DESCRIPTION OF WELL (EIM (Circle One) WIM ECM)

SE ¼ of NE ¼ of SE ¼ of sec. 17 ; TWP. 16 (N) S; RGE 9 **COUNTY** Creek

3. TYPE OF WORK
- [X] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Test/Monitoring

4. USE
- [X] Domestic
- [ ] Stock
- [ ] Test/Monitoring

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [ ] Rotary
- [ ] Rev. Rotary
- [X] Cable
- [ ] Other
- [ ] Air

6. LOG

Material	From	To	Saturated
top soil	0	2	
red bed	2	25	
lime	25	27	
shale	27	30	
lime	30	32	
shale	32	45	
red bed	45	70	
Shale	70	73	
red bed	73	88	
iron rock	88	90	
red bed	90	120	
water sand	120	179	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

[ ] Yes [ ] No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-21-87 Completed 9-24-87
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¼ in. Total Depth 179 ft.

CASING RECORD

	Diameter		From		To	
Inside	4½	in.	18" ↑ ground	ft.	179	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal [X] Yes [ ] No
Type of Surface Seal: portland cement Depth of Seal: 20 ft.
GRAVEL PACKED:
Gravel Packed From 20 ft. to 179 ft.
Amount Used: Approx 1½ ton

PERFORATION RECORD

Type/Size
From 139 ft. To 179 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA

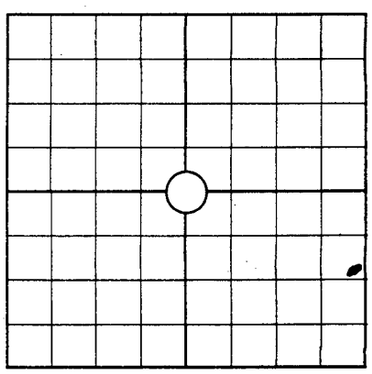
Static Water Level Below Land Surface 144 ft.
If Artesian: Flows gpm.
Approximate Yield 15 gpm.

10. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.



SE ¼ of NE ¼ of SE ¼ of SEC 17 ;
TWP 16 (N) S; RGE 9 (Circle One) EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK

Date Completed
[ ] Replaced Casing From ft. To ft.
[ ] Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew, Okla 74028 Phone # 918-324-5465
Signed Allen Baker Date 9-24-87

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000464

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 1-22
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

#12435

1. OWNER Cummins Const. Co. Inc **ADDRESS** 1420 W Chestnut
P.O. Box 748 Enid, Ok 73702 **PHONE**

2. LEGAL DESCRIPTION OF WELL
SE ¼ of NE ¼ of SW ¼ of sec. 18 ; TWP. 16 (N) S; RGE 9E (EIM) (Circle One) WIM ECM; **COUNTY** Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
Top Soil	0	4	
Quick Sand	4	25	
Water Sand	25	43	✓
Red Clay	43	45	

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APR 14 1987
Oklahoma W... Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA
DATES: Started 4-6-87 Completed 4-8-87
Contractor Moore Water Wells
Driller Mickey Moore
Diameter Hole 6 1/2 in. Total Depth 45 ft.

CASING RECORD

	Diameter		From		To	
Inside	4 1/2	in.	18" Aground	ft.	45	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal Portland Cement Depth of Seal: 26 ft.
GRAVEL PACKED:
Gravel Packed From 0 ft. to 45 ft.
Amount Used:

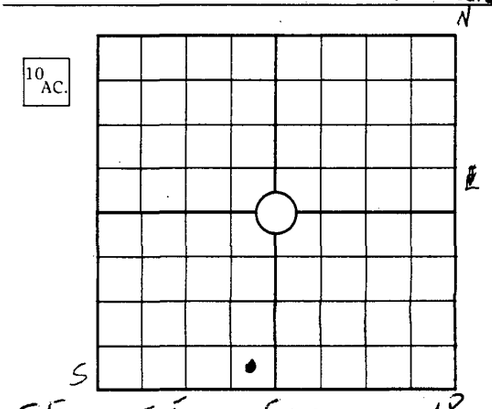
PERFORATION RECORD

Type	Size				
		From 26	ft. To 45	ft.	
		From	ft. To	ft.	
		From	ft. To	ft.	

9. WELL TEST DATA
Static Water Level Below Land Surface 25 ft.
If Artesian: Flows gpm.
Approximate Yield 30 gpm.

10. PLUGGING DATA
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SE ¼ of SE ¼ of SW ¼ of SEC 18 ;
TWP 16 (N) S; RGE 9E (Circle One) EIM WIM ECM

12. PUMP INFORMATION
Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK
Date Completed
☐ Replaced Casing From ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Micky Moore License # WD 197
Address RT 1 Box 632 Phone # 367-3137
Signed Micky Moore Date 4-13-87

Form 424-0684 USE ADDITIONAL SHEETS IF NECESSARY

000465

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12436

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 1-2
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

Tulsa

1 OWNER (b) (6) [redacted] ADDRESS Bristow Okla 74010
PHONE None

2. LEGAL DESCRIPTION OF WELL
NW ¼ of NE ¼ of NE ¼ of sec. 18 ; TWP. 16 N S; Rge. 9E EIM WIM ECM; COUNTY Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other

6. LOG

Material	From	To	Saturated ✓
top soil	0	5	
Sand rock	5	20	
Clay	20	40	
Water sand	40	60	
Clay	60	85	
red rock	85	90	
Water sand	90	110	
Clay	110	120	

RECEIVED
SEP 6 1983
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA
Dates: Started 7-20-83 Completed 7-20-83
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 120 ft.

CASING RECORD
4½ Diameter in. From 13" above ground ft. To ft.
Diameter in. From ft. To ft.
Surface Seal: ☑ Yes ☐ No Type: Portland Cement
Depth of Seal: 20 ft.
Gravel Packed:
Gravel Packed From 20 ft. to ft.
Amount Used: approx 2 ton

PERFORATION RECORD
Type From ft. To ft.
Size From 40 ft. To 60 ft.
" From 90 ft. To 110 ft.

8. WELL TEST DATA
Static Water Level Below Land Surface 45 ft.
If Artesian: Flows gpm.
Water Temp. °c/f Quality Good

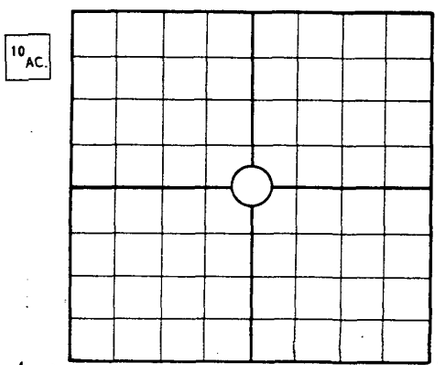
BAILER TEST
~~Drawdown~~ ft. ~~After Pumping~~ hrs. At 5-6 gpm.
Size of Bailer: 10 gal.

~~PUMPING TEST~~
Drawdown ft. ~~After Pumping~~ hrs. At gpm.

9. PLUGGING DATA
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK
Date Completed
☐ Replaced Casing From ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

11. PLAT



NW ¼ of NE ¼ of NE ¼ of SEC 18 ;
TWP 16 N S; RGE 9E EIM,WIM,ECM

12. PUMP INFORMATION
Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD 170
Address 741 Draper Okla Phone # 224-5465
Signed Allen Baker Date 7-20-83

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000466

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

12439

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

MULTI-PURPOSE WATER WELL REPORT

O-4/4'

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)
Tulsa

1. OWNER [redacted] ADDRESS Bristow, OKla. 74010

PHONE [redacted]

2. LEGAL DESCRIPTION OF WELL

SW ¼ of SW ¼ of SW ¼ of sec. 20 ; TWP. 16 N S; Rge. 9 EIM WIM ECM; COUNTY Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other

6. LOG

Material	From	To	Saturated ✓
Topsoil	0	2	
Red shale	2	5	
SAND rock	5	35	
Red SAND Rock	35	50	
Sandy Shale	50	60	
SAND rock with Shale Lens	60	105	✓
Red Shale	105	120	
WATER SAND	120	137	✓
Red Lime	137	145	
11 SAND	145	165	
Red shale	165	180	
SAND Lime	180	185	
Red Shale + Lime Shelves	185	198	
Sandy Blue Shale	198	200	
WATER SAND	200	202	✓
Lime & Hard SAND	202	206	
WATER SAND	206	220	✓
Blue Shale	220	230	

RECEIVED
JUN 27 1983

7. NEW WELL CONSTRUCTION DATA

Dates: Started 6-20-83 Completed 6-22-83
Contractor Tull's Waterwell Drlg.
Driller Dale E Tull
Diameter Hole 7⅞ in. Total Depth 230 ft.

CASING RECORD

Diameter		From	To
5"	in.	+1 ft.	230 ft.
PVC	in.	ft.	ft.

Surface Seal: ☑ Yes ☐ No Type: Portland
Depth of Seal: 10 ft. AGAIN FROM 105-145
Gravel Packed:
Gravel Packed From 230 ft. to 145 ft.
Amount Used: 1500#

PERFORATION RECORD

Type 3/32	From 155 ft.	To 145 ft.
Size SAWSLOTS	From 170 ft.	To 180 ft.
"	From 190 ft.	To 225 ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 120 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality good

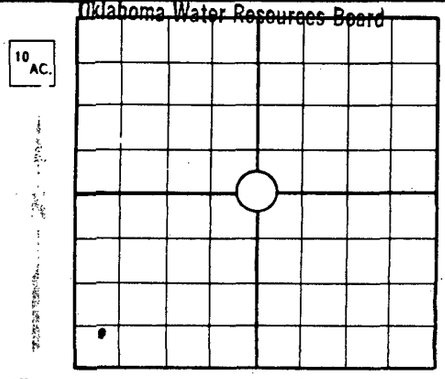
BAILER TEST
Drawdown 20 ft. After Pumping 2 hrs. At 10 gpm.
Size of Bailer: 10 gal.

PUMPING TEST
Drawdown 50 ft. After Pumping 6 hrs. At 15 gpm.

9. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK
Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT
Oklahoma Water Resources Board



SW ¼ of SW ¼ of SW ¼ of SEC 20 ;
TWP 16 N S; RGE 9 EIM WIM ECM

12. PUMP INFORMATION
Pump Type Hp Submerge
Power Source 220
Rated Capacity 15 gpm.
Depth of Bowls or Cylinder 1½ ft.

13. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Kelly B Tull License # WD 224
Address RR#2 Jennings Okla. Phone # 918-757-258
Signed Kelly B Tull Date 6-23-83

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000467

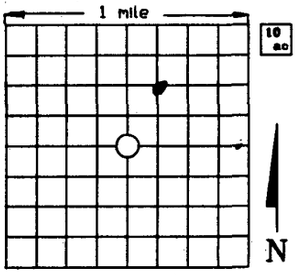
28567

4/2-1

MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

Please plot well location



Legal Description

NE 1/4 ~~SW 1/4~~ NE 1/4 of Sec. 20 Twp. 16N Rge. 9E

County Creek Well No:

Well Owner (b) (6) Phone (b) (6)

Address (b) (6) Bristow

Finding location Bristow - E. of Magnolia Cemetary 1½ Mi on R. side of rd.

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other
- ☐ Waterwell

G.W. Use

- ☑ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☑ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	30	
Rock	30	33	
Red Clay	33	90	
Sand Rock	90	115	
Red Clay	115	125	
Water Sand	125	150	
Red Clay	150	160	

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to exceed 3 acres.)

Permit No:

New Boring or Well Construction Data

Date: Started 8-9-92 Completed 8-13-92

Firm Moore Waterwell Drilling

Operator Harvey Moore Jr.

Type of Construction ☐ Open Hole ☑ Cased Hole

Hole Diameter 6 1/2 inches total depth 160 feet

Hole Diameter ____ inches total depth ____ feet

CASING RECORD

	diameter		from	to
Surface pipe		inches	ground feet	feet
Well casing	4 1/2	inches	12" feet	160 feet
Well casing		inches	feet	feet
Well casing		inches	feet	feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from	to
1/4" Drilled	125 feet	150 feet
	feet	feet
	feet	feet

GRAVEL PACK

Type and Size	from	to
1/4" Limestone	20 feet	160 feet
	feet	feet
	feet	feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from	to
Type of Surface Seal Portland	0 feet	20 feet
Aquifer Seal Type	feet	feet
	feet	feet

HYDROLOGIC DATA

First Water Zone Encountered 125 ft.

Approximate Yield 10 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged

Backfilled From ____ feet ____ feet Type ____

Cement Grouted From ____ feet ____ feet

Reconditioning Work

Replaced Casing/Screen From ____ feet ____ feet

Deepened Well From ____ feet ____ feet

Redeveloped Well By

Certification

The work described above was done under my supervision. ✓
This report is correct to the best of my knowledge.

Name Harvey Moore Sr. Lic. No. APC 0140

Address Rt 1 Box 632 Depew Phone 367-3137

Signed Harvey Moore Sr. Date 8-14-92

RECEIVED
OCT 29 1992
Oklahoma Water Resources Board

KW

*See Pump Installers Form On Back

000468

1/2 - 1'

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WATER WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

NOTICE BEFORE USE OF THIS WELL: It shall be the responsibility of the well owner to have the water tested for quality by any Oklahoma Water Resources Board certified laboratory and supply copy of these results to the Oklahoma Water Resources Board.

#12438

1. WELL OWNER (b) (6) [redacted] PHONE
EIM (Circle One) WIM ECM

2. LEGAL DESCRIPTION SE ¼ of NW ¼ of NE ¼ of sec. 20; TWP. 16 N S; RGE 9 E W COUNTY Creek

FINDING LOCATION
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
top soil	0	1	
Red bed	1	50	
Shale	50	100	
Water sand	100	107	✓
red bed	107	155	
water sand	155	167	✓
red bed	167	172	

RECEIVED
MAY 19 1988
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 5-10-88 Completed 5-13-88
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 in. Total Depth 172 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4½ in.	18" Above Ground ft.	172 ft.

Cement Grout Surface Seal? ☐ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACK:
Gravel Packed From 12 ft. to 172 ft.
Amount Used: Approx 1½ Ton

PERFORATION RECORD

Type/Size
From 100 ft. To 172 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 102 ft.
Approximate Yield 15 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address ~~Rt 1 Box 293~~ Depew Okla 74025 Phone # 324-5445
Signed Allen Baker Date 5-13-88

Form 424-0487

USE ADDITIONAL SHEETS IF NECESSARY

000469

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12437

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 1/2-1
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

1. OWNER (b) (6) [redacted] **ADDRESS** Bristow Okla,

PHONE

2. LEGAL DESCRIPTION OF WELL

(EIM) WIM (Circle One)

SE ¼ of SE ¼ of NW ¼ of sec. 20; TWP. 16 (N) S; RGE 9 ECM; **COUNTY** Creek

3. TYPE OF WORK
- [X] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Test/Monitoring

4. USE
- [X] Domestic
- [ ] Stock
- [ ] Test/Monitoring

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [ ] Rotary
- [ ] Rev. Rotary
- [X] Cable
- [ ] Other
- [ ] Air

6. LOG

Material	From	To	Saturated
top soil	0	5	
Clay	5	30	
Sand rock	30	50	
Clay	50	67	
Water sand	67	97	
Clay	97	98	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

[ ] Yes [ ] No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-17-87 Completed 9-19-87
Contractor Allen Baker
Driller Allen Baker
Diameter Hole in. Total Depth ft.

CASING RECORD

	Diameter		From		To	
Inside	4½	in.	2' Ground	ft.	98	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal [X] Yes [ ] No
Type of Surface Seal: Portland Cement Depth of Seal: 15 ft.
GRAVEL PACKED:
Gravel Packed From 15 ft. to 98 ft.
Amount Used: approx 1 Ton

PERFORATION RECORD

Type Size
From 58 ft. To 98 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA

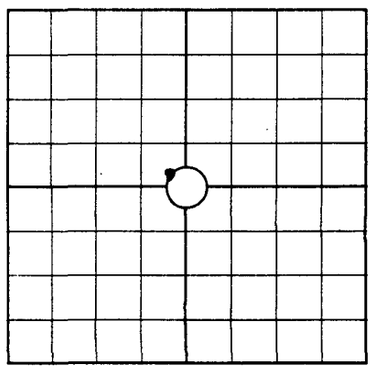
Static Water Level Below Land Surface 65 ft.
If Artesian: Flows gpm.
Approximate Yield 8 gpm.

10. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.



SE ¼ of SE ¼ of NW ¼ of SEC 20;
TWP 16 (N) S; RGE 9 (Circle One) EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK

Date Completed
[ ] Replaced Casing From ft. To ft.
[ ] Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew Okla, Phone # 918-324-54[illegible]
Signed Allen Baker Date 9-19-87

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000470

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

#24771

NE NW SW

STATE OF OKLAHOMA

MULTI-PURPOSE WATER WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1/2-1

RECEIVED
DEC 19 1988
Oklahoma Water Resources Board

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION ___ ¼ of E ½ ¼ of NE ¼ of sec. 20; TWP. 16 N S; RGE 9 ECM COUNTY Creek

(EIM (Circle One) WIM)

FINDING LOCATION Appx 1 Mi E of Magnolia Cemetary on South side of road

Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	40	
Water Sand	40	50	✓
Red Clay	50	95	
Water Sand	95	125	✓

RECEIVED
JAN 3 1989
OKLA. WATER RESOURCES BOARD

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. ___

8. NIW WELL CONSTRUCTION DATA

DATES: Started 11-6-88 Completed 11-7-88

Contractor Harvey Moore

Driller Same

Diameter Hole 6 1/2 in. Total Depth 125 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe	___	in.	1	ft.	___	ft.
Well Casing	4 1/2	in.	12" Ground	ft.	125	ft.

Cement Grout Surface Seal? ☑ Yes ☐ No

Type of Surface Seal: Portland Depth of Seal: 20 ft.

GRAVEL PACK:

Gravel Packed From 0 ft. to 125 ft.

Amount Used: Appx 1 Ton

PERFORATION RECORD

Type/Size				
1/4" Drilled	From	40 ft.	To	50 ft.
"	From	95 ft.	To	125 ft.
___	From	___ ft.	To	___ ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 30 ft.

Approximate Yield ___ gpm.

If Artesian: Flows ___ gpm.

10. PUMP INFORMATION

Pump Type ___

Power Source ___

Rated Capacity ___ gpm.

Depth of Bowls or Cylinder ___ ft.

11. PLUGGING DATA

Date Plugged ___

Backfilled With ___ Material To ___ ft.

Grouted or Cemented From ___ Ft. To ___ ft.

12. RECONDITIONING WORK

Date Completed ___

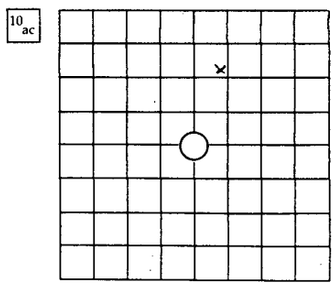
Replaced Casing From ___ ft. To ___ ft.

Replaced Screen From ___ ft. To ___ ft.

Deepened Well From ___ ft. To ___ ft.

Redeveloped Well By ___

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 197

Address Rt 1 Box 632 Depew Phone # 367-8133

Signed Mickey Moore Date 11-30-88

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000471

#28839

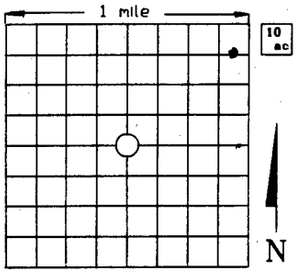
MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

1-2

FEB 10 1993

Please plot well location



Legal Description

NE 1/4 NE 1/4 NE 1/4 of Sec. 20 Twp. 16N Rge. 9E

County Creek Well No:

Well Owner (b) (6) Phone (b) (6)

Address (b) (6) Bristow, Ok. 74010

Finding location Bristow - E of Magnolia cemetery 1½ Mi on R. side of Rd.

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other
- ☐ Water Well

G.W. Use

- ☑ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☑ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	30	
Rock	30	33	
Red Clay	33	90	
Sand Rock / Salt Water	90	115	✓
Red Clay	115	125	
Water Sand	125	150	✓
Red Clay	150	160	

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to excede 3 acres.)

Permit No:

New Boring or Well Construction Data

Date: Started 8-7-92 Completed 8-13-92

Firm Moore Water Wells

Operator Harvey Moore Jr.

Type of Construction ☐ Open Hole ☑ Cased Hole

Hole Diameter 6½ inches total depth 160 feet

Hole Diameter ____ inches total depth ____ feet

CASING RECORD

	diameter		from ground	to
Surface pipe		inches	0 feet	feet
Well casing	4½	inches	12" feet	160 feet
Well casing		inches	feet	feet
Well casing		inches	feet	feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from	to
1/4" Drilled	125 feet	150 feet
	feet	feet
	feet	feet

GRAVEL PACK

Type and Size	from	to
1/4" Limestone	0 feet	160 feet
	feet	feet
	feet	feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from	to
Type of Surface Seal Portland	8 feet	115 feet
Aquifer Seal Type	feet	feet
	feet	feet

HYDROLOGIC DATA

First Water Zone Encountered 90 ft.

Approximate Yield 7 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged

Backfilled From ____ feet ____ feet Type

Cement Grouted From ____ feet ____ feet

Reconditioning Work

Replaced Casing/Screen From ____ feet ____ feet

Deepened Well From ____ feet ____ feet

Redeveloped Well By

Certification

The work described above was done under my supervision. This report is correct to the best of my knowledge.

Name Harvey Moore Jr. Lic. No. OPC 0140

Address Rt 1 Box 632 Depew Phone 367-3137

Signed Jeanette Moore Date 2-2-93

KW

*See Pump Installers Form On Back

000472

1-2

28840

MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

FEB 10 1993

Please plot well location
1 mile
10 ac
N

Legal Description

NW 1/4 NW 1/4 NW 1/4 of Sec. 21 Twp. 4N Rge. 5E
County Pontotoc Well No:
Well Owner (b) (6) Phone (b) (6)
Address
Finding location (illegible)

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other
- ☐ Dug Well

G.W. Use

- ☐ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☐ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Topsoil	0	1	
Red clay	1	30	
(illegible)			

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to exceed 3 acres.)
Permit No:

New Boring or Well Construction Data

Date: Started Completed
Firm
Operator
Type of Construction ☐ Open Hole ☐ Cased Hole
Hole Diameter inches total depth feet
Hole Diameter inches total depth feet

CASING RECORD

	diameter		from	to
Surface pipe		inches	feet	feet
Well casing		inches	feet	feet
Well casing		inches	feet	feet
Well casing		inches	feet	feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from	to
	feet	feet
	feet	feet
	feet	feet

GRAVEL PACK

Type and Size	from	to
Pea gravel	2 feet	feet
	feet	feet
	feet	feet

SEAL
Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from	to
Type of Surface Seal Bentonite	feet	feet
Aquifer Seal Type	feet	feet
	feet	feet

HYDROLOGIC DATA
First Water Zone Encountered 397 ft.
Approximate Yield 3 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged
Backfilled From feet feet Type
Cement Grouted From feet feet

Reconditioning Work

Replaced Casing/Screen From feet feet
Deepened Well From feet feet
Redeveloped Well By

Certification

The work described above was done under my supervision.
This report is correct to the best of my knowledge.
Name Harvey Mills Co. Lic. No.
Address (illegible) Phone
Signed Date 2-10-93

KW

*See Pump Installers Form On Back

000473

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 2631
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

#12440

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla

PHONE

2. LEGAL DESCRIPTION OF WELL (Circle One: EIM WIM)

NW ¼ of NW ¼ of SE ¼ of sec. 22 ; TWP. 16 (N) S; RGE 9 ECM; COUNTY Creek

3. TYPE OF WORK
- [x] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Test/Monitoring

4. USE
- [x] Domestic
- [ ] Stock
- [ ] Test/Monitoring

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [x] Rotary
- [ ] Rev. Rotary
- [ ] Cable
- [ ] Other
- [ ] Air

6. LOG

Material	From	To	Saturated
top soil	0	4	
sand rock	4	22	
Water Sand	22	25	✓
sand rock	25	30	
Water Sand	30	64	✓
red bed	64	72	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

[ ] Yes [ ] No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-14-85 Completed 9-15-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¾ in. Total Depth 72 ft.

CASING RECORD

	Diameter	From	To
Inside	in.	24" Ground ft.	72 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal [x] Yes [ ] No
Type of Surface Seal: Portland Cement Depth of Seal: 10 ft.
GRAVEL PACKED:
Gravel Packed From 10 ft. to 72 ft.
Amount Used: Approx 3/4 Ton

PERFORATION RECORD

Type/Size

From 30 ft. To 72 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 18 ft.
If Artesian: Flows gpm.
Approximate Yield 18 gpm.

10. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.

NW ¼ of NW ¼ of SE ¼ of SEC 22 ;
TWP 16 (N) S; RGE 9 (Circle One) EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK

Date Completed
[ ] Replaced Casing From ft. To ft.
[ ] Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew Okla 74028 Phone # 324-5465 918
Signed Allen Baker Date 9-15-85

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000474

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 2-3'
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

#12441

1. OWNER (b) (6) ADDRESS Bristow Okla
PHONE
2. LEGAL DESCRIPTION OF WELL (EIM) (Circle One) WIM ECM;
SW ¼ of SE ¼ of NW ¼ of sec. 22 ; TWP. 16 (N) S; RGE 9 COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top soil	0	2	
Sand rock	2	20	
red bed	20	30	
water sand	30	43	
red bed	43	46	
iron rock	46	50	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 6-2-86 Completed 6-3-86
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 50 ft.

CASING RECORD

	Diameter	From	To
Inside	4½ in.	18" ft. above ground	50 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: portland cement Depth of Seal: 12' ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 50 ft.
Amount Used: 6 yards 1/2 ton

PERFORATION RECORD

Type/Size		
From 30 ft.	To 50 ft.	
From ft.	To ft.	
From ft.	To ft.	

9. WELL TEST DATA

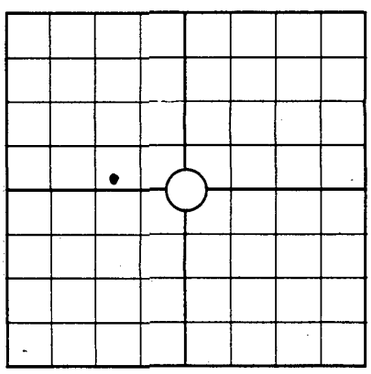
Static Water Level Below Land Surface 12 ft.
If Artesian: Flows gpm.
Approximate Yield 12 gpm.

10. PLUGGING DATA

Date Plugged
Backfilled With X Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.



SW ¼ of SE ¼ of NW ¼ of SEC 22 ;
TWP 16 (N) S; RGE 9 (Circle One) EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type
Power Source X
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK

Date Completed
☐ Replaced Casing From X ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # 1-170
Address Rt 1 Box 293 Kellyville 74039 Phone # 918 321-5446
Signed Allen Baker Date 6-3-86

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000475

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

24500

STATE OF OKLAHOMA

MULTI-PURPOSE WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1-2

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION SE ¼ of SW ¼ of SW ¼ of sec. 22; TWP. 16 N S; RGE 9 E (W) IM (Circle One) ECM COUNTY Creek

FINDING LOCATION 2 Mi E of Bristow on Hwy 16 Turn Left appx 2 Mi
Blocks or distance(s) from given point(s)
turn Right appx 1 Mi & property will be on Right at curve.

3. TYPE OF WORK
- [x] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

4. USE
- [x] Domestic
- [ ] Stock
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [ ] Fluid Rotary
- [ ] Rev. Rotary
- [x] Cable
- [ ] Other
- [ ] Air Rotary
- [ ] H.S. Auger

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Sand Rock	1	16	
Clay	16	18	
Water Sand	18	45	✓

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APR 24 1991
Oklahoma Water Resources

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

[ ] Yes [ ] No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 4-6-91 Completed 4-6-91
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6 3/4 in. Total Depth 45 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4½	in.	12" ground	ft.	45	ft.

Cement Grout Surface Seal? [x] Yes [ ] No
Type of Surface Seal: Portland Cement Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 45 ft.
Amount Used: ½ Ton apx.

PERFORATION RECORD

Type/Size: ¼" drilled From 20 ft. To 45 ft.
From ____ ft. To ____ ft.
From ____ ft. To ____ ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 10 ft.
Approximate Yield 15 gpm.
If Artesian: Flows ____ gpm.

10. PUMP INFORMATION

Pump Type ____
Power Source ____
Rated Capacity ____ gpm.
Depth of Bowls or Cylinder ____ ft.

11. PLUGGING DATA

Date Plugged ____
Backfilled With ____ Material To ____ ft.
Grouted or Cemented From ____ Ft. To ____ ft.

12. RECONDITIONING WORK

Date Completed ____
Replaced Casing From ____ ft. To ____ ft.
Replaced Screen From ____ ft. To ____ ft.
Deepened Well From ____ ft. To ____ ft.
Redeveloped Well By ____

13. PLAT

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 197
Address Rt 4 Box 632 Drumright Phone # 367-3137
Signed Harvey Moore Date 4-12-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000476

2-3

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

#12442

1. OWNER (b) (6) [redacted] **ADDRESS** Bristow Okla.

PHONE

2. LEGAL DESCRIPTION OF WELL

EIM (Circle One) WIM

SW ¼ of NE ¼ of SW ¼ of sec. 22; TWP. 16 (N) S; RGE 9 ECM; **COUNTY** Creek

3. TYPE OF WORK
☒ New Well ☐ Plugging
☐ Reconditioning Work
☐ Test/Monitoring

4. USE
☒ Domestic
☐ Stock
☐ Test Monitoring

NON-DOMESTIC
☐ Irrigation
☐ Municipal
☐ Industrial
☐ Commercial
☐ Other

5. DRILLING METHOD
☐ Rotary ☐ Rev. Rotary
☒ Cable ☐ Other _____
☐ Air

6. LOG

Material	From	To	Saturated
top Soil	0	1	
Sand rock	1	22	
Water Sand	22	30	
Sand rock	30	44	

RECEIVED
JAN 7 1985
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 12-7-84 Completed 12-8-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 44 ft.

CASING RECORD

	Diameter		From		To	
Inside		in.		ft.		ft.
Outside	4 ½	in.	15" Approx	ft.	44	ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 44 ft.
Amount Used: Approx 3/4 ton

PERFORATION RECORD

Type Size
From 15 ft. To 30 ft.
From _____ ft. To _____ ft.
From _____ ft. To _____ ft.

9. WELL TEST DATA

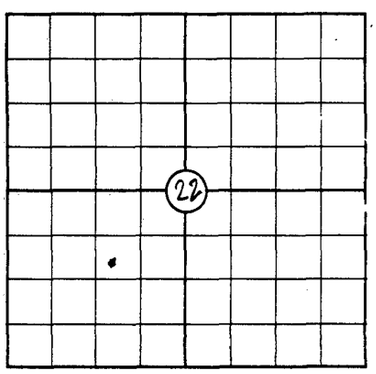
Static Water Level Below Land Surface 18 ft.
If Artesian: Flows _____ gpm.
Approximate Yield _____ gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With X Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.



SW ¼ of NE ¼ of SW ¼ of SEC 22;
TWP 16 (N) S; RGE 9 (Circle One) EIM WIM ECM

12. PUMP INFORMATION

Pump Type X
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From X ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew Okla 74028 Phone # 918-324-5465
Signed Allen Baker Date 12-8-84

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000477

#29932

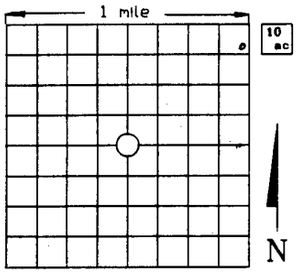
2-3'

K.K

MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

Please plot well location



Legal Description

NE/4 NE/4 NE/4 1/4 — 1/4 — 1/4 of Sec. 22 Twp. 9E Rge. 24W

County Coal Well No:

Well Owner (b) (6) Phone (b) (6)

Address (b) (6) Coalgate, Ok. 74538

Finding location E from Coalgate on Hwy 3 to Rd 1 E 1/2 mile

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other
- ☐ Water Well

G.W. Use

- ☑ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☑ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Sand	1	20	
Lime	20	23	
Shale	23	27	
Lime	27	28	

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to excede 3 acres.)

Permit No:

New Boring or Well Construction Data

Date: Started 6-22-93 Completed 6-23-93

Firm Mike Dickens

Operator Mike Dickens Jr.

Type of Construction ☐ Open Hole ☑ Cased Hole

Hole Diameter 6 inches total depth 28 feet

Hole Diameter inches total depth feet

CASING RECORD

	diameter		from		to	
Surface pipe		inches		feet		feet
Well casing	2	inches	2	feet	23	feet
Well casing		inches		feet		feet
Well casing		inches		feet		feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from		to	
2 slot	23	feet	28	feet
		feet		feet
		feet		feet

GRAVEL PACK

Type and Size	from		to	
Gravel Pack	22	feet		feet
		feet		feet
		feet		feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from		to	
Type of Surface Seal Neat		feet		feet
Aquifer Seal Type		feet		feet
		feet		feet

HYDROLOGIC DATA

First Water Zone Encountered 23 ft.

Approximate Yield 15 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged

Backfilled From feet feet Type

Cement Grouted From feet feet

Reconditioning Work

Replaced Casing/Screen From feet feet

Deepened Well From feet feet

Redeveloped Well By

Certification

The work described above was done under my supervision. ✓
This report is correct to the best of my knowledge.

Name Raymond L. Lic. No. 0125

Address P.O. Box 632 Bryan Phone 580-924-5

Signed Raymond L. Date 6-30-93

JUL 30 1993

KW NOV - 5 1993 Oklahoma Water Resources Board

*See Pump Installers Form On Back

000478

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12444

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 1-21
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

1. OWNER [redacted] ADDRESS Bristow Okla —
PHONE —

2. LEGAL DESCRIPTION OF WELL
NW ¼ of SW ¼ of SE ¼ of sec. 28 ; TWP. 16 N S; Rge. 9 EIM WIM ECM; COUNTY Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other

6. LOG

Material	From	To	Saturated ✓
top Soil	0	2	
Sand rock	2	20	
Clay	20	30	
Water sand	30	60	
Red Shale	60	85	
Water sand	85	94	
lime stone	94	100	

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MAR 7 1984
Oklahoma ... Resources Board

7. NEW WELL CONSTRUCTION DATA
Dates: Started 2-10-84 Completed 2-10-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 100 ft.

CASING RECORD

Diameter		From		To	
4 1/2	in.	18" Aground	ft.	100	ft.
	in.		ft.		ft.

Surface Seal: ☑ Yes ☐ No Type: Portland Cement
Depth of Seal: 15 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 100 ft.
Amount Used: Approx 1 ton

PERFORATION RECORD
Type From 20 ft. To 60 ft.
Size From 80 ft. To 100 ft.
" From ft. To ft.

8. WELL TEST DATA
Static Water Level Below Land Surface 60 ft.
If Artesian: Flows gpm.
Water Temp. °c/f Quality Good

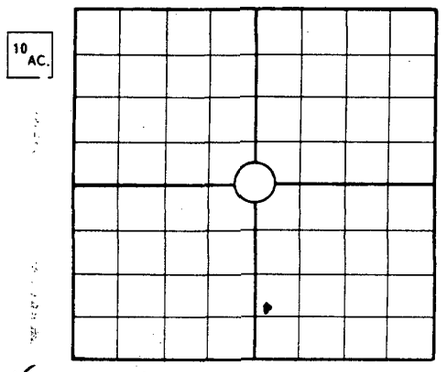
BAILER TEST
Drawdown ft. After Pumping hrs. At 5 1/2 gpm.
Size of Bailer: 10 gal.

PUMPING TEST
Drawdown ft. After Pumping hrs. At gpm.

9. PLUGGING DATA
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK
Date Completed
☐ Replaced Casing From ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

11. PLAT



N 2 ½ of SW ¼ of SE ¼ of SEC 28 ;
TWP 16 N S; RGE 9 EIM,WIM,ECM

12. PUMP INFORMATION
Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Name Allen Baker License # WD-170
Address Rt 1 Depew Okla 74028 Phone # 918-324-5466
Signed Allen Baker Date 2-18-84

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000479

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12445

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 1-72'
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

1. OWNER (b) (6) **ADDRESS** (b) (6) Bristow, Ok. 74010

PHONE (b) (6)

2. LEGAL DESCRIPTION OF WELL

EIM (Circle One)
WIM
ECM; **COUNTY** Creek

SE ¼ of SE ¼ of NE ¼ of sec. 28; TWP. 16N N S; RGE 9E

3. TYPE OF WORK
- [x] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Test/Monitoring

4. USE
- [x] Domestic
- [ ] Stock
- [ ] Test/Monitoring

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [ ] Rotary
- [ ] Rev. Rotary
- [ ] Cable
- [ ] Other
- [x] Air

6. LOG

Material	From	To	Saturated
Top soil	0	1	
Clay	1	4	
Sand rock	4	11	
Clay	11	28	
Sand rock	28	30	
Clay	30	38	
Sand rock	38	45	
Clay	45	55	
Sand rock	55	60	
Limestone	60	63	
Cay	63	65	
Limestoen	65	66	
Sand rock	66	70	
Clay	70	74	
Sand rock	74	84	4 gpm
Shale	84	100	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

[ ] Yes [ ] No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 6-26-85 Completed 6-26-85
Contractor Knott's Water Well drilling
Driller Dale Knott
Diameter Hole 8 in. Total Depth 100 ft.

CASING RECORD

	Diameter	From	To
Inside	5" in.	100 ft.	+2 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal [x] Yes [ ] No
Type of Surface Seal: portland Depth of Seal: 15' ft.

GRAVEL PACKED:
Gravel Packed From 100 ft. to 15 ft.
Amount Used: 1 T

PERFORATION RECORD

Type/Size				
1/32" slotted	From	60 ft.	To	97 ft.
	From	ft.	To	ft.
	From	ft.	To	ft.

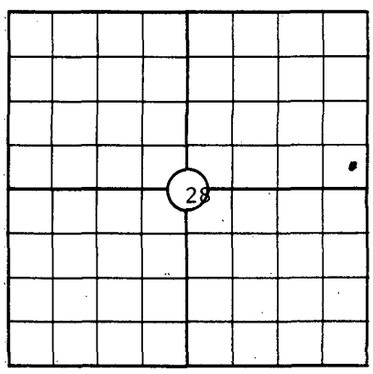
9. WELL TEST DATA

Static Water Level Below Land Surface 70 ft.
If Artesian: Flows gpm.
Approximate Yield 4 gpm.

10. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



SE ¼ of SE ¼ of NE ¼ of SEC 28;
N (Circle One)
TWP 16N S; RGE 9E EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK

Date Completed
[ ] Replaced Casing From ft. To ft.
[ ] Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Kathleen Knott License # WD 74
Address Rt. 1, Terlton, Ok. 74081 Phone # (918)865-354
Signed Kathleen Knott Date 6-29-85

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000480

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 1-21
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

#12446

1. OWNER (b) (6) **ADDRESS** (b) (6) Bristow

PHONE

2. LEGAL DESCRIPTION OF WELL

(EIM) WIM ECM (Circle One)

NE ¼ of SW ¼ of NE ¼ of sec 28 ; TWP 16 (N) S; RGE 9E; **COUNTY** Creek

3. TYPE OF WORK
☐ New Well ☐ Plugging
☐ Reconditioning Work
☐ Test/Monitoring

4. USE
☑ Domestic
☐ Stock
☐ Test/Monitoring

NON-DOMESTIC
☐ Irrigation
☐ Municipal
☐ Industrial
☐ Commercial
☐ Other

5. DRILLING METHOD
☐ Rotary ☐ Rev. Rotary
☑ Cable ☐ Other
☐ Air

6. LOG

Material	From	To	Saturated
Top Soil	0	3	
Red Clay	3	30	
Sand Rock	30	60	
Water Sand	60	80	✓
Red Clay	80	85	
Water Sand	85	100	
Red Clay	100	108	

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APR 14 1987
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started Apr 8 Completed Apr 10
Contractor Moore Water Wells
Driller Mickey Moore
Diameter Hole 6 1/2 in. Total Depth 108 ft.

CASING RECORD

	Diameter		From		To	
Inside	4 1/2	in.	18" Aground	ft.	108	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 10 ft.
GRAVEL PACKED:
Gravel Packed From 0 ft. to 108 ft.
Amount Used: 1 TON

PERFORATION RECORD

Type Size				
60	From 60	ft. To 100	ft.	
	From	ft. To	ft.	
	From	ft. To	ft.	

9. WELL TEST DATA

Static Water Level Below Land Surface 60 ft.
If Artesian: Flows gpm.
Approximate Yield gpm.

10. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.

NE ¼ of SW ¼ of NE ¼ of SEC 28 ;
TWP 16 (N) S; RGE 9E (EIM,WIM,ECM) (Circle One)

12. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK

Date Completed
☐ Replaced Casing From ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Mickey Moore License # WD 197
Address Rt 1 Box 362 Phone # 367-3137
Bristow OK 74028
Signed Mickey Moore Date 4-13-87

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000481

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

24501

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1-2W

1. **WELL OWNER** (b) (6) **PHONE** (b) (6)

2. **LEGAL DESCRIPTION** SE/4 ¼ of NE/4 ¼ of NE ¼ of sec. 28 ; TWP. 16 N S; RGE 9E EIM (Circle One) WIM ECM **COUNTY** Creek

FINDING LOCATION From Bristow: 2 Mi. E on 16 Hwy ¼ Mi. N on Left side "Round House"
Blocks or distance(s) from given point(s).

3. TYPE OF WORK
- [x] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

4. USE
- [x] Domestic
- [ ] Stock
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [ ] Fluid Rotary
- [ ] Rev. Rotary
- [x] Cable
- [ ] Other
- [ ] Air Rotary
- [ ] H.S. Auger

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	40	
Water Sand	40	50	✓
Blue Shale	50	90	

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APR 24 1991
Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
- [ ] Yes
- [ ] No

Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 1-15-91 Completed 1-17-91
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6 3/4 in. Total Depth 90 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4 1/2	in.	12" ground	ft.	90	ft.

Cement Grout Surface Seal? [x] Yes [ ] No
Type of Surface Seal: Portland Cement Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 90 ft.
Amount Used: Apx 3/4 Ton

PERFORATION RECORD

Type/Size	From	To
1/4" drilled	40 ft.	50 ft.
	ft.	ft.
	ft.	ft.

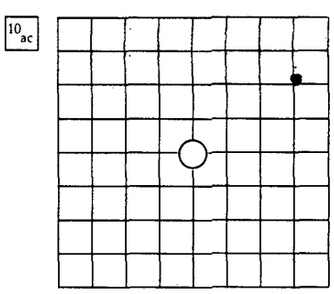
9. WELL TEST DATA
Static Water Level Below Land Surface 30 ft.
Approximate Yield 4 1/2 gpm.
If Artesian: Flows _____ gpm.

10. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

11. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK
Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT



14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 197
Address Rt 1 Box 632 Phone # 367-3137
Depew, Okla 74028
Signed Harvey Moore Date 3-24-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000482

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA

MULTI-PURPOSE WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1-24

#26627

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION SE¼ of SE ¼ of NE NE¼ ¼ of sec. 28; TWP. 16 N S; RGE 9 WIM ECM COUNTY Creek
(Circle One)

FINDING LOCATION 3 Mi E on Hwy 16 from Bristow Appx ½ Mi N on left side of road
Blocks or distance(s) from given point(s).

3. TYPE OF WORK
- ☑ New Well
- ☐ Plugging
- ☐ Reconditioning Work
- ☐ Monitoring
- ☐ Test Hole
- ☐ Other

4. USE
- ☑ Domestic
- ☐ Stock
- ☐ Monitoring
- ☐ Test Hole
- ☐ Other

NON-DOMESTIC
- ☐ Irrigation
- ☐ Municipal
- ☐ Industrial
- ☐ Commercial
- ☐ Other

5. DRILLING METHOD
- ☐ Fluid Rotary
- ☐ Rev. Rotary
- ☑ Cable
- ☐ Other
- ☐ Air Rotary
- ☐ H.S. Auger

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	8	
Water Sand	8	12	
Red Clay	12	86	
Water Sand	86	90	~
Red Clay & Blue Shale Intermitently	90	143	

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OCT 2 1991
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 8-12-91 Completed 8-15-91
Contractor Harvey Moore
Driller Harvey Moore (Non-Certified)
Diameter Hole 6½ in. Total Depth 143 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4½ in.	12" ground ft.	143 ft.

Cement Grout Surface Seal? ☐ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 143 ft.
Amount Used: Appx 1¼ Ton

PERFORATION RECORD

Type/Size ¼" drilled From 86 ft. To 90 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 73 ft.
Approximate Yield 3 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # DP-0140 WD 147
Address Rt 1 Box 632 Depew OK 74028 Phone # 367-3137
Signed Harvey Moore Date 8-25-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000483

1-21

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WATER WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

#25151

1. **WELL OWNER** [redacted] **PHONE** [redacted]

2. **LEGAL DESCRIPTION** NE ¼ of SW ¼ of SE ¼ of sec. 31; TWP. 16 N S; RGE 9 (EIM) WIM ECM **COUNTY** Creek

FINDING LOCATION W on old County Barn Rd appx 1/2 Mi from Hwy 48 White House w/ circle drive around house
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
quick sand	1	28	
Red clay	28	40	
Water Sand	40	71	✓

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JUL 0 - 1991
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started April 30 Completed May 2 1991
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6¾ in. Total Depth 71 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe	8	in.	10	ft.	28	ft.
Well Casing	4½	in.	12" ground	ft.	71	ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 28 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 71 ft.
Amount Used: Appx ½ Ton

PERFORATION RECORD

Type/Size				
¼" drilled	From 40	ft. To 71	ft.	
	From	ft. To	ft.	
	From	ft. To	ft.	

9. WELL TEST DATA

Static Water Level Below Land Surface 25 ft.
Approximate Yield 15 gpm.
If Artesian: Flows _____ gpm.

10. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

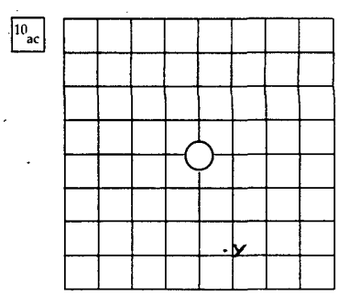
11. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 197
Address Rt 1 Box 632 Phone # 367 3137
Signed Harvey Moore Date 6-22-91

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000484

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1-2

#26628

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION NW ¼ of NW ¼ of SW ¼ of sec. 31 ; TWP. 16 N; RGE 9 (EIM / WIM / ECM) COUNTY Creek

FINDING LOCATION From Harns store on W. edge of Bristow on Hwy 66 go S. on Airport Rd. ½ Mi. House on E side of Rd.
Blocks or distance(s) from given point(s).

3. TYPE OF WORK
- ☑ New Well
- ☐ Plugging
- ☐ Reconditioning Work
- ☐ Monitoring
- ☐ Test Hole
- ☐ Other

4. USE
- ☑ Domestic
- ☐ Stock
- ☐ Monitoring
- ☐ Test Hole
- ☐ Other

NON-DOMESTIC
- ☐ Irrigation
- ☐ Municipal
- ☐ Industrial
- ☐ Commercial
- ☐ Other

5. DRILLING METHOD
- ☐ Fluid Rotary
- ☐ Rev. Rotary
- ☐ Cable
- ☐ Other
- ☐ Air Rotary
- ☐ H.S. Auger

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Sand	1	10	
Quick Sand	10	31	
Water Sand	31	63	✓

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Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 11-13-91 Completed 11-15-91
Contractor Harvey Moore Sr.
Driller Harvey Moore Sr.
Diameter Hole 6 3/4 in. Total Depth 63 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe	8	in.	0	ft.	31	ft.
Well Casing	4½	in.	12" ground	ft.	63	ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 63 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 63 ft.
Amount Used: agg ½ T

PERFORATION RECORD

Type/Size				
¼" Drilled	From	31	ft. To	63 ft.
	From		ft. To	ft.
	From		ft. To	ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 33 ft.
Approximate Yield 15 gpm.
If Artesian: Flows _____ gpm.

10. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

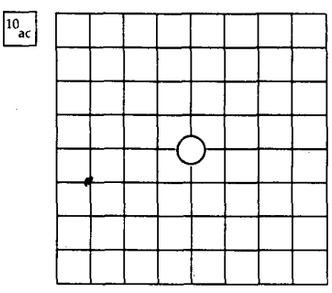
11. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore Sr. License # OPC 0140
Address Rt #1 Box 632 Phone # _____
Depew, OK 74028
Signed Harvey Moore Date 1-4-92

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000485

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

#-27756

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

RECEIVED
APR 3 2 1992
Oklahoma Water Resources Board

1. **WELL OWNER** (b) (6) [redacted] **PHONE** (b) (6) [redacted]

2. **LEGAL DESCRIPTION** NE ¼ of NE ¼ of NE ¼ of sec. 32; TWP. 16 N S; RGE 9 E WM ECM **COUNTY** Creek

FINDING LOCATION 1 Mi. E of Bristow on Hwy 16 R. side of Rd.
Blocks or distance(s) from given point(s).

3. TYPE OF WORK
- ☒ New Well
- ☐ Plugging
- ☐ Reconditioning Work
- ☐ Monitoring
- ☐ Test Hole
- ☐ Other

4. USE
- ☒ Domestic
- ☐ Stock
- ☐ Monitoring
- ☐ Test Hole
- ☐ Other

NON-DOMESTIC
- ☐ Irrigation
- ☐ Municipal
- ☐ Industrial
- ☐ Commercial
- ☐ Other

5. DRILLING METHOD
- ☐ Fluid Rotary
- ☐ Rev. Rotary
- ☒ Cable
- ☐ Other
- ☐ Air Rotary
- ☐ H.S. Auger

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Sand Rock	1	15	
Red Clay	15	17	
Sand Rock	17	35	
Red Clay	35	38	
Water Sand	38	48	←
Red Clay	48	50	

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 1-19-92 Completed 1-21-92
Contractor Harvey Moore Sr.
Driller Harvey Moore Jr.
Diameter Hole 6 1/2 in. Total Depth 50 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4 1/2	in.	12" ground	ft.	50	ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 50 ft.
Amount Used: 3/4 Ton

PERFORATION RECORD
Type/Size 1/4" drilled From 38 ft. To 48 ft.
_____ From _____ ft. To _____ ft.
_____ From _____ ft. To _____ ft.

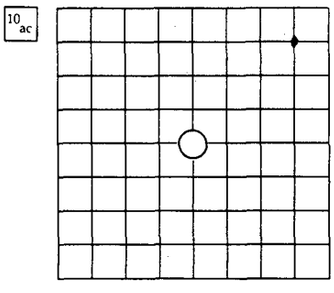
9. WELL TEST DATA
Static Water Level Below Land Surface 30 ft.
Approximate Yield 10 gpm.
If Artesian: Flows _____ gpm.

10. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

11. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK
Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT



14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore Sr. License # OWC 0140
Address Rt 1 Box 632 Depew Phone # _____
Signed Harvey Moore Sr. Date 1-30-92

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000486

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12386

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 3-41
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla.
PHONE

2. LEGAL DESCRIPTION OF WELL
SW ¼ of SW ¼ of SW ¼ of sec. 11 ; TWP. 16 N S; RGE 8 EIM (Circle One) WIM ECM; COUNTY Creek

3. TYPE OF WORK
☒ New Well ☐ Plugging
☐ Reconditioning Work
☐ Test/Monitoring

4. USE
☒ Domestic
☐ Stock
☐ Test/Monitoring

NON-DOMESTIC
☐ Irrigation
☐ Municipal
☐ Industrial
☐ Commercial
☐ Other

5. DRILLING METHOD
☒ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other
☐ Air

6. LOG

Material	From	To	Saturated
topsoil	0	2	
Red bed	2	25	
Sand rock with Water sand layers	25	45	✓
Red bed	45	55	
iron rock	55	60	
Water sand	60	120	✓

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Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA
DATES: Started 7-20-84 Completed 7-21-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 120 ft.

CASING RECORD

	Diameter		From		To	
Inside	4½	in.	18" ground	ft.	120	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☒ Yes ☐ No
Type of Surface Seal: Portland cement Depth of Seal: 15 ft.
GRAVEL PACKED:
Gravel Packed From 15 ft. to 120 ft.
Amount Used: Approx 1¼ ton

PERFORATION RECORD

Type Size				
	From	60 ft.	To	120 ft.
	From	ft.	To	ft.
	From	ft.	To	ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 50 ft.
If Artesian: Flows gpm.
Approximate Yield 10 gpm.

10. PLUGGING DATA
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.

SW ¼ of SW ¼ of SW ¼ of SEC 11 ;
TWP 16 N S; RGE 8 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION
Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK
Date Completed
☐ Replaced Casing From ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Depew Okla Phone # 918-324-5465
Signed Allen Baker Date 7-21-84

USE ADDITIONAL SHEETS IF NECESSARY

000487

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 3-4'
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

12387

1. OWNER (b) (6) ADDRESS Bristow Okla

PHONE

2. LEGAL DESCRIPTION OF WELL (EIM) (Circle One) WIM

SE ¼ of SW ¼ of NE ¼ of sec. 11 ; TWP. 16 (N) S; RGE 8 ECM; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test. Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
Top Soil	0	6"	
Sand rock	6"	15'	
Red bed	15'	25	
Sand rock	25	33	
iron rock	33	34	
Red bed	34	42	
Sand rock	42	60	
Water Sand	60	80	✓
iron rock	80	81	
Red bed	81	93	
Sand rock	93	105	
Water Sand	105	131	✓
iron rock	131	135	
Clay	135	150	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 3-25-85 Completed 3-26-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 150 ft.

CASING RECORD

	Diameter	From	To
Inside	in.	ft.	ft.
Outside	4 1/2 in.	18" Ground ft.	150 ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal Portland Cement Depth of Seal: Approx 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 150 ft.
Amount Used: Approx 1½ Tons

PERFORATION RECORD

Type Size

From 50 ft. To 150 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 30 ft.
If Artesian: Flows gpm.
Approximate Yield 24 gpm.

10. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

APR 8 1985 WATER RESOURCES BOARD

10 AC.

SE ¼ of SW ¼ of NE ¼ of SEC 11 ;
TWP 16 (N) S; RGE 8 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK

Date Completed
☐ Replaced Casing From ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew OKla 74028 Phone # (918) 324-5465
Signed Allen Baker Date 3-26-85

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000488

3-4

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

#22291

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER (b) (6) (b) (6) Bristow, Ok. 74010 PHONE (b) (6)

2. LEGAL DESCRIPTION SE ¼ of SW ¼ of SE ¼ of sec. 11 TWP. 16N N S RGE 8E EIM (Circle One) WIM ECM COUNTY Creek

FINDING LOCATION _____
Blocks or distance(s) from given point(s).

3. TYPE OF WORK
- [x] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

4. USE
- [x] Domestic
- [ ] Stock
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [ ] Fluid Rotary
- [ ] Rev. Rotary
- [ ] Cable
- [ ] Other
- [x] Air Rotary
- [ ] H.S. Auger

Material	From	To	Saturated
Top soil	0	1	
Clay	1	7	
Sand rock	7	24	
Red clay	24	32	
Sand rock	32	42	1gpm
Limestone	42	46	
Clay	46	52	
Sand rock	52	63	
Clay	63	67	
Sand rock	67	76	2gpm
Red clay	76	83	
Sand rock	83	90	3 gpm
Clay	90	98	
Sandy shale	98	114	
Sand rock	114	125	
Clay	125	135	
Limestone	135	137	
Sand rock	137	146	
Shale	146	156	
Sand rock	156	185	20gpm
Red clay	185	189	
Sand rock	189	195	5 gpm
Limestone	195	197	
Shale	197	218	
Limestone	218	221	
Sand rock	221	226	
Clay	226	240	
Limestone	240	243	
Clay & shale	243	260	
Red clay	260	264	
Water sand	264	300	30+ gpm

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AUG 21 1990
Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
[ ] Yes [ ] No Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 8-2-90 Completed 8-3-90
Contractor Knott's Water Well Drilling
Driller Dale Knott
Diameter Hole 8 in. Total Depth 300 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	5"	in.	300	ft.	+2	ft.

Cement Grout Surface Seal? [x] Yes [ ] No
Type of Surface Seal: Portland Depth of Seal: 10 ft.
GRAVEL PACK:
Gravel Packed From 300 ft. to 10 ft.
Amount Used: 3T

PERFORATION RECORD

Type/Size				
1/32" slotted	From 80 ft.	To 100 ft.		
	From 160 ft.	To 180 ft.		
	From 280 ft.	To 298 ft.		

9. WELL TEST DATA
Static Water Level
Below Land Surface 95 ft.
Approximate Yield 60+ gpm.
If Artesian: Flows _____ gpm.
100 mg/l salt; 11g hard;

10. PUMP INFORMATION
Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

11. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK
Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

10 ac

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Kathleen Knott License # WD 74
Address Terlton, Ok, 74081 Phone # (918)865-3546
Signed Kathleen Knott Date 8-4-90

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000489

2-3'

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

#12388

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla

PHONE _____

2. LEGAL DESCRIPTION OF WELL (EIM) (Circle One) WIM

NE ¼ of SE ¼ of SW ¼ of sec. 13; TWP. 16 (N) S; RGE 8 ECM; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top Soil	0	2	
Sand rock	2	30	
Red bed	30	60	
Water sand	60	85	
Red bed	85	140	
Shale	140	163	
Red bed	163	180	
lime	180	182	
shale	182	205	
Water sand	205	212	
iron rock	212	215	
Water sand	215	233	
shale	233	235	

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AUG 4 1986
Oklahoma

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 7-22-86 Completed 7-23-86
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 235 ft.

CASING RECORD

	Diameter	From	To
Inside	in.	18" ↑ ground ft.	235 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland cement Depth of Seal: 15 ft.
GRAVEL PACKED:
Gravel Packed From 15 ft. to 235 ft.
Amount Used: Approx 2 1/4 ton

PERFORATION RECORD

Type/Size		
From 55 ft.	To 95 ft.	
From 195 ft.	To 235 ft.	
From ____ ft.	To ____ ft.	

9. WELL TEST DATA

Static Water Level Below Land Surface 130 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 10 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With X Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC

NE ¼ of SE ¼ of SW ¼ of SEC 13;
TWP 16 (N) S; RGE 8 (Circle One) EIM WIM ECM

12. PUMP INFORMATION

Pump Type X
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From X ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License #WD-120
Address Rt 1 Box 293 Depew Okla 74028 Phone #918-324-5465
Signed Allen Baker Date 7-23-86

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000490

2-3

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

12389

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla

PHONE _____

2. LEGAL DESCRIPTION OF WELL
NW ¼ of NW ¼ of SE ¼ of sec. 13 ; TWP. 16 N S; Rge. 8 EIM WIM ECM; COUNTY Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other _____

6. LOG

Material	From	To	Saturated ✓
Top Soil	0	6	
Sand rock	6	15	
Water Sand	15	50	
Red bed	50	58	
Iron rock	58	60	
Red bed	60	110	
Shale	110	135	
Water Sand	135	180	

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JUL 10 1984
OWRB

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AUG 9 1984
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA

Dates: Started 6-15-84 Completed 6-20-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 180 ft.

CASING RECORD

Diameter		From		To	
4½	in.	15" above ground	ft.	180	ft.
	in.		ft.		ft.

Surface Seal: ☑ Yes ☐ No Type: Portland Cement
Depth of Seal: 12 ft.
Gravel Packed:
Gravel Packed From 12 ft. to 180 ft.
Amount Used: Approx 2 ton

PERFORATION RECORD

Type	From	30	ft. To	50	ft.
Size	From	120	ft. To	180	ft.
"	From		ft. To		ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 30 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality Good

BAILER TEST

Drawdown _____ ft. After Pumping _____ hrs. At 20 gpm.
Size of Bailer: 12 gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT

10 AC.

NW ¼ of NW ¼ of SE ¼ of SEC 13 ;
TWP 16 N S; RGE 8 EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address RT 1 Depew OKla 74028 Phone # 918-324-5465
Signed Allen Baker Date 6-20-84

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000491

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12390

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 3-41
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

1. OWNER [redacted] ADDRESS Sapulpa Okla.
PHONE

2. LEGAL DESCRIPTION OF WELL
SE ¼ of NW ¼ of NW ¼ of sec. 14 ; TWP. 16 (N) S; RGE 8 EIM (Circle One) WIM ECM; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
Clay	0	45	
Water Sand	45	60	
Red Rock	60	195	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 11-8-85 Completed 11-10-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 ¼ in. Total Depth 195 ft.

CASING RECORD

	Diameter	From	To
Inside	4 ½ in.	15" Ground ft.	195 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 195 ft.
Amount Used: Approx 2 Ton

PERFORATION RECORD

Type Size		
	From [redacted]30 ft. To [redacted]90 ft.	
	From ft. To ft.	
	From ft. To ft.	

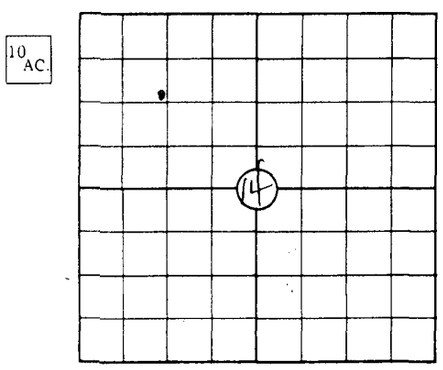
9. WELL TEST DATA

Static Water Level Below Land Surface 35 ft.
If Artesian: Flows gpm.
Approximate Yield 5 gpm.

10. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



¼ of ¼ of ¼ of SEC ;
N (Circle One)
TWP S; RGE EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK

Date Completed
☐ Replaced Casing From ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD 170
Address RT 1 Depew Okla. 74025 Phone # 918-324-5465
Signed Allen Baker Date 11-16-85

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000492

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 3-4'
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

#-12391

MULTI-PURPOSE WATER WELL REPORT

1. OWNER (b) (6) [redacted] ADDRESS Kiefstow Okla.
PHONE

2. LEGAL DESCRIPTION OF WELL
NW ¼ of NW ¼ of NW ¼ of sec. 14 ; TWP. 16 N; Rge. 8 EIM WIM ECM; COUNTY Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☑ Rotary ☐ Rev. Rotary
☐ Cable ☐ Other

6. LOG

Material	From	To	Saturated ✓
top Soil	0	5	
Sand rock	5	12	
Clay	12	20	
Sand rock	20	30	
Water Sand	30	45	
Red bed	45	60	
Water Sand	60	75	
Red bed	75	120	
layers of shale Mixed With red Rock	120	145	
Water Sand	145	160	
Red bed	160	164	

RECEIVED
MAY 3 1984
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA
Dates: Started 4-19-84 Completed 4-21-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¾ in. Total Depth 164 ft.

CASING RECORD
Diameter 4½ in. From 10" Ground ft. To 164 ft.
in. ft. ft.
Surface Seal: ☑ Yes ☐ No Type: Portland Cement
Depth of Seal: 15 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 164 ft.
Amount Used: Approx 2 Ton

PERFORATION RECORD
Type From 35 ft. To 75 ft.
Size From 145 ft. To 164 ft.
" From ft. To ft.

8. WELL TEST DATA
Static Water Level Below Land Surface 34 ft.
If Artesian: Flows gpm.
Water Temp. °c/f Quality Good

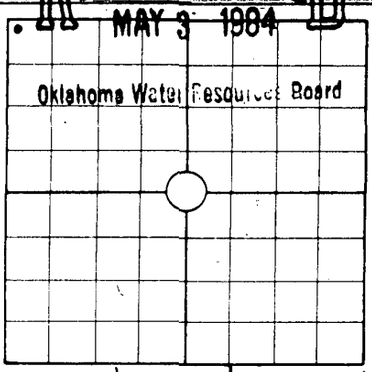
BAILER TEST
Drawdown ft. After Pumping hrs. At 10 gpm.
Size of Bailer: 10 gal.

PUMPING TEST
Drawdown ft. After Pumping hrs. At gpm.

9. PLUGGING DATA
Date Plugged
Backfilled With X Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK
Date Completed
☐ Replaced Casing From X ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

11. PLAT



NW ¼ of NW ¼ of NW ¼ of SEC 14 ;
TWP 16 N S; RGE 8 E EIM WIM ECM

12. PUMP INFORMATION
Pump Type
Power Source X
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Depew Okla 74028 Phone # 918-324-5465
Signed Allen Baker Date 4-21-84

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10/76

000493

3-4'

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

#12392

STATE OF OKLAHOMA

MULTI-PURPOSE WATER WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER (b) (6) [redacted] PHONE
2. LEGAL DESCRIPTION NW ¼ of NW ¼ of SE ¼ of sec. 15; TWP. 16 N S; RGE 8 E W (Circle One) ECM COUNTY Creek

FINDING LOCATION
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Sand rock	0	35	
Water Sand	35	45	✓
iron rock	45	48	
red bed	48	58	
Water Sand	58	102	✓

RECEIVED
SEP 1
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 8-8-88 Completed 8-9-88
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 1/2 in. Total Depth 102 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4 1/2	in.	18" Above Ground	ft.	102	ft.

Cement Grout Surface Seal? ☐ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACK:
Gravel Packed From 12 ft. to 102 ft.
Amount Used: approx 1 ton

PERFORATION RECORD

Type/Size				
	From	42 ft.	To	102 ft.
	From	ft.	To	ft.
	From	ft.	To	ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 50 ft.
Approximate Yield gpm.
If Artesian: Flows 12 gpm.

10. PUMP INFORMATION

Pump Type
Power Source X
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

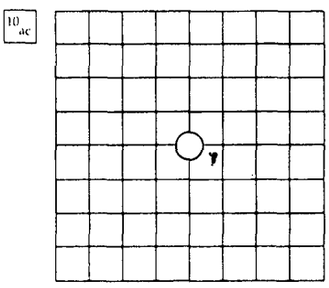
11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From X Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From X ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew Okla Phone # 334-5465
Signed Allen Baker Date 8-8-88

Form 424-0886

USE ADDITIONAL SHEETS IF NECESSARY

000494

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12396

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 3-4'
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

1. OWNER (b) (6) [redacted] ADDRESS Enid, Okla.
PHONE
2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM
SW ¼ of SW ¼ of NE ¼ of sec. 15 ; TWP 16 N S; RGE 8 ECM; COUNTY Grant

3. TYPE OF WORK
- ☑ New Well
- ☐ Plugging
- ☐ Reconditioning Work
- ☐ Test/Monitoring

4. USE
- ☑ Domestic
- ☐ Stock
- ☐ Test Monitoring

NON-DOMESTIC
- ☐ Irrigation
- ☐ Municipal
- ☐ Industrial
- ☐ Commercial
- ☐ Other

5. DRILLING METHOD
- ☑ Rotary
- ☐ Rev. Rotary
- ☐ Cable
- ☐ Other
- ☐ Air

6. LOG

Material	From	To	Saturated
top Soil	0	3	
Sand, rock	3	15	
red bed	15	60	
Water Sand	60	80	✓
red bed	80	110	
water sand	110	135	✓
red bed	135	135	

RECEIVED OCT 1 1986

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-24-86 Completed 9-24-86
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 138' ft.

CASING RECORD

	Diameter		From		To	
Inside	4 1/2	in.	18" ↑ ground		135	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal Portland Cement Depth of Seal: 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 135 ft.
Amount Used: Gypsum, 1 1/4 Tons

PERFORATION RECORD

Type	Size					
		From	60	ft. To	80	ft.
		From	95	ft. To	135	ft.
		From		ft. To		ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 103 ft.
If Artesian: Flows gpm.
Approximate Yield 15 gpm.

10. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.

SW ¼ of SW ¼ of NE ¼ of SEC 15 ;
TWP 16 N S; RGE 8 (Circle One) EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK

Date Completed
☐ Replaced Casing From ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address RT 1 Box 293 Kingfisher Okla 73028 Phone #918-324-5465
Signed Allen Baker Date 9-29-86

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

3-4

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA

MULTI-PURPOSE WATER WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION S½ ~~¼~~ of SE ¼ of ¼ of sec. 15; TWP. 16 N; RGE 8 E of the County Rd. ECM COUNTY Creek

FINDING LOCATION From Intersection 66 & 16 go W, cross turnpike & turn L, go appx 3 mi - house on R. side of road just past a curve.
Blocks or distance(s) from given point(s)

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top Soil	0	1	
Sand Rock	1	20	
Red Clay	20	70	
Water Sand	70	90	✓
Red Clay	90	93	
Water Sand	93	102	✓

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 8-28-90 Completed 9-2-90
Contractor Harvey Moore
Driller Harvey Moore
Diameter Hole 6½ in. Total Depth 102 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4½	in.	12" ground	ft.	102	ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 20 ft.
GRAVEL PACK:
Gravel Packed From 0 ft. to 102 ft.
Amount Used: 1 sack

PERFORATION RECORD

Type/Size				
¼" Drilled	From	70 ft.	To	102 ft.
	From	ft.	To	ft.
	From	ft.	To	ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 60 ft.
Approximate Yield 20 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT

Completed by Groundwater Quality

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Harvey Moore License # WD 197
Address Rt #1 Box 632 Phone #367-3137
Signed Harvey Moore Date

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000496

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA

MULTI-PURPOSE WATER WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1-2'

12402

1. WELL OWNER (b) (6) [redacted] PHONE

2. LEGAL DESCRIPTION SW ¼ of SW ¼ of SW ¼ of sec. 24 TWP. 16 (N) S; RGE 8 EIM (Circle One) WIM ECM COUNTY Creek

FINDING LOCATION
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
top Soil	0	2	
Sand rock	2	25	
Water sand	25	35	✓
red bed	35	45	
Water sand	45	75	✓
red bed	75	80	

RECEIVED
JUL 12 1988
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 5-24-88 Completed 5-25-88
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¼ in. Total Depth 80 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	in.	ft.	ft.
Well Casing	4½ in.	18" Ground	80 ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 10 ft.
GRAVEL PACK:
Gravel Packed From 10 ft. to 80 ft.
Amount Used: approx 1 ton

PERFORATION RECORD

Type/Size
From 20 ft. To 80 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 15 ft.
Approximate Yield 8 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION

Pump Type
Power Source X
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From X Ft. To ft.

12. RECONDITIONING WORK

Date Completed
Replaced Casing From X ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT

10 ac

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # W.D-170
Address Rt 1 Box 293 Drumm Okla 74028 Phone # 3245465
Signed Allen Baker Date 5-25-88

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000497

1-21

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12404

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

1. OWNER (b) (6) [redacted] ADDRESS Tulsa Kristow Okla.

PHONE _____
EIM
WIM

2. LEGAL DESCRIPTION OF WELL

NE ¼ of SE ¼ of NE ¼ of sec. 24 ; TWP. 16 N S; Rge. 8 ECM; COUNTY Creek

3. TYPE OF WORK	4. PROPOSED / PAST USE	5. DRILLING METHOD
☒ New Well ☐ Plugging	☒ Domestic ☐ Irrigation ☐ Stock	☒ Rotary ☐ Rev. Rotary
☐ Reconditioning Work ☐ Test	☐ Municipal ☐ Industrial ☐ Test	☐ Cable ☐ Other _____

6. LOG

Material	From	To	Satu. rated ✓
Top Soil	0	3	
Sand Rock	3	20	
Water Sand	20	60	
Clay	60	105	

RECEIVED
SEP 6 1983
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA

Dates: Started 8-1-83 Completed 8-1-83
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 105 ft.

CASING RECORD

Diameter		From		To	
4 ½	in.	15 above ground	ft.	105	ft.
	in.		ft.		ft.

Surface Seal: ☒ Yes ☐ No Type: Portland Cement
Depth of Seal: 15 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 105 ft.
Amount Used: Approx 1½ Ton

PERFORATION RECORD

Type _____ From 80 ft. To 60 ft.
Size _____ From 85 ft. To 105 ft.
" _____ From _____ ft. To _____ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 60 ft.
If Artesian: Flows _____ gpm.
Water Temp. _____ °c/f Quality Good

BAILER TEST

Drawdown _____ ft. After Pumping _____ hrs. At 5 gpm.
Size of Bailer: 10 gal.

PUMPING TEST

Drawdown _____ ft. After Pumping _____ hrs. At _____ gpm.

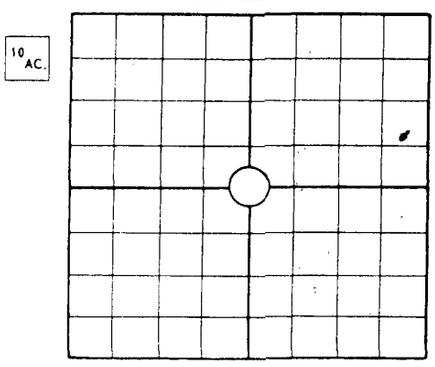
9. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

11. PLAT



NE ¼ of SE ¼ of NE ¼ of SEC 24 ;
TWP 16 N S; RGE 8 EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Depew Okla Phone # 918-324-5465

Signed Allen Baker Date 8-1-83

USE ADDITIONAL SHEETS IF NECESSARY

FORM 424-10 76

000498

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

24741

STATE OF OKLAHOMA

MULTI-PURPOSE WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1-21

1. WELL OWNER (b) (6) (b) (6) Bristow, Ok, 74010 PHONE (b) (6)

2. LEGAL DESCRIPTION SW ¼ of NE ¼ of NE ¼ of sec. 24 ; TWP. 16N N S; RGE 8E EIM (Circle One) WIM ECM COUNTY Creek

FINDING LOCATION _____
Blocks or distance(s) from given point(s).

3. TYPE OF WORK
XX ☐ New Well ☐ Plugging
☐ Reconditioning Work
☐ Monitoring
☐ Test Hole
☐ Other _____

4. USE
XX ☐ Domestic
☐ Stock
☐ Monitoring
☐ Test Hole
☐ Other _____

NON-DOMESTIC
☐ Irrigation
☐ Municipal
☐ Industrial
☐ Commercial
☐ Other

5. DRILLING METHOD
☐ Fluid Rotary ☐ Rev. Rotary
☐ Cable ☐ Other _____
XX ☐ Air Rotary
☐ H.S. Auger

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top soil	0	1	
Clay	1	2	
Sand rock	2	16	
Red clay	16	22	
Red sand rock	22	25	
Red clay	25	27	
San rock	27	34	20gpm
Red clay	34	57	
San rock	57	75	
Red clay	75	83	
Sand rock	83	100	

RECEIVED
MAY 8 - 1991
Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA
DATES: Started 4-26-91 Completed 4-26-91
Contractor Knott's Water Well Drilling
Driller Dale Knott
Diameter Hole 8 in. Total Depth 100 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	5"	in.	100	ft.	+2	ft.

Cement Grout Surface Seal? X Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 10 ft.
GRAVEL PACK:
Gravel Packed From 100 ft. to 10 ft.
Amount Used: 1T

PERFORATION RECORD

Type/Size				
1/32" slotted	From	97	ft. To	80 ft.
	From	35	ft. To	25 ft.
	From		ft. To	ft.

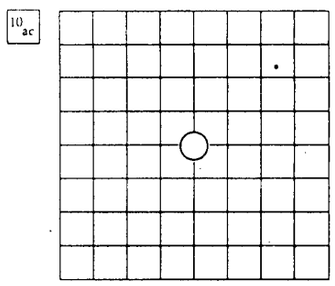
9. WELL TEST DATA
Static Water Level Below Land Surface 20 ft.
Approximate Yield 20 gpm.
If Artesian: Flows _____ gpm.
75mg/l salt; 10g hard;

10. PUMP INFORMATION
Pump Type Submersible
Power Source Electric
Rated Capacity 10 gpm.
Depth of Bowls or Cylinder 90 ft.

11. PLUGGING DATA
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK
Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT



14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Kathleen Knott License # WD 74
Address Rt. 1, TErlton, Ok, 74081 Phone # 4-27-91
Signed Kathleen Knott Date 965-3546

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000499

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12405

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. _____
Aquifer _____
Steam System Code _____
Use Code _____
County _____
(Official Use Only)

1-21

1. OWNER [redacted] **ADDRESS** Drumright Okla.

PHONE

2. LEGAL DESCRIPTION OF WELL (EIM) WIM (Circle One)

NW ¼ of NW ¼ of NE ¼ of sec. 25; TWP. 18 (N) S; RGE 8 E; ECM; **COUNTY** Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top Soil	0	1	
Sand rock	1	25	
red bed	25	80	
water Sand	80	100	✓
red bed	100	128	
water sand	128	145	✓
sand rock	145	164	
water sand	164	176	
Shale	176	180	

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OKLA. WATER RESOURCES BOARD
MAY 10

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 5-2-86 Completed 5-3-86
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6¾ in. Total Depth 150 ft.

CASING RECORD

	Diameter		From		To	
Inside	4½	in.	12" ft.	ground	150	ft.
Outside		in.		ft.		ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: Portland Cement Depth of Seal: 15' ft.
GRAVEL PACKED:
Gravel Packed From 15 ft. to 150 ft.
Amount Used: Approx 2 ton

PERFORATION RECORD

Type/Size

From 60 ft. To 150 ft.
From _____ ft. To _____ ft.
From _____ ft. To _____ ft.

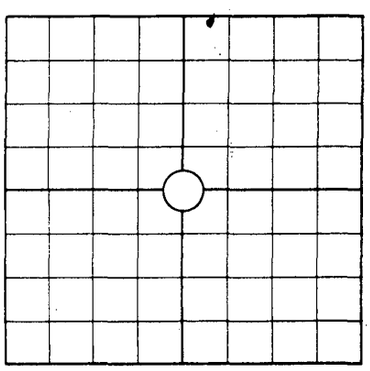
9. WELL TEST DATA

Static Water Level Below Land Surface 50 ft.
If Artesian: Flows _____ gpm.
Approximate Yield 6½-7 gpm.

10. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ ft. To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT



NW ¼ of NW ¼ of NE ¼ of SEC 25;
TWP 18 (N) S; RGE 8 E (Circle One) EIM/WIM,ECM

12. PUMP INFORMATION

Pump Type _____
Power Source _____
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

13. RECONDITIONING WORK

Date Completed _____
☐ Replaced Casing From _____ ft. To _____ ft.
☐ Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD 170
Address RFD 1 Depew Okla 74028 Phone # 918-324-5465
Signed Allen Baker Date 5-5-86

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000500

White — Water Resources Board
Canary — Drillers Copy
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MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 2-31
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

#12406

1. OWNER (b) (6) [redacted] ADDRESS Preston Okla

PHONE

2. LEGAL DESCRIPTION OF WELL (Circle One) EIM WIM

SW ¼ of SW ¼ of SW ¼ of sec. 25; TWP. 16 N S; RGE 8 ECM; COUNTY Creek

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☑ Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☐ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air
		☐ Commercial	
		☐ Other	

6. LOG

Material	From	To	Saturated
top Soil	0	2	
Sand Rock	2	15	
Red bed	15	20	
Sand Rock	20	24	
Red bed	24	84	
Sand Rock	84	100	
Water Sand	100	135	✓

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NOV 6 1985
O... Water Res...

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 10-16-85 Completed 10-16-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 135 ft.

CASING RECORD

	Diameter	From	To
Inside	4½ in.	2' ↑ ground ft.	135 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal ☑ Yes ☐ No
Type of Surface Seal: portland Cement Depth of Seal: 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 135 ft.
Amount Used: Approx 1 ½ Ton

PERFORATION RECORD

Type/Size
From 95 ft. To 135 ft.
From ft. To ft.
From ft. To ft.

9. WELL TEST DATA

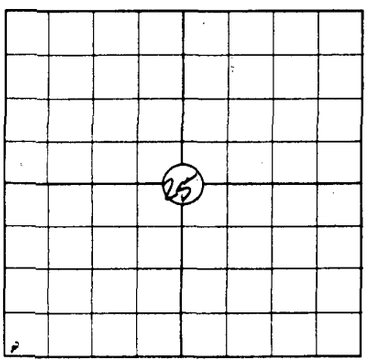
Static Water Level Below Land Surface 75 ft.
If Artesian: Flows gpm.
Approximate Yield 10 gpm.

10. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.



SW ¼ of SW ¼ of SW ¼ of SEC 25;
TWP 16 N S; RGE 8 (Circle One) EIM WIM ECM

12. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK

Date Completed
☐ Replaced Casing From ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD 170
Address Rt 1 Box 293 Depew Okla 74028 Phone # 918-324-5465
Signed Allen Baker Date 10-16-85

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000501

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12047
12407

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10TH STREET, P.O. BOX 53585
OKLAHOMA CITY, OKLAHOMA 73152

MULTI-PURPOSE WATER WELL REPORT

Application No. 1-2
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

1. OWNER (b) (6) ADDRESS (b) (6) Bristow, Oklahoma 74010 PHONE (b) (6)

2. LEGAL DESCRIPTION OF WELL (EIM) WIM

NE ¼ of SE ¼ of SW ¼ of sec. 25 ; TWP. 16 (N) S; Rge. 8 ECM; COUNTY Creek

3. TYPE OF WORK
☒ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☒ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☒ Rotary ☐ Rev. Rotary
☐ Cable ☒ Other Air

Material	From	To	Saturated ✓
Brown & red sandy clay topsoil	0	5	
Tan to red sandstone w/red clayey shale layers	5	50	
Red soft sandstone	50	55	X
Red sandy shale dry w/red sandstone layers	55	95	
Red to tan sandstone w/red sandy shale layers, dry	95	130	
Red clayey shale, dry	130	150	
Red to tan sandstone w/ gray sandy shale layers (water)	150	190	X
Red sandy shale	190	195	
Tan sandstone (water)	195	235	X
Red sandy shale	235	238	
Tan sandstone w/red sandstone & red shale layers	238	273	X
Tan sandstone	273	290	X
Red sandstone & shale	290	293	
Tan sandstone	293	300	
Red shaley sandstone	300	310	
Tan sandstone	310	321	X
Red sandy shale	321	325	

Dates: Started 4/19/85 Completed 4/25/85
Contractor Stewart, White & Associates, Inc.
Driller Bob Knopf
Diameter Hole 8 in. Total Depth 320 ft.

CASING RECORD

Diameter		From		To	
5	in.	-0-	ft.	320	ft.
5 1/2	in.	---	ft.	---	ft.

Surface Seal: ☒ Yes ☐ No Type: Cement
Depth of Seal: 10 ft.
Gravel Packed:
Gravel Packed From 15 ft. to 320 ft.
Amount Used: 2000 lbs.

PERFORATION RECORD

Type	5" PVC Pipe	From	0 ft.	To	160 ft.
Size	5" PVC Screen	From	160 ft.	To	200 ft.
"	5" Pipe PVC	From	200 ft.	To	260 ft.
	5" PVC Screen		260		320 ✓

Static Water Level Below Land Surface 49 ft.
If Artesian: Flows --- gpm.
Water Temp. °c/f Quality

BAILER TEST
Drawdown ft. After Pumping hrs. At gpm.
Size of Bailer: gal.

PUMPING TEST approximate yield 100 GPM
Drawdown ft. After Pumping hrs. At gpm.

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MAY 9 1985

10 AC.

NE ¼ of SE ¼ of SW ¼ of SEC 25 ;
TWP 16N (N) S; RGE 8 EIM WIM ECM

Pump Type By Others
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

Date Completed
☐ Replaced Casing From ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Glen Pryor License # WD 141
Address 1716 E. 7th, Tulsa, OK 74101 Phone # 918-584-3681

Signed Glen Pryor Date 5/7/85

USE ADDITIONAL SHEETS IF NECESSARY

000502

28566

MULTI-PURPOSE COMPLETION REPORT

l-2'

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

Please plot well location
1 mile
10 ac
N

Legal Description

NW 1/4 SW 1/4 1/4 NW 1/4 of Sec. 25 Twp. 20N Rge. 8E

County Creek Well No: _____

Well Owner (b) (6) Pho (b) (6)

Address (b) (6) Bristow Ok. 74010

Finding location Bristow N. Hwy. 16 - take 1st rd. to the L. after crossing Turnpike - 1/2 M - L. side of rd.

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other
- ☐ Water Well

G.W. Use

- ☑ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☑ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	30	
Water Sand "Did not include in well"	30	40	
Red Clay	40	80	
Water Sand "Did not include in well"	80	95	
Red Clay	95	135	
Water sand	135	160	✓

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to excede 3 acres.)

Permit No: _____

New Boring or Well Construction Data

Date: Started 7-27-92 Completed 7-31-92

Firm Moore Waterwell Drilling

Operator Harvey (Mickey) Moore Jr.

Type of Construction ☐ Open Hole ☑ Cased Hole

Hole Diameter 6½ inches total depth 16 feet

Hole Diameter _____ inches total depth _____ feet

CASING RECORD

	diameter		from ground	to
Surface pipe		inches	1 feet	feet
Well casing	4½	inches	12" feet	160 feet
Well casing		inches	feet	feet
Well casing		inches	feet	feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from	to
¼ Drilled	135 feet	160 feet
	feet	feet
	feet	feet

GRAVEL PACK

Type and Size	from	to
¼ Gunasteel	20 feet	160 feet
	feet	feet
	feet	feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from	to
Type of Surface Seal Portland	0 feet	20 feet
Aquifer Seal Type	feet	feet
	feet	feet

HYDROLOGIC DATA

First Water Zone Encountered 30 ft.

Approximate Yield 30 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged _____

Backfilled From _____ feet _____ feet Type _____

Cement Grouted From _____ feet _____ feet

Reconditioning Work

Replaced Casing/Screen From _____ feet _____ feet

Deepened Well From _____ feet _____ feet

Redeveloped Well By

Certification

The work described above was done under my supervision. This report is correct to the best of my knowledge. ✓

Name Harvey Moore Jr. Lic. No. 1220

Address Rt. 1 Box 32 Depew Phone 367-3137

Signed Harvey Moore Jr. Date 8-10-92

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OCT 29 1992
Oklahoma Water Resources Board

KW

*See Pump Installers Form On Back

000503

#28838

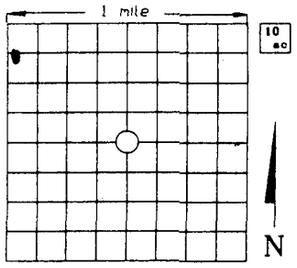
1-21

MULTI-PURPOSE COMPLETION REPORT

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

FEB 10 1993

Please plot well location



Legal Description

SW 1/4 NW 1/4 NW 1/4 of Sec. 25 Twp. 16N Rge. 8E

County Creek Well No:

Well Owner (b) (6) Phone (b) (6)

Address (b) (6) Bristow, Ok 74010

Finding location From Bristow Hwy 16 N. Take 1st rd. to the left after crossing the turnpike 1½ Mi on left side

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other
- ☐ Water Well

G.W. Use

- ☑ Domestic
- ☐ Non-Domestic:
  Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☑ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
Top Soil	0	1	
Red Clay	1	30	
Water Sand	30	40	✓
Red Clay	40	80	
Water Sand	80	95	✓
Red Clay	95	135	
Water Sand	135	160	✓

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to excede 3 acres.)

Permit No:

New Boring or Well Construction Data

Date: Started 7-26-92 Completed 7-31-92

Firm Moore Water Wells

Operator Harvey Moore Jr.

Type of Construction ☐ Open Hole ☑ Cased Hole

Hole Diameter 6½ inches total depth 160 feet

Hole Diameter ____ inches total depth ____ feet

CASING RECORD

	diameter		from ground		to	
Surface pipe		inches		feet		feet
Well casing	4½	inches	12"	feet	160	feet
Well casing		inches		feet		feet
Well casing		inches		feet		feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from	to
¼" Drilled	135 feet	160 feet
	feet	feet
	feet	feet

GRAVEL PACK

Type and Size	from	to
¼" Limestone	0 feet	160 feet
	feet	feet
	feet	feet

SEAL

Cement Grout Surface Seal Installed ☑ Yes ☐ No

	from	to
Type of Surface Seal Portland	0 feet	95 feet
Aquifer Seal Type	feet	feet
	feet	feet

HYDROLOGIC DATA

First Water Zone Encountered 30 ft.

Approximate Yield 25 GPM Artesian ☐ Yes ☑ No

Plugging Data

Date Plugged

Backfilled From feet feet Type

Cement Grouted From feet feet

Reconditioning Work

Replaced Casing/Screen From feet feet

Deepened Well From feet feet

Redeveloped Well By

Certification

The work described above was done under my supervision. This report is correct to the best of my knowledge.

Name Harvey Moore Lic. No. DPC 0140

Address Rt 1 Box 632 Depew 74028 Phone 367-9137

Signed Harvey Moore Date 2-2-93

KW

*See Pump Installers Form On Back

000504

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA

MULTI-PURPOSE WATER WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

3-41

#12410

RECEIVED
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1. WELL OWNER (b) (6) [redacted] Oklahoma Water Resources Board

2. LEGAL DESCRIPTION SE ¼ of NE ¼ of SW ¼ of sec. 27 ; TWP. 16 (N) S; RGE 8 E/W (Circle One) WIM ECM COUNTY Creek

FINDING LOCATION _____
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☑ New Well ☐ Plugging	☑ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☑ Cable ☐ Other
☐ Test/Monitoring	☐ Test/Monitoring	☐ Industrial	☐ Air Rotary
☐ G.W. Heat Pump	☐ G.W. Heat Pump	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGIC LOG

Material	From	To	Saturated
top Soil	0	2	
Sand rock	2	27	
Red bed	27	70	
Iron rock	70	75	
Water Sand	75	107	✓
Red bed	107	111	

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

☐ Yes ☐ No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 9-19-88 Completed 9-20-88
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 1/2 in. Total Depth 111 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.		ft.		ft.
Well Casing	4 1/2	in.	18" above ground	ft.	111	ft.

Cement Grout Surface Seal? ☑ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 12 ft.
GRAVEL PACK: Cement
Gravel Packed From 12 ft. to 111 ft.
Amount Used: Approx 1 3/4 Ton

PERFORATION RECORD

Type/Size
_____ From 27 ft. To 111 ft.
_____ From _____ ft. To _____ ft.
_____ From _____ ft. To _____ ft.

9. WELL TEST DATA

Static Water Level
Below Land Surface 70 ft.
Approximate Yield 10 gpm.
If Artesian: Flows _____ gpm.

10. PUMP INFORMATION

Pump Type _____
Power Source X
Rated Capacity _____ gpm.
Depth of Bowls or Cylinder _____ ft.

11. PLUGGING DATA

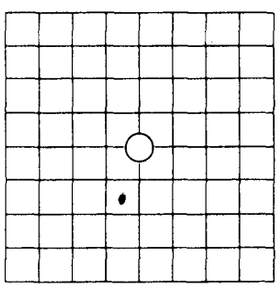
Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From X Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From X ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT

10 ac



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address RT 1 Box 293 Drumright Okla Phone # 324-9465
Signed Allen Baker Date 9/20/88

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000505

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

#12414

MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 3-4'
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

1. OWNER (b) (6) [redacted] **ADDRESS** Bristow Okla
PHONE Creek

2. LEGAL DESCRIPTION OF WELL (EIM) WIM (Circle One)

SW ¼ of SW ¼ of NE ¼ of sec. 34 ; TWP. 16 (N) S; RGE 8 ECM; **COUNTY** Creek

3. TYPE OF WORK
- [x] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Test/Monitoring

4. USE
- [x] Domestic
- [ ] Stock
- [ ] Test Monitoring

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [x] Rotary
- [ ] Rev. Rotary
- [ ] Cable
- [ ] Other
- [ ] Air

6. LOG

Material	From	To	Saturated
top soil	0	4	
Red bed	4	18	
Sand rock	18	29	
iron rock	29	40	
red rock	40	43	
iron rock	43	45	
red bed	45	55	
Water sand	55	105	

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JUN 10 1985
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?
- [ ] Yes
- [ ] No Permit No.

8. NEW WELL CONSTRUCTION DATA

DATES: Started 5-20-85 Completed 5-20-85
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 3/4 in. Total Depth 105 ft.

CASING RECORD

	Diameter	From	To
Inside	4 1/2 in.	18" ↑ ground ft.	105 ft.
Outside	in.	ft.	ft.

Cement Grout Surface Seal [x] Yes [ ] No
Type of Surface Seal: Portland Cement Depth of Seal: 12 ft.
GRAVEL PACKED:
Gravel Packed From 12 ft. to 105 ft.
Amount Used: Approx 1 1/4 ton

PERFORATION RECORD

Type	Size		
	From 45 ft.	To 105 ft.	
	From ft.	To ft.	
	From ft.	To ft.	

9. WELL TEST DATA

Static Water Level Below Land Surface 60 ft.
If Artesian: Flows gpm.
Approximate Yield 12 gpm.

10. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. PLAT

10 AC.

SW ¼ of SW ¼ of NE ¼ of SEC 34 ;
TWP 16 (N) S; RGE 8 (Circle One) EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. RECONDITIONING WORK

Date Completed
- [ ] Replaced Casing From ft. To ft.
- [ ] Replaced Screen From ft. To ft.

Deepened Well From ft. To ft.
Redeveloped Well By

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Box 293 Depew Okla 74028 Phone # 918-334-5465
Signed Allen Baker Date 5-20-85

Form 424-0684

USE ADDITIONAL SHEETS IF NECESSARY

000506

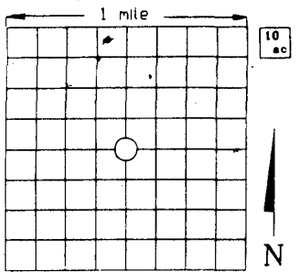
21-31

MULTI-PURPOSE COMPLETION REPORT

29930

OKLAHOMA WATER RESOURCES BOARD
600 N. HARVEY AVE.
P.O. BOX 150
OKLAHOMA CITY, OK 73101-0150

Please plot well location



Legal Description NE¼ NE¼ NW¼

NE 1/4 NE 1/4 NW 1/4 of Sec. 33 Twp. 16 N Rge. 8 E

County Osage Well No:

Well Owner (b) (6) Phone (b) (6)

Address (b) (6) Bristow 74010

Finding location Located at Veterans Memorial Park - NE corner 1½ Mi. E. of Bristow

Type of work

- ☐ Geotechnical Boring
- ☐ G.W. Heat Pump Well
- ☐ Monitor Well
- ☐ Observation Well
- ☐ Piezometer
- ☐ Plugging
- ☐ Pump Inst.*
- ☐ Reconditioning
- ☐ W.W. Test Hole
- ☐ De-watering
- ☐ Other
- ☐ Water Well

G.W. Use

- ☑ Domestic
- ☐ Non-Domestic:

Specify Purpose

Drilling Method

- ☐ Hand Auger
- ☒ Cable Tool
- ☐ Air Rotary
- ☐ Fluid Rotary
- ☐ H.S. Auger
- ☐ S.S. Auger
- ☐ Rev. Rotary
- ☐ D.W. Rev. Rotary
- ☐ Other

Lithologic Log

Material	From	To	Saturated
topsoil	0	1	
	1	25	
	25	63	
Shale	63	81	

0 ft. to 12 ft. I believe 2 feet would be the surface but wouldn't it? You wouldn't cement up any further than the surface would you?

JUL 30 1993

Oklahoma Water Resources Board

NOV - 1993

KW

*See Pump Installers Form On Back

Non-Domestic Permitting

If this well is for other than domestic use (use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land & for the irrigation of land not to excede 3 acres.)

Permit No:

New Boring or Well Construction Data

Date: Started 6-29-93 Completed 6-29-93

Firm Magic Drilling

Operator Barry Minick Jr.

Type of Construction ☐ Open Hole ☒ Cased Hole

Hole Diameter 5 3/4 inches total depth 81 feet

Hole Diameter inches total depth feet

CASING RECORD

	diameter		from		to	
Surface pipe		inches		feet		feet
Well casing	4 1/2	inches	12"	feet	81	feet
Well casing		inches		feet		feet
Well casing		inches		feet		feet

SCREEN or PERFORATION RECORD

Type and Slot Size	from		to	
10 Slotted	25	feet	80	feet
		feet		feet
		feet		feet

GRAVEL PACK

Type and Size	from		to	
½" Limestone	12 0	feet	81	feet
		feet		feet
		feet		feet

SEAL

Cement Grout Surface Seal Installed ☒ Yes ☐ No

	from		to	
Type of Surface Seal Natural		feet	12	feet
Aquifer Seal Type		feet		feet
		feet		feet

HYDROLOGIC DATA

First Water Zone Encountered ft.

Approximate Yield 7 GPM Artesian ☐ Yes ☒ No

Plugging Data

Date Plugged

Backfilled From feet feet Type

Cement Grouted From feet feet

Reconditioning Work

Replaced Casing/Screen From feet feet

Deepened Well From feet feet

Redeveloped Well By

Certification

The work described above was done under my supervision. This report is correct to the best of my knowledge.

Name Lic. No.

Address Phone

Signed Date

000507

12-21

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

#22443

STATE OF OKLAHOMA

MULTI-PURPOSE WELL REPORT

OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION NW ¼ of NW ¼ of NE ¼ of sec. 36 ; TWP. 16N N S; RGE 8E EIM (Circle One) WIM ECM COUNTY Creek

FINDING LOCATION _____
Blocks or distance(s) from given point(s).

3. TYPE OF WORK
- [x] New Well
- [ ] Plugging
- [ ] Reconditioning Work
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

4. USE
- [x] Domestic
- [ ] Stock
- [ ] Monitoring
- [ ] Test Hole
- [ ] Other

NON-DOMESTIC
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Commercial
- [ ] Other

5. DRILLING METHOD
- [ ] Fluid Rotary
- [ ] Rev. Rotary
- [ ] Cable
- [ ] Other
- [x] Air Rotary
- [ ] H.S. Auger

6. LITHOLOGIC LOG

Material	From	To	Saturated
Top soil	0	1	
Clay	1	7	
Sand rock	7	10	
Clay	10	14	
Sand rock	14	18	
Clay	18	24	
Shale	24	26	
Sand rock	26	30	
Clay	30	31	
Sand rock	31	44	1 gpm
Clay	44	48	
Sand rock	48	55	
Clay	55	63	
Gray iron rock	63	70	
Clay	70	100	
Sand rock	100	127	39 gpm
Iron rock	127	129	
Sand rock	129	134	
Iron rock	134	135	
Clay	135	140	

DEC 10 1990
Oklahoma Water Resources Board

7. LOCATION PERMIT

If this well is Non-Domestic, has the location been permitted?

[ ] Yes [ ] No Permit No. _____

8. NEW WELL CONSTRUCTION DATA

DATES: Started 11-26-90 Completed 11-26-90
Contractor Knott's Water Well Drilling
Driller Dalae Knott
Diameter Hole 8 in. Total Depth 140 ft.

CASING RECORD

	Diameter	From	To
Surface Pipe	_____ in.	_____ ft.	_____ ft.
Well Casing	5" in.	140 ft.	+2 ft.

Cement Grout Surface Seal? [x] Yes [ ] No
Type of Surface Seal: Portland Depth of Seal: 10 ft.
GRAVEL PACK:
Gravel Packed From 140 ft. to 10 ft.
Amount Used: 1½T

PERFORATION RECORD

Type/Size		
1/32" slotted	From 137 ft.	To 100 ft.
	From _____ ft.	To _____ ft.
	From _____ ft.	To _____ ft.

9. WELL TEST DATA

Static Water Level
Below Land Surface 50 ft.
Approximate Yield 40 gpm.
If Artesian: Flows _____ gpm.
75 mg/l salt; 50g hard;

10. PUMP INFORMATION

Pump Type Submersible
Power Source Electric
Rated Capacity 10 gpm.
Depth of Bowls or Cylinder 130 ft.

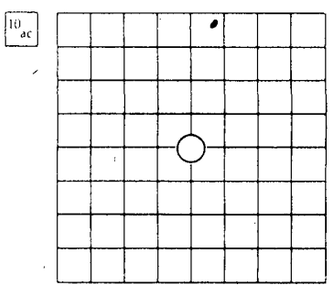
11. PLUGGING DATA

Date Plugged _____
Backfilled With _____ Material To _____ ft.
Grouted or Cemented From _____ Ft. To _____ ft.

12. RECONDITIONING WORK

Date Completed _____
Replaced Casing From _____ ft. To _____ ft.
Replaced Screen From _____ ft. To _____ ft.
Deepened Well From _____ ft. To _____ ft.
Redeveloped Well By _____

13. PLAT



14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Kathleen Knott License # WD 74
Address Rt. 1, Terlton, Ok, 74081 Phone # 865-3546

Signed Kathleen Knott Date 11-28-90

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000508

1-21

White—Water Resources Board
Canary—Driller's Copy
Pink—Customer's Copy

STATE OF OKLAHOMA
MULTI-PURPOSE WELL REPORT
OKLAHOMA WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

30241

1. WELL OWNER (b) (6) PHONE (b) (6)

2. LEGAL DESCRIPTION NW ¼ of NW ¼ of NE ¼ of sec. 36; TWP. 16 N S; RGE 8E EIM (Circle One) WIM ECM COUNTY Creek

FINDING LOCATION W on 66 from Bristow to Glen Acres turn R less than ¼ Mi on R.
Blocks or distance(s) from given point(s).

3. TYPE OF WORK	4. USE	NON-DOMESTIC	5. DRILLING METHOD
☐ New Well ☐ Plugging	☐ Domestic	☐ Irrigation	☐ Fluid Rotary ☐ Rev. Rotary
☐ Reconditioning Work	☐ Stock	☐ Municipal	☒ Cable ☐ Other
☐ Monitoring	☐ Monitoring	☐ Industrial	☐ Air Rotary
☐ Test Hole	☐ Test Hole	☐ Commercial	☐ H.S. Auger
☐ Other	☐ Other	☐ Other	

6. LITHOLOGY

Material	From	To	Saturated
Top Soil	0	1	
Red Clay + Sand Rock	1	50	
Water Sand	50	90	✓
Red Clay	90	110	
Water Sand	110	123	
Red Clay	123	128	

JAN 18 1994
Oklahoma Water Resources Board

7. LOCATION PERMIT
If this well is Non-Domestic, has the location been permitted?
☐ Yes ☐ No Permit No.

8. NEW WELL CONSTRUCTION DATA
DATES: Started 10-28-93 Completed 10-30-93
Contractor Harvey Moore Sr
Driller Harvey Moore Sr
Diameter Hole 6 3/4 in. Total Depth 128 ft.

CASING RECORD

	Diameter		From		To	
Surface Pipe		in.	ground	ft.		ft.
Well Casing	4½	in.	12"	ft.	128	ft.

Cement Grout Surface Seal? ☒ Yes ☐ No
Type of Surface Seal: Portland Depth of Seal: 10 ft.
GRAVEL PACK:
Gravel Packed From 10 ft. to 130 128 ft.
Amount Used:

PERFORATION RECORD

Type/Size			
½" Drilled	From 50 ft.	To 90	ft.
"	From 110 ft.	To 123	ft.
	From ft.	To	ft.

9. WELL TEST DATA
Static Water Level Below Land Surface 50 ft.
Approximate Yield 15 gpm.
If Artesian: Flows gpm.

10. PUMP INFORMATION
Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

11. PLUGGING DATA
Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From Ft. To ft.

12. RECONDITIONING WORK
Date Completed
Replaced Casing From ft. To ft.
Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

13. PLAT
10 ac

14. CERTIFICATION
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge. ✓

Name Harvey Moore Sr License # DPC 0140
Address Rt 1 Box 632 Phone # 367-3137
Depew 74028
Signed Harvey Moore Sr Date 10-31-93

KW

Form 424-0887

USE ADDITIONAL SHEETS IF NECESSARY

000509

White — Water Resources Board
Canary — Drillers Copy
Pink — Drillers Copy

RECEIVED
FEB 2 1984
Oklahoma Water Resources Board

#12408

STATE OF OKLAHOMA
WATER RESOURCES BOARD
1000 N.E. 10th St., P.O. Box 53585
Oklahoma City, Oklahoma 73152

Application No. 1-2
Aquifer
Steam System Code
Use Code
County
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

1. OWNER (b) (6) [redacted] ADDRESS Bristow Okla -
PHONE

2. LEGAL DESCRIPTION OF WELL
SE ¼ of NE ¼ of NW ¼ of sec. 25 ; TWP. 16 N S; Rge. 8 EIM WIM ECM; COUNTY Creek

3. TYPE OF WORK
☑ New Well ☐ Plugging
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE
☑ Domestic ☐ Irrigation ☐ Stock
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD
☐ Rotary ☐ Rev. Rotary
☑ Cable ☐ Other

6. LOG

Material	From	To	Saturated ✓
top soil	1	3	
Red bed	3	35	
Sand rock	35	37	
Red bed	37	55	
Sand rock	55	60	
Red bed	60	80	
Water Sand	80	95	
Red bed	95	110	
Water Sand	110	138	

7. NEW WELL CONSTRUCTION DATA

Dates: Started 1-3-84 Completed 1-6-84
Contractor Allen Baker
Driller Allen Baker
Diameter Hole 6 in. Total Depth 138 ft.

CASING RECORD

Diameter		From		To	
4½	in.	15" T ground	ft.	138	ft.
	in.		ft.		ft.

Surface Seal: ☑ Yes ☐ No Type: portland cement
Depth of Seal: 12 ft.
Gravel Packed:
Gravel Packed From 12 ft. to 138 ft.
Amount Used: Approx 1½ Ton

PERFORATION RECORD

Type From 80 ft. To 138 ft.
Size From ft. To ft.
" From ft. To ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 88 ft.
If Artesian: Flows gpm.
Water Temp. °c/f Quality Good

BAILER TEST

Drawdown ft. After Pumping hrs. At 15 gpm.
Size of Bailer: 10 gal.

PUMPING TEST

Drawdown ft. After Pumping hrs. At gpm.

9. PLUGGING DATA

Date Plugged
Backfilled With Material To ft.
Grouted or Cemented From ft. To ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed
☐ Replaced Casing From ft. To ft.
☐ Replaced Screen From ft. To ft.
Deepened Well From ft. To ft.
Redeveloped Well By

11. PLAT

10 AC.

SE ¼ of NE ¼ of NW ¼ of SEC ; N
TWP S; RGE EIM,WIM,ECM

12. PUMP INFORMATION

Pump Type
Power Source
Rated Capacity gpm.
Depth of Bowls or Cylinder ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Allen Baker License # WD-170
Address Rt 1 Depew Okla 74028 Phone # 918-324-5465

Signed Allen Baker Date

USE ADDITIONAL SHEETS IF NECESSARY

FORM 474-12-76

000510

Reference 13

MEMORANDUM

December 7, 1994

From: David Cates, Environmental Specialist, DEQ, Superfund (Site Assessment Unit).

To: Wilcox Oil Company Site Preliminary Assessment (PA)

Re: Public Water Supply near Bristow, Oklahoma.

Much of the following information was obtained during a telephone conversation on 11/28/94 with Danny Trout of the Bristow, Oklahoma, Public Works Department. The City of Bristow municipal water supply system has eight active wells which are connected via a distribution network to four water storage towers. The towers and wells are interconnected forming a blended system with line taps occurring before and after the towers. The system serves 4,300 people in Bristow and 119 people in Slick, Oklahoma. Water supply to the system is obtained from wells only. The water is chlorinated at the well head.

Three of Bristow's eleven wells reported to be active on the public water supply database (#'s 3, 7 & 21) are no longer part of the system (References A; B; C;). Well #7 which is incorrectly located on the database has been plugged and abandoned as a result of deactivating an underground water storage system to which it was connected. The correct location of this well was in the NE/4 SE/4 NE/4 of Section 30-T16N-R9E instead of R8E, which puts it about one quarter mile southwest of the site. Well #3 is apparently plugged and abandoned, also. Well #21 was given to Mid-America Cafe who presumably is using it for water supply.

Well #18 is incorrectly located on the public water supply database also. It should be in the SW/4 SW/4 SE/4 of Section 25-T16N-R8E instead of in the SW/4 SW/4 SW/4 of the section, which puts it within the 2 mile radius of the site. All the wells except #14 are located in the 1 to 2 mile radius zone. Well #14 is within the one half to 1 mile radius zone.

A hand dug well which has the dimensions of 30 feet in diameter by 200 feet deep was reported to be located in the NW/4 NE/4 NE/4 of Section 31-T16N-R9E. This municipal water supply well has the capability of producing but is currently shut down. An industrial well about 200 feet deep which supplies drinking water to the employees of the McAdams Pipeline Company was reported in the SE/4 SE/4 of Section 19-T16N-R9E. This well is not shown on any of the public information because apparently it was drilled in the 1950's prior to record keeping. Well #15 which was located in the SW/4 NE/4 SE/4 of Section 30-T16N-R9E, about one half mile southwest of the site, was supposedly plugged and abandoned because of diesel contamination following a train derailment. No other wells have been reported to be contaminated or abandoned because of contamination.

Three of Bristow's water supply wells are high capacity wells (#'s 20, 22, & 23), producing 200 gpm each. The other five wells (#'s 14, 16, 17, 18, 19) are small capacity wells which produce at rates from 50 gpm to 90 gpm. Not all of the wells are produced at once. Instead, two large capacity wells and one small capacity well are pumped together on a daily basis. The specific wells in this production scheme are changed periodically.

Records indicate there are two mobile home parks which have their own public water supply wells. Fogle Mobile Home Park is currently on city water and their well is reported to be inactive. It is unknown whether or not this well has been plugged and abandoned. The records show that a water supply well 120 feet deep serves 50 people of the Evergreen trailer park.

Apportionment of the population to the wells for Bristow's water supply system is based on the relative contribution of each well to the system, considering individual well capacities. The following reasons are given to support this type of apportionment: the wells are part of a blended system, they lie within two radius categories, and one well produces more than forty per cent of the daily water supply according to the production scheme cited above. Also, since annual production data is lacking, it is assumed that the large capacity wells operate for 120 days each and the small capacity wells operate for 73 days each. However, considering these durations and individual well capacities, no one well contributes more than forty per cent of the total capacity of all wells on an annual basis. The table below shows the apportionment for the total population of 4416 people (4300 from Bristow plus 116 from Slick).

POPULATION SERVED BY WELLS

WELLS ID	CAPACITY (DAILY)	EST.PROD. (ANNUAL)	POP. FRACTION	POP. SERVED
# 14	72,000	5,256,000	0.0374	165.16
# 16	72,000	5,256,000	0.0374	165.16
# 17	100,800	7,358,400	0.0524	231.40
# 18	129,600	9,460,800	0.0673	297.20
# 19	129,600	9,460,800	0.0673	297.20
# 20	288,000	34,560,000	0.2460	1086.34
# 22	288,000	34,560,000	0.2460	1086.34
# 23	288,000	34,560,000	0.2460	1086.34
Totals	1,368,000	140,472,000	0.9998	4415.14

The population served by well #14 is assigned to the 1/2 to 1 mile radius zone. Since the other wells are situated in the one to two mile zone, the remaining apportioned population is placed within this zone.

REFERENCES

A. Stegmann, S., DEQ, *Letter of Request for Public Water Supply information: Mike Harrell, Water Quality Division.* August 5, 1994. (Response attached).

B. Oklahoma Department of Environmental Quality. *Public Water Supply Reports.* 1988.

C. Oklahoma Department of Environmental Quality. *Public Water Supply Database Computer Printout.* June 26, 1992.

MEMORANDUM

August 5, 1994

To: Mike Harrell, Water Quality Division

From: Scott Stegmann, Site Assessment, Waste Management Division

Subject: Request for Public Water Supply information

The following request is for Public Water Supply information concerning the attached sites. The information provided by your division will be used in partial completion of Superfund preliminary assessments of these sites.

The following sections with the accompaning township and ranges is the area of study for this project. The following fields for each public water supply are needed from your division: pwsid #, system name, source, aquifer, location, activity, type, and population served.

Your assistance is greatly appreciated by me and our division. If you have any questions, please call me at 271-7049.

RECEIVED
AUG - 8 1994
WATER QUALITY
DIVISION

SITE NAME	Sections	Township	Range	County	
AT & SF Roundhouse	1, 10-15, 21-28, 33-36	10 N	3 E	Pottawatomie	
	5-10, 14-23, 26-35	10 N	4 E		
	1-4, 10-14	9 N	3 E		
	2-10, 16-18	9 N	4 E		
Ben Franklin Refining Company	9-17, 20-36	4 S	4 W	Jefferson	
	7, 8, 16-21, 28-33	4 S	3 W		
	1-6, 8-16, 22-24	5 S	4 W		
	4-9, 17, 18	5 S	3 W		
Chicago, Rock Island, & Pacific Roundhouse	35, 36	11 N	3 E	Pottawatomie	
	31-33	11 N	4 E		
	1-3, 9-16, 21-28, 33-36	10 N	3 E		
	3-10, 14-23, 26-34	10 N	4 E		
	1-3, 11, 12	9 N	3 E		
	3-8.	9 N	4 E		
Mercury Oil Refining Company	7, 17-21, 28-33	11 N	2 W	Oklahoma	
	9-17, 19-36	11 N	3 W		
	4-8, 17, 18	10 N	2 W		
	1-17, 21-24	10 N	3 W		
Rock Island Roundhouse - Haileyville	10-16, 20-29, 32-36	5 N	16 E	Pittsburg	NONE
	7, 17-21, 28-33	5 N	17 E		
	1-5, 8-17, 21-24	4 N	16 E		NONE
	4-9, 16-20	4 N	17 E		NONE
10th Street Sludge	10-16, 21-28, 33-36	12 N	3 W	Oklahoma	
	7-9, 15-22, 26-35	12 N	2 W		
	1-4, 9-15, 24	11 N	3 W		
	2-10, 16-19	11 N	2 W		
Tide Water Associated Oil Company	25, 26, 35, 36	18 N	6 E	Creek	
	19-22, 26-36	18 N	7 E		
	1-3, 10-15, 23-26, 36	17 N	6 E		
	1-24, 26-34	17 N	7 E		
United States Smelting	13, 23-26, 35, 36	12 N	16 E	McIntosh	NONE
	4, 7-36	12 N	17 E		NONE
	18, 19, 30, 31	12 N	18 E		
	1, 2, 12	11 N	16 E		
	1-18.	11 N	17 E		NONE
	6	11 N	18 E		
Victory Metals	13, 22-27, 33-36	12 N	12 E	Okmulgee	NONE
	17-22, 26-35	12 N	13 E		"
	1-4, 9-16, 22-26	11 N	12 E		"
	2-11, 14-22, 28-30	11 N	13 E		
Wilcox Oil Company	1-2, 10-15, 22-27, 34-36	16 N	8 E	Creek	
	3-11, 13-36	16 N	9 E		
	1-3, 11, 12	15 N	8 E		?
	2-10, 17, 18	15 N	9 E		NONE

RECEIVED
AUG - 8 1994
WATER QUALITY
DIVISION

PWSID	SYSTEM	SOURCEID	SOURCE	AQUIFER	DEPTH	LOCATION	ACTIVITY	TYPE	
2001955	CAMP BRISTOW	01	WELL 1	UNKNOWN		SW4NW4NW4S05T16NR09EIM	A	N	3-4
2001940	COUNTRY HILLS MHP #2 N	01	WELL 2	VAMOOSA	00220	SE4SW4SE4S07T16NR09EIM	A	T	2-3
2001941	MACK'S COUNTRY STORE	01	WELL 1	UNKNOWN		SW4NW4NW4S08T16NR09EIM	A	N	2-3
2001904	COUNTRY HILLS MHP #1 S	01	WELL 1	VAMOOSA	00220	NE4NE4NW4S18T16NR09EIM	A	T	2-3
2001964	FOOD DISTRIBUTORS	01	WELL 1	UNKNOWN		NE4NW4NE4S20T16NR09EIM	A	S	1-2
2001910	BRISTOW	09	WELL 14	VAMOOSA	00200	SE4NE4SW4S30T16NR09EIM	A	C	1/2-1
2001905	FOGLE MHP	01	WELL 1	VAMOOSA	00120	SE4NE4NW4S31T16NR09EIM	I	C	1-2
2001910	BRISTOW	07	WELL 3	VAMOOSA	00100	NW4SE4NE4S31T16NR09EIM	A	C	1-2
2001910	BRISTOW	01	WELL 16	VAMOOSA	00200	NE4NE4NE4S32T16NR09EIM	A	C	1-2

PWSID	SYSTEM	SOURCEID	SOURCE	AQUIFER	DEPTH	LOCATION	ACTIVITY	TYPE	
2001910	BRISTOW	05	WELL 22	ADA-VAMOOSA	00545	NW4SE4NE4S24T16NR08EIM	A	C	1-2
2001910	BRISTOW	06	WELL 23	ADA-VAMOOSA	00545	NE4NW4NE4S24T16NR08EIM	A	C	1-2
2001910	BRISTOW	11	WELL 21	ADA-VAMOOSA	00545	NW4NE4SE4S24T16NR08EIM	A	C	1-2
2001973	MID-AMERICA CAFE	01	WELL 1		00545	NE4NE4SE4S24T16NR08EIM	A	N	1-2
2001910	BRISTOW	02	WELL 18	VAMOOSA	00200	SW4SW4SW4S25T16NR08EIM	A	C	1-2
2001910	BRISTOW	03	WELL 19	VAMOOSA	00200	SW4SE4SE4S25T16NR08EIM	A	C	1-2
2001910	BRISTOW	04	WELL 20	ADA-VAMOOSA	00450	NW4NE4NE4S25T16NR08EIM	A	C	1-2
2001910	BRISTOW	10	WELL 17	VAMOOSA	00200	SE4SW4SE4S25T16NR08EIM	A	C	1-2
2001910	BRISTOW	08	WELL 7	VAMOOSA	00200	NE4SE4NE4S30T16NR08EIM	A	C	0-1/4
3001937	KUYKENDALL MHP	01	BRISTOW	UNKNOWN		NE4SW4NW4S31T16NR08EIM	A	N	OUT
2001906	EVERGREEN TP	01	WELL 1	VAMOOSA	00120	NW4SE4NW4S36T16NR08EIM	A	C	2-3
2001976	BRISTOW ELKS LODGE #1614	01				SE4SE4NE4S36T16NR08EIM	A	N	1-2

PUBLIC WATER SUPPLY REPORT

FACILITY: BRISTOW
OPERATOR: BRISTOW
ADDRESS : 110 WEST 7TH STREET
BRISTOW OK 74010
PHONE : 918 3672454
SYSTEMS SERVED:
3001921 SLICK

MSIS-NUMBER : 2001910
COUNTY : CREEK
POPULATION SERVED: 5000

SOURCE OF WATER:	LEGAL DESCRIPTION	DEPTH
WELL 16	NE4SW4SW4S32T16NR08EIM	00200
WELL 18	SW4SW4SW4S25T16NR08EIM	00200
WELL 19	SW4SE4SE4S25T16NR08EIM	00200

STORAGE CAPACITY : 1500000 GALLONS
AVERAGE PRODUCTION: 400000 GALLONS/DAY
PRODUCTION CAPACITY: 1152000 GALLONS/DAY
TREATMENT:
DISINFECTION - CHLORINE GAS

PARAMETERS	UNITS	1986	1983
HARDNESS,CALCIUM	MG/L	98.2	
CHLORIDE	MG/L	20	58
FLUORIDE TOTAL	MG/L	0.14	0.56
NITRITE-NITRATE AS N	MG/L	< 0.5	1.0
PH (LAB)	STD UNIT	7.30	7.05
SULFATE	MG/L	< 20	< 20
SOLIDS,TOTAL DISS	MG/L	292	256
ALKALINITY,TOTAL	MG/L	248.0	141
HARDNESS,TOTAL	MG/L	286	124
TURBIDITY	NTU	< 1.00	3
WATER TEMPERATURE	DEG CELS	19.0	
ARSENIC-TOTAL	UG/L	< 10	< 10
BARIUM TOTAL	UG/L	310	< 200
CADMIUM-TOTAL	UG/L	< 2	< 2
CHROMIUM-TOTAL	UG/L	< 10	< 10
COPPER-TOTAL	UG/L	22	27
IRON-TOTAL	UG/L	< 100	1580
LEAD-TOTAL	UG/L	< 20	< 20
MANGANESE-TOTAL	UG/L	< 20	< 20.0
MERCURY-TOTAL	UG/L	< 0.5	< 0.5
SELENIUM-TOTAL	UG/L	< 5	< 5
SILVER-TOTAL	UG/L	< 3	< 3.0
SODIUM-TOTAL	MG/L	30	56.00
ZINC-TOTAL	UG/L	29	72
CORROSIVITY	(CALC)	- 0.33	

000519

PUBLIC WATER SUPPLY REPORT

FACILITY: FOGLE MHP
OPERATOR: FOGLE MHP
ADDRESS : PO BOX 630
BRISTOW OK 74010
PHONE : 918 3673427

MSIS-NUMBER : 2001905
COUNTY : CREEK
POPULATION SERVED: 50

SOURCE OF WATER: WELL 1
LEGAL DESCRIPTION: SE4NE4NE4S31T16NR09EIM
DEPTH: 00120

STORAGE CAPACITY : GALLONS
AVERAGE PRODUCTION: GALLONS/DAY
PRODUCTION CAPACITY: GALLONS/DAY

PARAMETERS	UNITS	1986	1983		
HARDNESS,CALCIUM	MG/L	172.5			
CHLORIDE	MG/L	15	14		
FLUORIDE TOTAL	MG/L	< 0.10	0.56		
NITRITE-NITRATE AS N	MG/L	4.1	5.8		
PH (LAB)	STD UNIT	7.20	6.43		
SULFATE	MG/L	43	48		
SOLIDS,TOTAL DISS	MG/L	410	387		
ALKALINITY,TOTAL	MG/L	279.0	262		
HARDNESS,TOTAL	MG/L	299	283		
TURBIDITY	NTU	< 1.00	< 1		
WATER TEMPERATURE	DEG CELS	16.5			
ARSENIC-TOTAL	UG/L	< 10	< 10		
BARIUM TOTAL	UG/L	350	< 200		
CADMIUM-TOTAL	UG/L	< 2	< 2		
CHROMIUM-TOTAL	UG/L	< 10	< 10		
COPPER-TOTAL	UG/L	10	39		
IRON-TOTAL	UG/L	< 100	< 100		
LEAD-TOTAL	UG/L	< 20	< 20		
MANGANESE-TOTAL	UG/L	< 20	< 20.0		
MERCURY-TOTAL	UG/L	< 0.5	< 0.5		
SELENIUM-TOTAL	UG/L	< 5	< 5		
SILVER-TOTAL	UG/L	< 3	< 3.0		
SODIUM-TOTAL	MG/L	36	37.00		
ZINC-TOTAL	UG/L	79	180		
CORROSIVITY	(CALC)	- 0.08			

000520

PUBLIC WATER SUPPLY REPORT

FACILITY: EVERGREEN TP
OPERATOR: EVERGREEN TP
ADDRESS : RT 1 BOX 77
BRISTOW OK 74010
PHONE : 918 3672692

MSIS-NUMBER : 2001906
COUNTY : CREEK
POPULATION SERVED: 50

SOURCE OF WATER:	LEGAL DESCRIPTION	DEPTH
WELL 1	NW4SE4SE4S36T16NR08EIM	00120

STORAGE CAPACITY : 4900 GALLONS
AVERAGE PRODUCTION: GALLONS/DAY
PRODUCTION CAPACITY: GALLONS/DAY

PARAMETERS	UNITS	1986	1983
HARDNESS,CALCIUM	MG/L	98.2	
CHLORIDE	MG/L	21	28
FLUORIDE TOTAL	MG/L	0.13	0.60
NITRITE-NITRATE AS N	MG/L	1.2	1.7
PH (LAB)	STD UNIT	6.80	7.05
SULFATE	MG/L	< 20	< 20
SOLIDS,TOTAL DISS	MG/L	226	239
ALKALINITY,TOTAL	MG/L	169.0	164
HARDNESS,TOTAL	MG/L	191	173
TURBIDITY	NTU	< 1.00	< 1
WATER TEMPERATURE	DEG CELS	16.5	
ARSENIC-TOTAL	UG/L	< 10	< 10
BARIUM TOTAL	UG/L	300	242
CADMIUM-TOTAL	UG/L	< 2	< 2
CHROMIUM-TOTAL	UG/L	10	< 10
COPPER-TOTAL	UG/L	4	4
IRON-TOTAL	UG/L	< 100	< 100
LEAD-TOTAL	UG/L	< 20	< 20
MANGANESE-TOTAL	UG/L	< 20	< 20.0
MERCURY-TOTAL	UG/L	< 0.5	< 0.5
SELENIUM-TOTAL	UG/L	< 5	< 5
SILVER-TOTAL	UG/L	< 3	< 3.0
SODIUM-TOTAL	MG/L	17	18.00
ZINC-TOTAL	UG/L	34	63
CORROSIVITY	(CALC)	- 0.93	

000521

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2001907045                    0190203          91836724540K
2001907050     X
2001907055              19        0         0      40000      40000          0      40000
2001910001 C0574000050001              SA000000    NBRISTOW
2001910005 01WELL 16 ⌐          G      PVAM003549550962430          000000000000G      01
2001910005 01VAMOOSA            0005800200                                              02
2001910005 01                                                NE4NE4NE4S32T16NR09EIM03
2001910005 02WELL 18 ⌐          G      OVAM003549550962430          000000000000G      01
2001910005 02VAMOOSA            0005800200                                              02
2001910005 02                                                SW4SW4SW4S25T16NR08EIM03
2001910005 03WELL 19 ⌐          G      PVAM003549550962430          000000000000G      01
2001910005 03VAMOOSA            0005800200                                              02
2001910005 03                                                SW4SE4SE4S25T16NR08EIM03
2001910005 04WELL 20 ⌐          G      PADA-03549550962430          000000000000G      01
2001910005 04ADA-VAMOOSA        0004200450                                              02
2001910005 04                                                NW4NE4NE4S25T16NR08EIM03
2001910005 05WELL 22 ⌐          G      PADA-03549550962430          000000000000G      01
2001910005 05ADA-VAMOOSA        0004200545                                              02
2001910005 05                                                NW4SE4NE4S24T16NR08EIM03
2001910005 06WELL 23 ⌐          G      PADA-03549550962430          000000000000G      01
2001910005 06ADA-VAMOOSA        0004200545                                              02
2001910005 06                                                NE4NW4NE4S24T16NR08EIM03
2001910005 07WELL 3 plugged     G      OVAM003549550962430          000000000000G      01
2001910005 07VAMOOSA            0005800100                                              02
2001910005 07                                                NW4SE4NE4S31T16NR09EIM03
2001910005 08WELL 7 capped ⌐    G      RVAM003549550962430          000000000000G      01
2001910005 08VAMOOSA cleaned out 0005800200                                          9? 02
2001910005 08                                                NE4SE4NE4S30T16NR08EIM03
2001910005 09WELL 14 ⌐          G      OVAM003549550962430          000000000000G      01
2001910005 09VAMOOSA            0005800200                                              02
2001910005 09                                                SE4NE4SW4S30T16NR09EIM03
2001910005 10WELL 17 ⌐          G      OVAM003549550962430          000000000000G      01
2001910005 10VAMOOSA            0005800200                                              02
2001910005 10                                                SE4SW4SE4S25T16NR08EIM03
2001910005 11WELL 21 ⌐          G      RADA-03549550962430          000000000000G      01
2001910005 11ADA-VAMOOSA        0004200545                                              02
2001910005 11                                                NW4NE4SE4S24T16NR08EIM03
2001910025 BRISTOW
2001910030 100 W 7TH ST                          BRISTOW                OK74010     M
2001910035 BRISTOW                               % WATER DEPARTMENT
2001910040 110 WEST 7TH STREET                   BRISTOW                OK74010
2001910045                    0190203          91836724540K
2001910050     X
2001910055              1980   1845     400000     500000    1152000          0    1500000
2001911001 C0574000002501              SA000000      NSHAMROCK
2001911005 01WELL 1             G      PVAM003554500963515          100000000001       01
2001911005 01VAMOOSA            0005800485                                              02
2001911005 01ADDRESS CHANGED 27MAR90 FAB                     NE4SE4NE4S32T17NR07EIM03
2001911005 02WELL 2             G      RVAM003554500963515          100000000001       01
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2001903035 DEPEW
2001903040 PO BOX 357                          DEPEW                OK74028
2001903045                  0190203            9183245251OK
2001903050     X
2001903055              140     250      75000     432000          0          0      50000
2001904001 NC6770000000121             SA000000       NCOUNTRY HILLS MHP #1 S
2001904005 01WELL 1            G       PVAMO                                 Y      01
2001904005 01VAMOOSA           0005800220                                           02
2001904005 01                                                  NE4NE4NW4S18T16NR09EIM03
2001904025 COUNTRY HILLS MHP #1 SOUTH
2001904030 RT 3 BOX 63                         BRISTOW              OK74010     I
2001904035 COUNTRY HILLS MHP #1 SOUTH
2001904040 RT 3 BOX 63                         BRISTOW              OK74010
2001904045                  0190203            9183679234OK
2001904050         X
2001904055                9       0          0          0          0          0          0
2001905001 C0677000000501              SA000000       NFOGLE MHP
2001905005 01WELL 1            G       PVAMO03605000962450       100000000000       01
2001905005 01VAMOOSA           0005800120                                           02
2001905005 01                                                  SE4NE4NW4S31T16NR09EIM03
2001905025 FOGLE MHP
2001905030 PO BOX 630                          BRISTOW              OK74010     I
2001905035 FOGLE MHP                           % RAY FOGLE
2001905040 PO BOX 630                          BRISTOW              OK74010
2001905045                  0190203            9183673427OK
2001905050           X
2001905055               14       0          0          0          0          0          0
2001906001 C0677000000501              SA000000       NEVERGREEN TP
2001906005 01WELL 1            G       PVAMO03554150962700       100000000000       01
2001906005 01VAMOOSA           0005800120                                           02
2001906005 01                                                  NW4SE4NW4S36T16NR08EIM03
2001906025 EVERGREEN TP
2001906030 RT 1 BOX 77                         BRISTOW              OK74010     I
2001906035 EVERGREEN TP                        % RONALD BOYD
2001906040 RT 1 BOX 77                         BRISTOW              OK74010
2001906045                  0190203            9183672692OK
2001906050         X
2001906055              21       0          0          0          0          0       4900
2001907001 C0677000000501              SA000000       NCREEK COUNTY RWD #10
2001907005 01BIG WELL          G       PVAMO03605000963010       100000000000       01
2001907005 01VAMOOSA           00058                                                02
2001907005 01                                                  NE4SW4NE4S08T18NR09EIM03
2001907005 02LITTLE WELL       G       PVAMO03605000963010       100000000000       01
2001907005 02VAMOOSA           00058                                                02
2001907005 02                                                  SE4SE4NW4S08T18NR09EIM03
2001907025 CREEK COUNTY RWD #10
2001907030 RT 2, BOX 942                       MANNFORD             OK74044     I
2001907035 CREEK COUNTY RWD #10                JOSEPHINE PATKOFF
2001907040 RT 2 BOX 964                        MANNFORD,            OK74044
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2001971045                    019                                OK
2001971050              X
2001971055                    2        0        0        0        0        0        0
2001972001 N029100000000251           SA                MIDAMERICA CAFE
2001972005 01WELL 1                                                                  01
2001972005 01                                                                        02
2001972005 01                                                          S  T  R       M03
2001972025 MIDAMERICA  CAFE
2001972030 PO BOX 900                          BRISTOW,                OK74010    I
2001972035 MIDAMERICA CAFE
2001972040 PO BOX 900                          BRISTOW                 OK74010
2001972045                    019                      91836723000K
2001972050              X
2001972055                    1        0        0        0        0        0        0
2001973001 N039100000000251           SA                MID-AMERICA CAFE
2001973005 01WELL 1        G                                                         01
2001973005 01                        00545                                          02
2001973005 01                                                  NE4NE4SE4S24T16NR08EIM03
2001973025 MID-AMERICA CAFE
2001973030 BOX 900                             BRISTOW                 OK74010    I
2001973035 MID-AMERICA CAFE
2001973040 BOX 900                             BRISTOW                 OK74010
2001973045                    019                      91836723000K
2001973050              X
2001973055                    5        0        0        0        0        0        0
2002001001 C061200000014751           SA000000          NTHOMAS PWA
2002001005 01WELL 1              G        PRUSH03544000984350        100000000000G     01
2002001005 01RUSH SPRINGS SS0000200220                                               02
2002001005 01                                                  NW4NW4NE4S32T15NR14WIM03
2002001005 02WELL 2              G        PRUSH03544000984350        100000000000G     01
2002001005 02RUSH SPRINGS SS0000200220                                               02
2002001005 02                                                  NW4NW4SE4S32T15NR14WIM03
2002001005 03WELL 3              G        PRUSH03544000984350        100000000000G     01
2002001005 03RUSH SPRINGS SS0000200220                                               02
2002001005 03                                                  NW4NW4SE4S32T15NR14WIM03
2002001005 04WELL 4              G        PRUSH03544000984350        100000000000G     01
2002001005 04RUSH SPRINGS SS0000200185                                               02
2002001005 04                                                  NW4SE4SE4S32T15NR14WIM03
2002001005 05WELL #5             G        PRUSH                                      01
2002001005 05RUSH SPRINGS SS00002                                                    02
2002001005 05                                                  NW4SE4SE4S32T15NR14W M03
2002001025 THOMAS
2002001030 BOX 250                             THOMAS                  OK73669    I
2002001035 THOMAS PWA
2002001040 BOX 250                             THOMAS                  OK73669
2002001045                    0200405                  40566125020K
2002001050     X
2002001055                525      525     110000     160000     400000          0     355000
2002002001 C067700000095001           SA000000          NWEATHERFORD PWA
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Reference 14

Table 1. Selected Population and Housing Characteristics: 1990
Creek County, Oklahoma

The population counts set forth herein are subject to possible correction for undercount or overcount. The United States Department of Commerce is considering whether to correct these counts and will publish corrected counts, if any, not later than July 1, 1991.

Total population	60,915
SEX	
Male	29,609
Female	31,306
AGE	
Under 5 years	4,432
5 to 17 years	12,661
18 to 20 years	2,512
21 to 24 years	2,714
25 to 44 years	18,028
45 to 54 years	7,087
55 to 59 years	2,881
60 to 64 years	2,682
65 to 74 years	4,416
75 to 84 years	2,662
85 years and over	840
Median age	34.2
Under 18 years	17,093
Percent of total population	28.1
65 years and over	7,918
Percent of total population	13.0
HOUSEHOLDS BY TYPE	
Total households	22,470
Family households (families)	17,336
Married-couple families	14,544
Percent of total households	64.7
Other family, male householder	676
Other family, female householder	2,116
Nonfamily households	5,134
Percent of total households	22.8
Householder living alone	4,662
Householder 65 years and over	2,411
Persons living in households	60,273
Persons per household	2.68
GROUP QUARTERS	
Persons living in group quarters	642
Institutionalized persons	611
Other persons in group quarters	31
RACE AND HISPANIC ORIGIN	
White	53,522
Black	1,918
Percent of total population	3.1
American Indian, Eskimo, or Aleut	5,128
Percent of total population	8.4
Asian or Pacific Islander	142
Percent of total population	0.2
Other race	205
Hispanic origin (of any race)	660
Percent of total population	1.1

Total housing units	25,143
OCCUPANCY AND TENURE	
Occupied housing units	22,470
Owner occupied	17,440
Percent owner occupied	77.6
Renter occupied	5,030
Vacant housing units	2,673
For seasonal, recreational, or occasional use	161
Homeowner vacancy rate (percent)	3.2
Rental vacancy rate (percent)	12.8
Persons per owner-occupied unit	2.69
Persons per renter-occupied unit	2.65
Units with over 1 person per room	802
UNITS IN STRUCTURE	
1-unit, detached	18,214
1-unit, attached	267
2 to 4 units	665
5 to 9 units	468
10 or more units	406
Mobile home, trailer, other	5,123
VALUE	
Specified owner-occupied units	11,076
Less than $50,000	6,402
$50,000 to $99,999	3,921
$100,000 to $149,999	558
$150,000 to $199,999	141
$200,000 to $299,999	40
$300,000 or more	14
Median (dollars)	44,500
CONTRACT RENT	
Specified renter-occupied units paying cash rent	4,181
Less than $250	2,576
$250 to $499	1,529
$500 to $749	69
$750 to $999	6
$1,000 or more	1
Median (dollars)	223
RACE AND HISPANIC ORIGIN OF HOUSEHOLDER	
Occupied housing units	22,470
White	20,124
Black	725
Percent of occupied units	3.2
American Indian, Eskimo, or Aleut	1,520
Percent of occupied units	6.8
Asian or Pacific Islander	34
Percent of occupied units	0.2
Other race	67
Hispanic origin (of any race)	187
Percent of occupied units	0.8

The user should note that there are limitations to many of these data. Please refer to the technical documentation provided with Summary Tape File 1A for a further explanation on the limitations of the data.

Reference 15

MARK S. COLEMAN
Executive Director

DAVID WALTERS
Governor

State of Oklahoma

DEPARTMENT OF ENVIRONMENTAL QUALITY

August 5, 1994

site
Wilcox oil company
NO INTAKES

Gene Dousett
Stream Water Division
Oklahoma Water Resources Board
6000 North Harvey
P.O. Box 150
Oklahoma City, Oklahoma 73101

Dear Mr. Dousett:

The purpose of this letter is to request any information regarding surface water intakes that may be located within 15 miles downstream from the point of entry (PPE) into perennial waters. Enclosed is the list of sites and the legal location of the **PPE** and **15-mile end.** The information provided by your office will be used to partly describe surface water targets in preliminary site assessments conducted by the DEQ (Superfund), as authorized through a cooperative agreement with the U.S. Environmental Protection Agency.

Your assistance is greatly appreciated by me and our division. If you have any questions, please call me at 271-7049.

Sincerely,

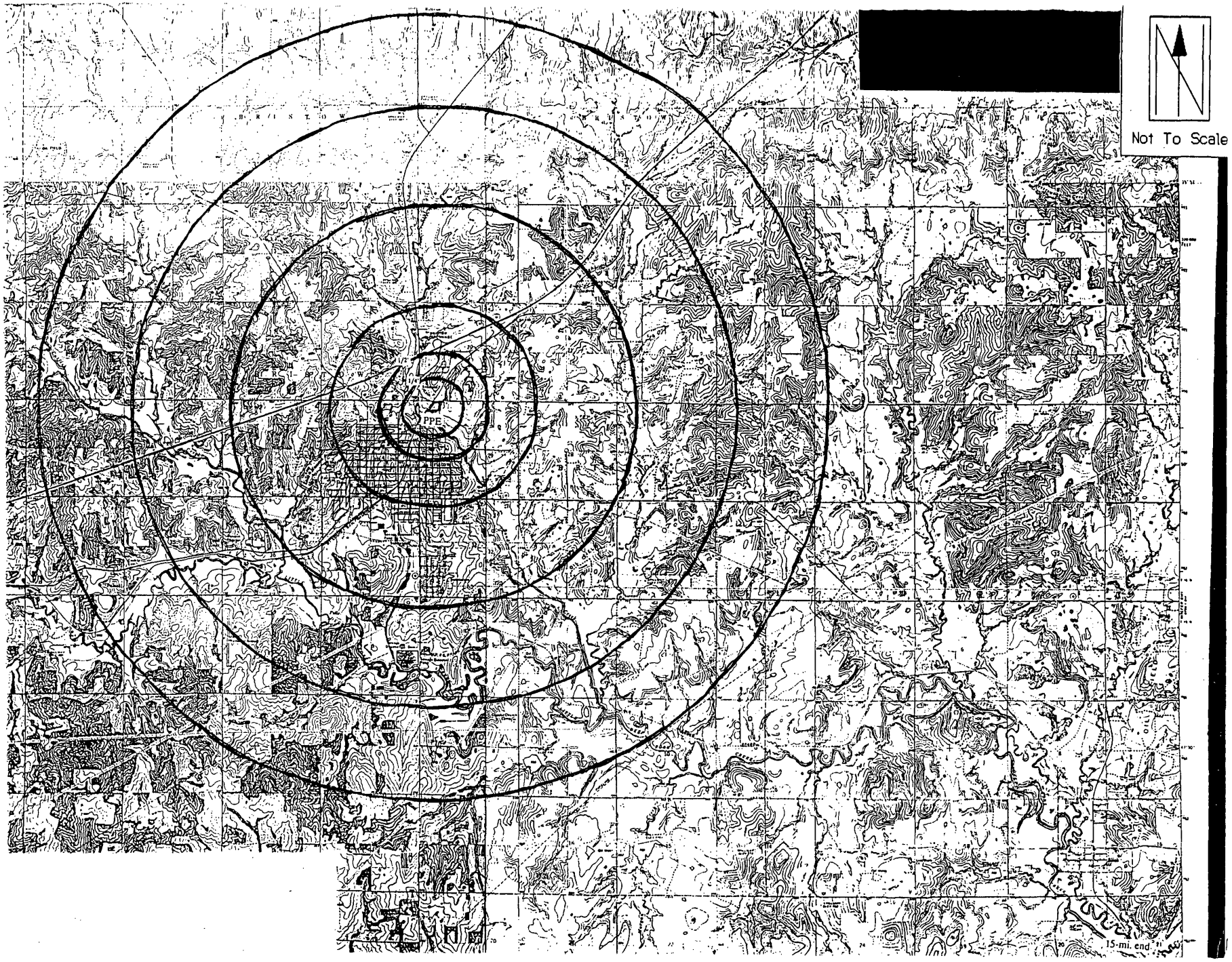
Scott Stegmann

Scott Stegmann
Site Assessment Unit
Waste Management Division

Attachment

000528

Reference 16


[redacted]
Not To Scale
PPE
15-mi. end

Reference 17

STATISTICAL SUMMARIES OF STREAMFLOW RECORDS IN OKLAHOMA AND PARTS OF ARKANSAS, MISSOURI, AND TEXAS THROUGH 1984

RECEIVED
SEP 26 1988
Waste Management Section

By David C. Heimann and Robert L. Tortorelli

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations Report 87-4205

Prepared in cooperation with the
OKLAHOMA WATER RESOURCES BOARD

Oklahoma City, Oklahoma
1988

000532

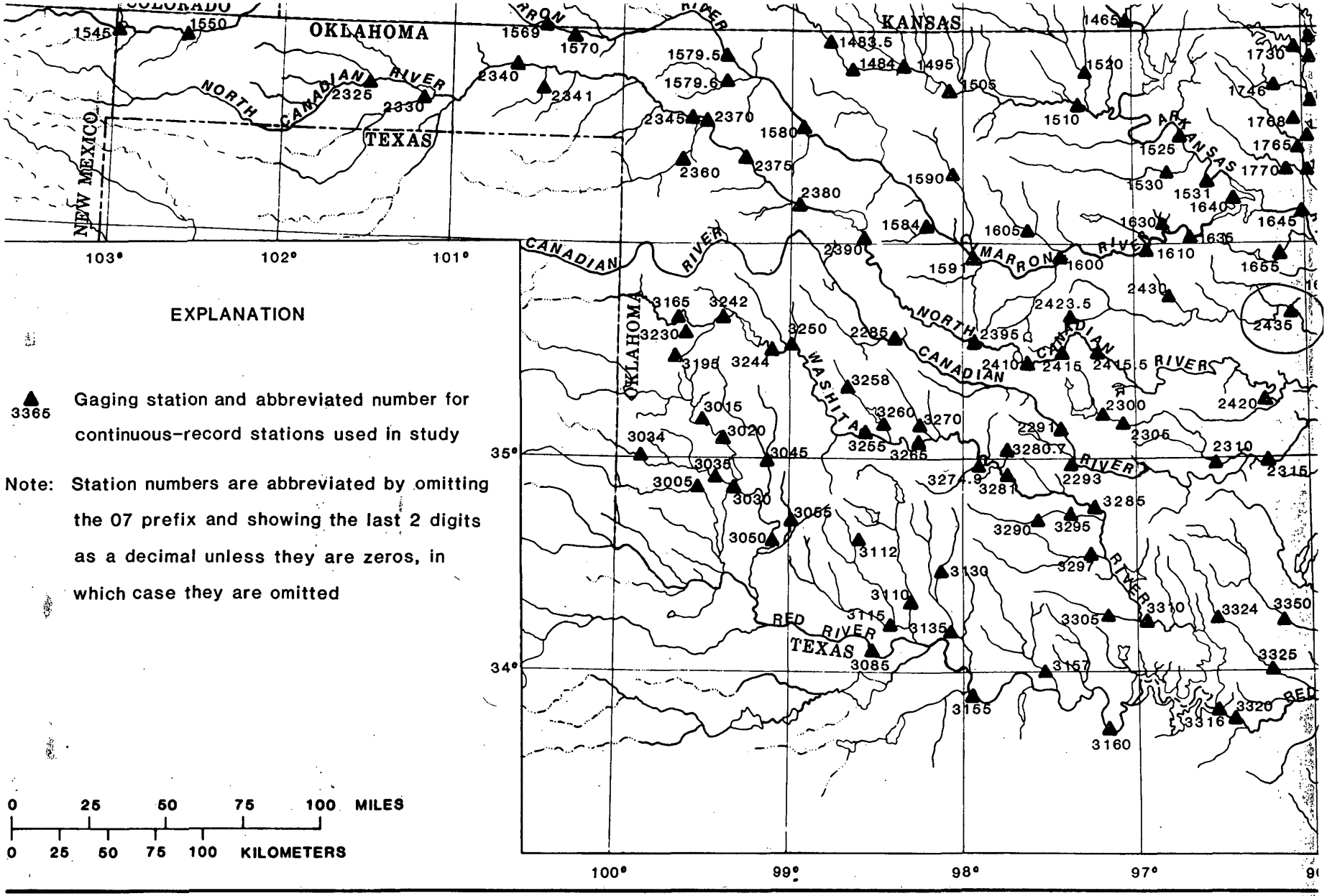


Figure 1.--Location of streamflow gaging stations.

000533

07243500 DEEP FORK NEAR BEGGS, OK

LOCATION.--Lat 35°40'31", long 96°03'55", NW 1/4 SW 1/4 sec.20, T.14 N., R.12 E., Okmulgee County, Hydrologic Unit 11100303, on right bank 1,000 ft downstream from county road bridge, 2.8 mi upstream from Adams Creek, 4.0 mi south of Beggs, 8.2 mi downstream from Flat Rock (Checkerboard) Creek, and at mile 84.8.

DRAINAGE AREA.--2,018 mi^2.

PERIOD OF RECORD.--September 1938 to current year.

REMARKS.--Flow regulated since 1968 by numberous floodwater-retarding structures.

STREAMFLOW UNREGULATED

MONTHLY AND ANNUAL MEAN DISCHARGES 1939-67

MONTH	MAXIMUM (CFS)	MINIMUM (CFS)	MEAN (CFS)	STANDARD DEVIATION (CFS)	COEFFICIENT OF VARIATION	PERCENT OF ANNUAL RUNOFF
OCTOBER	5460	0.00	613	1390	2.3	6.3
NOVEMBER	5980	0.00	477	1140	2.4	4.9
DECEMBER	1220	0.51	252	343	1.4	2.6
JANUARY	1190	7.7	206	286	1.4	2.1
FEBRUARY	1850	20	309	411	1.3	3.2
MARCH	4490	9.6	584	890	1.5	6.0
APRIL	9520	37	1570	2160	1.4	16.3
MAY	12500	178	2350	2850	1.2	24.4
JUNE	8900	59	1820	2340	1.3	18.9
JULY	3950	5.7	830	975	1.2	8.6
AUGUST	1770	3.3	276	393	1.4	2.9
SEPTEMBER	1300	0.00	364	423	1.2	3.8
ANNUAL	2450	114	806	602	0.75	100

MAGNITUDE AND PROBABILITY OF ANNUAL LOW FLOW
BASED ON PERIOD OF RECORD 1940-67

PERIOD (CONSECUTIVE DAYS)	DISCHARGE, IN CFS, FOR INDICATED RECURRENCE INTERVAL, IN YEARS, AND NON-EXCEEDANCE PROBABILITY, IN PERCENT			
	2 50%	5 20%	10 10%	20 5%
1	7.9	1.2	0.00	0.00
3	8.8	1.4	0.00	0.00
7	10	1.6	0.00	0.00
14	14	2.0	0.30	0.00
30	22	4.3	1.0	0.00
60	44	11	3.0	0.00
90	72	15	4.8	0.96
120	107	19	5.4	1.6
183	142	34	14	6.3

MAGNITUDE AND PROBABILITY OF INSTANTANEOUS PEAK FLOW
BASED ON 29 YEARS OF RECORD

DISCHARGE, IN CFS, FOR INDICATED RECURRENCE INTERVAL IN YEARS, AND EXCEEDANCE PROBABILITY, IN PERCENT					
2 50%	5 20%	10 10%	25 4%	50 2%	100 1%
9440	22600	36900	63700	91900	129000

OKLAHOMA WEIGHTED SKEW = 0.335

MAGNITUDE AND PROBABILITY OF ANNUAL HIGH FLOW
BASED ON PERIOD OF RECORD 1939-67

PERIOD (CONSECUTIVE DAYS)	DISCHARGE, IN CFS, FOR INDICATED RECURRENCE INTERVAL, IN YEARS, AND EXCEEDANCE PROBABILITY, IN PERCENT					
	2 50%	5 20%	10 10%	25 4%	50 2%	100 1%
1	9070	21400	34100	57000	80200	110000
3	8330	18800	29200	47200	64800	86600
7	6970	15100	22700	35400	47300	61400
15	4730	9850	14500	22000	28900	36900
30	2990	6370	9480	14500	19100	24500
60	2010	4200	6150	9190	11900	15000
90	1640	3340	4740	6780	8460	10300

DURATION TABLE OF DAILY MEAN FLOW FOR PERIOD OF RECORD 1939-67

DISCHARGE, IN CFS, WHICH WAS EQUALED OR EXCEEDED FOR INDICATED PERCENT OF TIME																
1%	5%	10%	15%	20%	30%	40%	50%	60%	70%	80%	90%	95%	98%	99%	99.5%	99.9%
11900	3790	2180	1260	702	333	194	124	81	51	28	13	5.1	0.20	0.05	0.03	0.00

000534

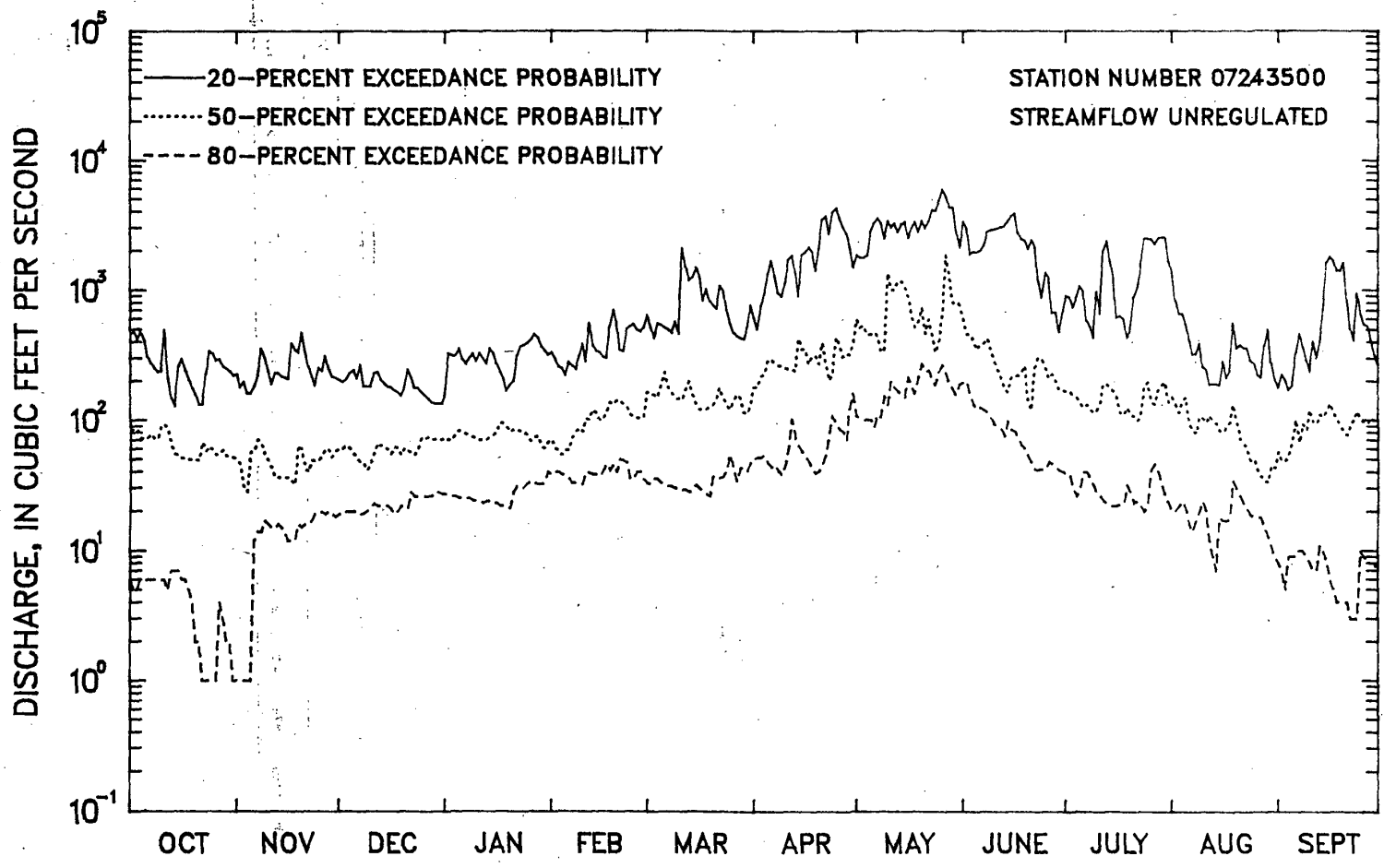
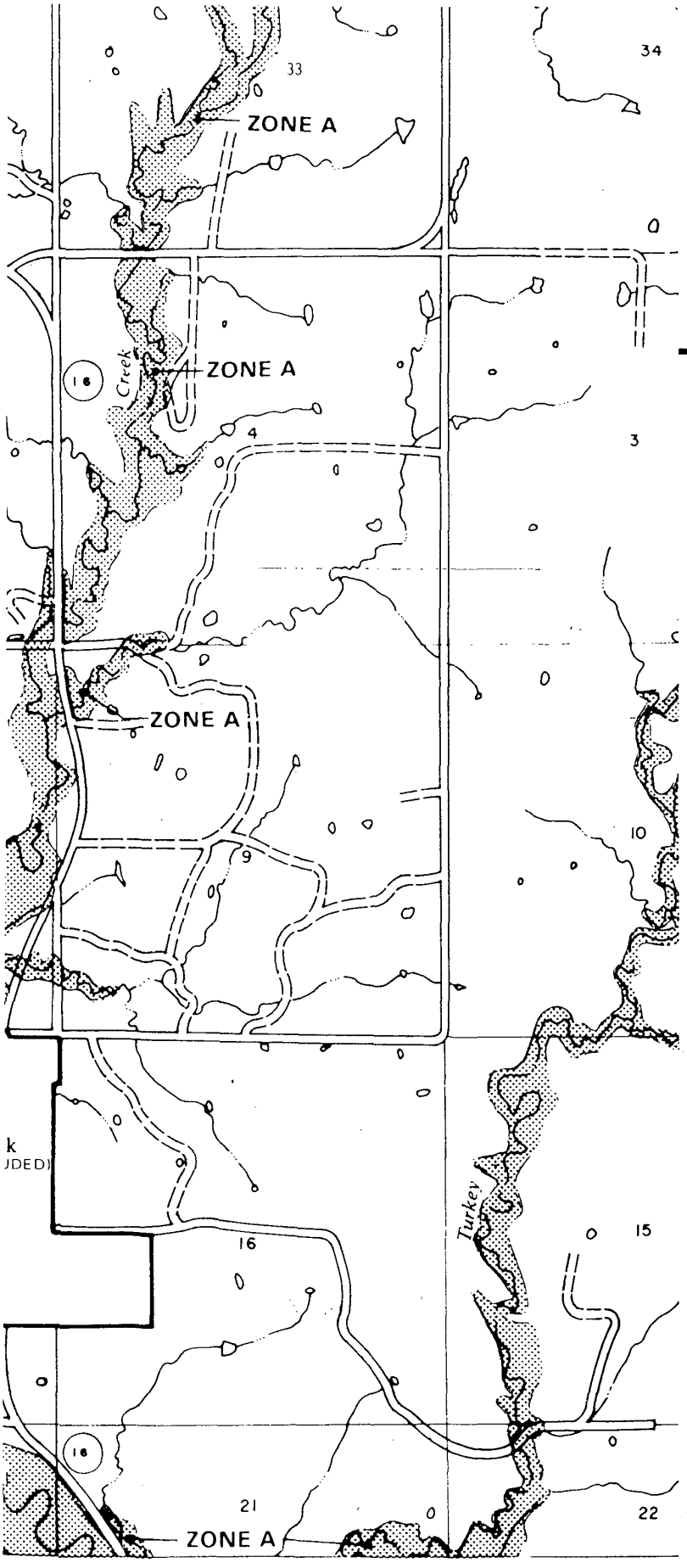


Figure 103.--Duration hydrographs of daily discharge values for Deep Fork near Beggs, Oklahoma, water years 1949–1967 (streamflow unregulated).

000535

Reference 18



N

APPROXIMATE SCALE

2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CREEK COUNTY, OKLAHOMA

UNINCORPORATED AREA

PANEL 7 OF 10

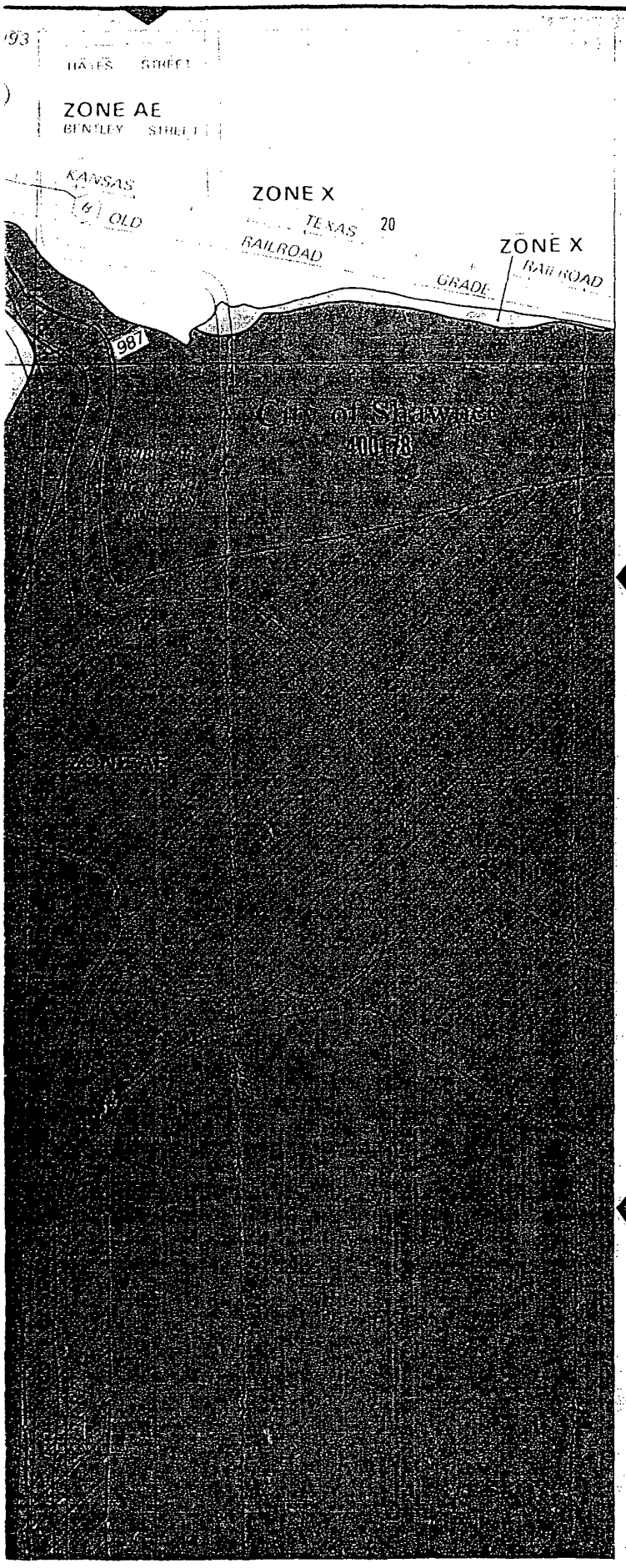
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
400490 0007 B

EFFECTIVE DATE:
JUNE 1, 1987

federal emergency management agency
federal insurance administration

000537



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100 YEAR FLOOD

- ZONE A — No base flood elevations determined.
- ZONE AE — Base flood elevations determined.
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE A99 — To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.
- ZONE V — Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- ZONE VE — Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- ZONE X — Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- ZONE X — Areas determined to be outside 500-year floodplain.
- ZONE D — Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
- 513 — Base Flood Elevation Line; Elevation in Feet*
- D — D — Cross Section Line
- (EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone*
- RM7X — Elevation Reference Mark
- •M1.5 — River Mile

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

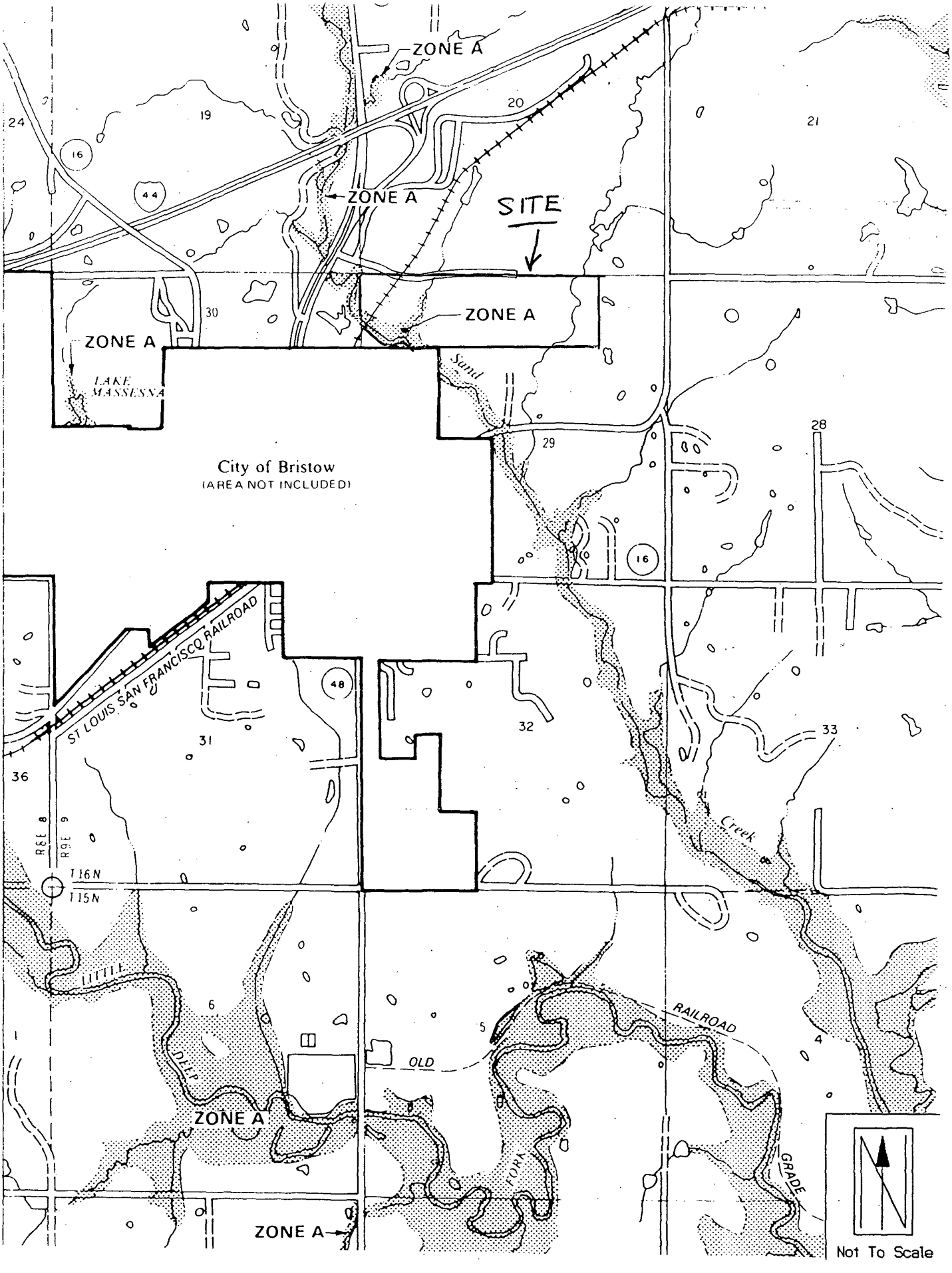
Coastal base flood elevations apply only landward of 0.0 NGVD, and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.


ZONE A
ZONE A
SITE
ZONE A
ZONE A
LAKE MASSENA
City of Bristow
(AREA NOT INCLUDED)
ST LOUIS SAN FRANCISCO RAILROAD
ZONE A
ZONE A
RAILROAD
GRADE
Not To Scale

000539

Reference 19

OKLAHOMA WATER RESOURCES BOARD

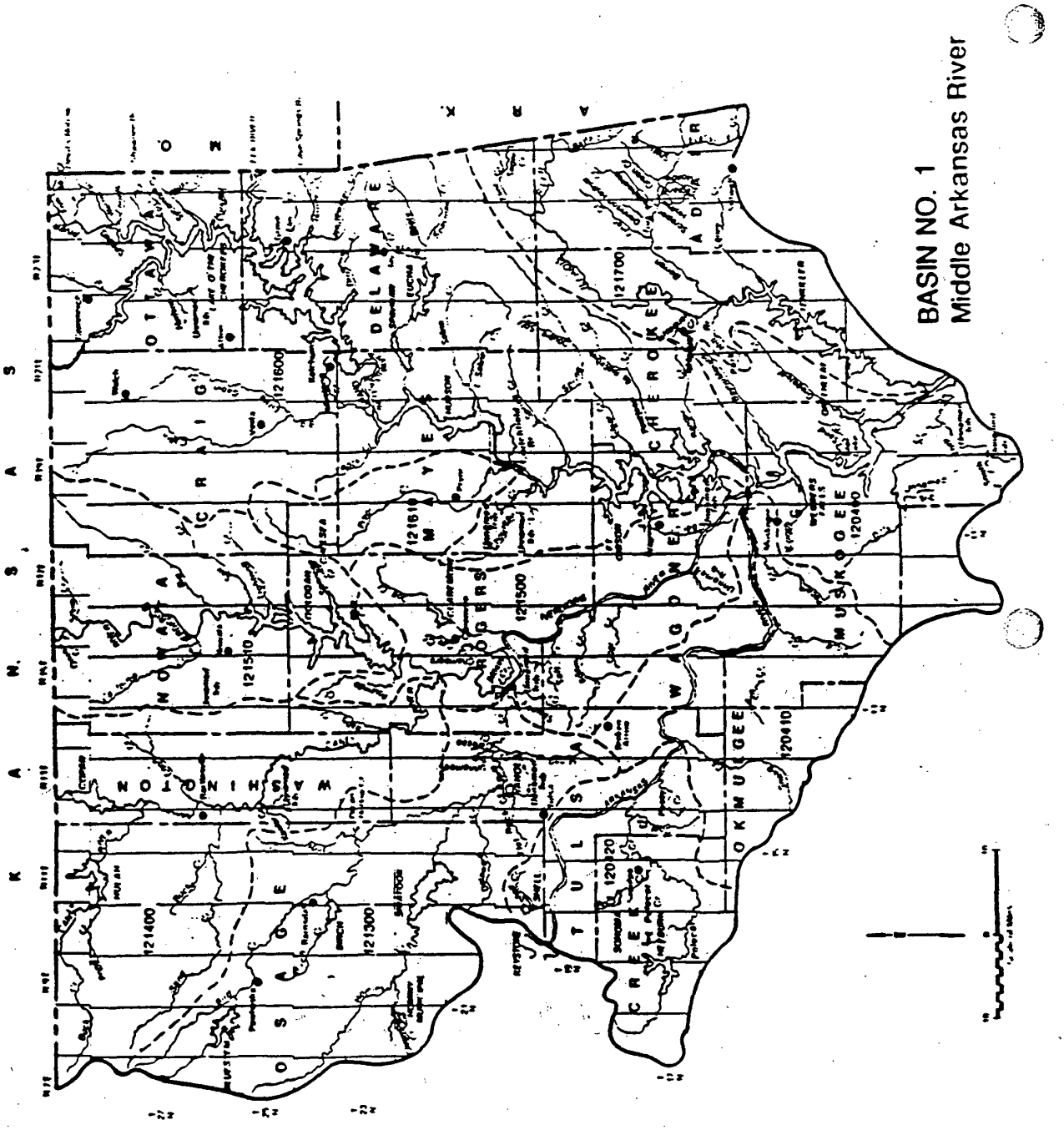
WATER QUALITY STANDARDS

Oklahoma Administrative Code (OAC) Title 785

AS AMENDED THROUGH JUNE 13, 1994

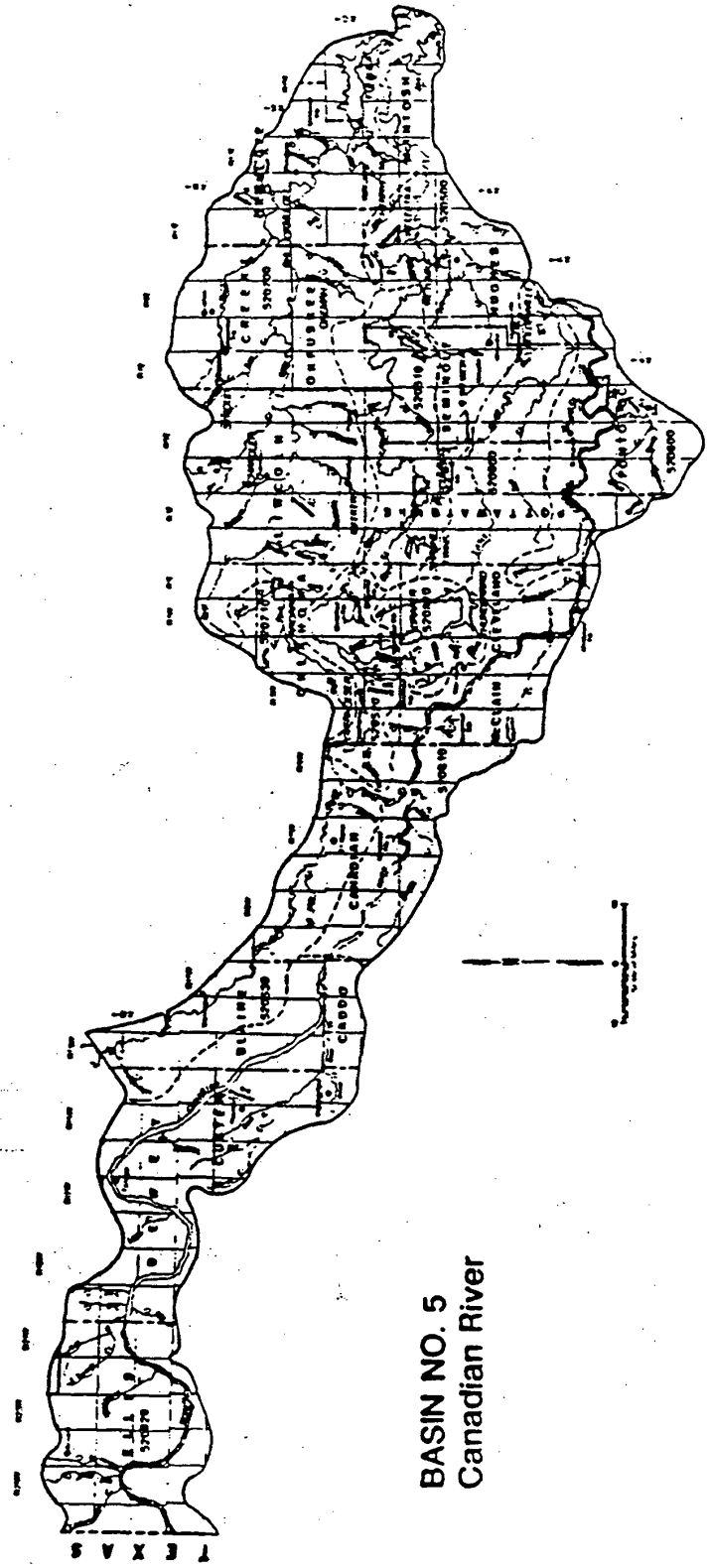
Note:

Chapter 40 - Pollution Remedies was revoked by the Oklahoma Water Resources Board. The revocation was approved by the Governor and Oklahoma Legislature, however, the Code documents were not accepted by the Office of Administrative Rules. Therefore, the revocation procedures are not final. Subject matter from Chapter 40 was transferred to the Department of Environmental Quality by state law effective July 1, 1993.


BASIN NO. 1
Middle Arkansas River

Basin 1 Page 2

Waterbody Name and Sequence	WQM Segment	Water Supply	F&W Prop.	Ag.	H.P.	M&I	Rec.	Nav.	Aes.	Limit-ations	Remarks
Barren Fork from Hwy. 59 to Arkansas State Line	121700	PPWS	CWAC	1			PBCR		●	ORW	
Evansville Creek.	121700	PPWS	CWAC	●			PBCR		●	ORW	
Upper Illinois River upstream of Barren Fork confluence	121700	PPWS	CWAC	1			PBCR		●	ORW	Scenic River
Tahlequah Creek	121700	PPWS	CWAC	●			PBCR		●	ORW	
Flint Creek	121700	PPWS	CWAC	●			PBCR		●	ORW	Scenic River
Sager Creek	121700	PPWS	CWAC	1			PBCR		●	ORW	
Ballard Creek	121700	PPWS	CWAC	●			PBCR		●	ORW	
Greenleaf Creek including Greenleaf Lake and Watershed	120400	PPWS	WWAC	●		●	PBCR		●	SWS	
Star Lake	120400		WWAC	●		●	PBCR		●		
Sand Creek	120400		HLAC	●		●	SBCR		●		
Bayou Manard	120400	PPWS	WWAC	●		●	PBCR		●		
Coody Creek	120400	PPWS	WWAC	●		●	PBCR		●		
Grand River Main Stem (Grand Neosho River) from mouth to Kansas State Line, including Fort Gibson Reservoir, Lake Hudson, and (Grand) Lake O' the Cherokees	121600	PPWS	WWAC	1	●	●	PBCR		●		
Ranger Creek	121600	PPWS	WWAC	●		●	PBCR		●		
Fourteen Mile Creek	121600	PPWS	CWAC	●		●	PBCR		●	HQW	
Black Bird Creek	121600	PPWS	CWAC	●		●	PBCR		●		
Clear Creek	121600	PPWS	CWAC	●		●	PBCR		●		
Spring Creek	121600	PPWS	CWAC	●		●	PBCR		●	HQW	
Little Spring Creek	121600	PPWS	CWAC	●		●	PBCR		●	HQW	
Double Spring Creek	121600	PPWS	CWAC	●		●	PBCR		●		
Chouteau Creek	121600	PPWS	WWAC	●		●	PBCR		●		
Tributary at SE 1/4, Sec. 13, T20N, R18E, IM	121600		WWAC	●		●	SBCR		●		
Tributary at SE 1/4, Sec. 29, T20N, R19E, IM	121600		HLAC	●		●	SBCR		●		



BASIN NO. 5
Canadian River

000544

OKLAHOMA WATER RESOURCES BOARD
OAC 785:45
Appendix A, p33

APPENDIX A OF OKLAHOMA'S WATER QUALITY STANDARDS 1991
DESIGNATED BENEFICIAL USES OF SURFACE WATER
BASIN 5 PAGE 1

Waterbody Name and Sequence	WQM Segment	Water Supply	F&W Prop.	Ag.	H.P.	M&I	Rec.	Nav.	Aes.	Limit-ations	Remarks
North Canadian River from Canadian River to S.H. 99 bridge	520500 & 520510	PPWS	WWAC	●		●	PBCR		●		
Deep Fork of Canadian River downstream from Arcadia Reservoir	520700	PPWS	WWAC	2		●	PBCR		●		
Wolf Creek downstream from Lake Henryetta	520700		WWAC	●		●	PBCR		●		
Coal Creek	520700	EWS	WWAC	●		●	SBCR		●		
Henryetta Lake and Watershed	520700	PPWS	WWAC	●		●	PBCR		●	SWS	
Moore Creek	520700		WWAC	●		●	PBCR		●		
Cussetah Creek	520700		WWAC	●		●	PBCR		●		
Tributary at NE 1/4, Sec. 12, T13N, R13E, IM	520700		HLAC	●		●	SBCR		●		
Salt Creek downstream from Lake Okmulgee	520700	PPWS	WWAC	●		●	PBCR		●		
Okmulgee Lake and Watershed	520700	PPWS	WWAC	●		●	PBCR		●	SWS	
Flat Rock Creek	520700	PPWS	WWAC	●		●	PBCR		●		
Little Deep Fork Creek downstream from Sand Creek	520700		WWAC	●		●	PBCR		●		
Little Deep Fork Creek upstream from Sand Creek to State Hwy. 48 Bridge	520700	PPWS	HLAC	●		●	SBCR		●		
Little Deep Fork Creek upstream from State Hwy. 48 Bridge	520700	PPWS	WWAC	●		●	PBCR		●		
Tributary at SE 1/4, Sec. 06, T15N, R08E, IM	520700		HLAC	●		●	SBCR		●		
Nuyaka Creek	520700	PPWS	WWAC	1		●	PBCR		●		
Buckeye Creek	520700	PPWS	WWAC	1		●	PBCR		●		
Okemah Lake and Watershed	520700	PPWS	WWAC	●		●	PBCR		●	SWS	
Salt Creek	520700	PPWS	WWAC	●		●	PBCR		●		
Camp Creek downstream from Stroud Lake	520700	PPWS	WWAC	●		●	PBCR		●		

APPENDIX A.
DESIGNATED BENEFICIAL USES FOR SURFACE WATERS

(a) **Beneficial uses.** Beneficial uses are designated for specific waterbodies in the charts that follow.

(b) **Criteria and water quality management segments.** The criteria to protect the beneficial uses are assigned in Subchapter 5, SURFACE WATER QUALITY STANDARDS. WQM Segments refer to one of the fifty-nine (59) water quality management segments in the seven (7) planning basins found in this appendix.

(c) **Beneficial Use Codes.** The following codes are given in Appendix A and denote specific beneficial uses applicable to a specific waterbody.

(1) EWS - Emergency Water Supply beneficial use

(2) PPWS - Public and Private Water Supply beneficial use

(3) F&W Prop. - Fish and Wildlife Propagation beneficial use

- (i) WWAC - Warm Water Aquatic Community subcategory
- (ii) HLAC - Habitat Limited Aquatic Community subcategory
- (iii) CWAC - Cool Water Aquatic Community subcategory
- (iv) Trout - Trout Fishery (put and take) subcategory

(4) Ag. - Agriculture beneficial use

- (i) 1 - Class I Irrigation
- (ii) 2 - Class II Irrigation
- (iii) 3 - Class III Irrigation

(5) H.P. - Hydropower beneficial use

(6) M&I - Industrial and Municipal process and cooling water

(7) Rec. - Recreation beneficial use

- (i) PBCR - Primary Body Contact beneficial use
- (ii) SCBR - Secondary Body Contact beneficial use

(8) Nav. - Navigation beneficial use

(9) Aes. - Aesthetics beneficial use

(d) **Limitations for Additional Protection.**

(1) Limitations for additional protection are described in 785:45-5-25.

(2) The following symbols are used in the limitations column of the beneficial use charts in Appendix A to indicate the applicability of 785:45-5-25 for specific waters:

(A) "ORW" - indicating waters designated Outstanding Resource Waters;

(B) "HQW" - indicating waters designated High Quality Waters; and

(C) "SWS" - indicating waters designated Sensitive Public and Private Water Supplies.

(e) **Remarks used in Appendix A.** The following footnotes appear under "Remarks" in Appendix A and denote special circumstances which are associated with a specific waterbody.

waters include streams designated "Scenic River" or "ORW" in Appendix A of this Chapter, and waters of the State located within watersheds of Scenic Rivers. Additionally, these may include waters located within National and State parks, forests, wilderness areas, wildlife management areas, and wildlife refuges, and waters which contain species listed pursuant to the federal Endangered Species Act as described in 785:45-5-25(c)(2)(A). No degradation of water quality shall be allowed in these waters.

(b) **Application to high quality waters (HQW).** It is recognized that certain waters of the state possess existing water quality which exceeds those levels necessary to support propagation of fishes, shellfishes, wildlife, and recreation in and on the water. These high quality waters shall be maintained and protected.

(c) **Application to beneficial uses.** No water quality degradation which will interfere with the attainment or maintenance of an existing or designated beneficial use shall be allowed.

(d) **Application to improved waters.** As the quality of any waters of the state improve, no degradation of such improved waters shall be allowed.

(e) **Application to thermal discharge.** In cases where potential water quality impairment associated with a thermal discharge is involved, the anti-degradation policy and implementation method shall be consistent with Section 316 of Public Law 92-500 as amended.

[Source: Amended at 9 Ok Reg 1889, eff 5-26-92, and 9 Ok Reg 2625, eff 6-25-92]

SUBCHAPTER 5.
SURFACE WATER QUALITY STANDARDS

PART 1.
GENERAL PROVISIONS

Section

785:45-5-1. Declaration of policy
785:45-5-2. Beneficial uses: existing and designated
785:45-5-3. Unlisted surface waters
785:45-5-4. Applicability of narrative and numerical criteria

PART 3.
BENEFICIAL USES AND CRITERIA TO PROTECT USES

785:45-5-10. Public and private water supplies
785:45-5-11. Emergency public and private water supplies
785:45-5-12. Fish and wildlife propagation
785:45-5-13. Agriculture: livestock and irrigation
785:45-5-14. Hydroelectric power generation
785:45-5-15. Industrial and municipal process and cooling water
785:45-5-16. Primary Body Contact Recreation

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785:45-5-17. Secondary Body Contact Recreation
785:45-5-18. Navigation
785:45-5-19. Aesthetics

PART 5.
SPECIAL PROVISIONS

785:45-5-25. Limitations for additional protection
785:45-5-26. Mixing zones and zones of passage
785:45-5-27. [REVOKED]

[Source: Amended at 9 Ok Reg 2625, eff 6-25-92]

PART 1.
GENERAL PROVISIONS

785:45-5-1. Declaration of policy

Title 82 O.S. 1981, §926.2, provides as follows: *Whereas the pollution of the waters of this state constitute a menace to public health and welfare, creates public nuisances, is harmful to wildlife, fish and aquatic life, and impairs domestic, agricultural, industrial, recreational and other legitimate beneficial uses of water, and whereas the problem of water pollution in this state is closely related to the problem of water pollution in adjoining states, it is hereby declared to be the public policy of this state to conserve the waters of the state and to protect, maintain and improve the quality thereof for public water supplies, for propagation of wildlife, fish and aquatic life and for domestic, industrial, recreational and other legitimate beneficial uses; to provide that no waste be discharged into any waters of the state without first being given the degree of treatment necessary to protect the legitimate beneficial uses of such waters; to provide for the prevention, abatement and control of new or existing water pollution...*

785:45-5-2. Beneficial uses: existing and designated

Beneficial uses are designated for all waters of the state. Such uses are protected through the restrictions imposed by the antidegradation policy statement, narrative criteria and numerical standards. Some uses require higher quality water than others. When multiple uses are assigned to the same waters, all such uses shall be protected. Beneficial uses are also protected by permits or other authorizations issued to meet these Standards for point sources and through practical management or regulatory programs for nonpoint sources. The criteria to protect the beneficial uses designated in 785:45-5-3 or in Appendix A of this Chapter for certain surface waters of the state are described in the following sections:

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beneficial use of Public and Private Water Supply. Water column criteria to protect human health for the consumption of fish flesh only may be found in 785:45-5-12(9).

Water Column Numerical Criteria
to Protect Human Health for the Consumption of Fish Flesh And Water

Substances (total recoverable)	Criteria (µg/L)
Aldrin	0.001273
Arsenic	0.175
Benzene	11.87
Chlordane	0.00575
Dieldrin	0.001352
DDT	0.005876
Gamma BHC (Lindane)	0.1458
Heptachlor	0.00208
Hexachlorobenzene	0.009026
Carbon Tetrachloride	2.538
Chloroform	56.69
PCB	0.00079
2,3,7,8-TCDD (Dioxin)	0.00000013
1-1-1 TCE	3094.0
Cadmium	14.49
Chromium (Total)	166.3
Endrin	0.7553
Ethylbenzene	3120.0
Lead	5.0
Mercury	0.5563
Nickel	607.2
Pentachlorophenol	1014.0
Phenol	20900.0
Silver	104.8
Toluene	10150.0

[**Source:** Amended at 9 Ok Reg 1889, eff 5-26-92]

785:45-5-11. Emergency public and private water supplies
(a) During emergencies, those waters designated Emergency Public and Private Water Supplies may be put to use.
(b) Each emergency will be handled on a case-by-case basis, and be thoroughly evaluated by the appropriate State agencies and/or local health authorities.

785:45-5-12. Fish and wildlife propagation
(a) The narrative and numerical criteria in this section are designated to promote fish and wildlife propagation for the fishery classifications of Habitat Limited Aquatic Community, Warm Water Aquatic Community, Cool Water Aquatic Community (Excluding Lake Waters), and Trout Fishery (Put and Take).
(b) Habitat limited aquatic community means a subcategory of the beneficial use "Fish and Wildlife Propagation" where the water chemistry and habitat are not adequate to support a "Warm Water

000549

Aquatic Community" because:

(1) Naturally occurring water chemistry prevents the attainment of the use; or

(2) Naturally occurring ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of a sufficient volume of effluent to enable uses to be met; or

(3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

(4) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the waterbody to its original condition or to operate such modification in a way that would result in the attainment of the use; or

(5) Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of the "Warm Water Aquatic Community" beneficial use.

(c) Cool Water Aquatic Community means a subcategory of the beneficial use category "Fish and Wildlife Propagation" where the water quality, water temperature and habitat are adequate to support cool water intolerant climax fish communities and includes an environment suitable for the full range of cool water benthos. Typical species may include smallmouth bass, certain darters and stoneflies.

(d) Warm Water Aquatic Community means a subcategory of the beneficial use category "Fish and Wildlife Propagation" where the water quality and habitat are adequate to support intolerant climax fish communities and includes an environment suitable for the full range of warm water benthos.

(e) The narrative and numerical criteria shall include:

(1) **Dissolved oxygen.**

(A) Dissolved oxygen (DO) criteria are designed to protect the diverse aquatic communities of Oklahoma.

(B) Allowable loadings are designed to attain these criteria. For streams with sufficient historical data, the allowable load shall be based on meeting the dissolved oxygen concentration standard at the seven-day, two-year low flow and the appropriate seasonal temperatures. For streams lacking sufficient historical data, or when the appropriate flow is less than one (1) cubic foot per second (cfs), the allowable load shall be based on meeting the dissolved oxygen concentration standard at one (1) cfs and the appropriate seasonal temperature.

(C) Except for naturally occurring conditions, the dissolved oxygen criteria are set forth in the following table.

000550

In cases where mineral content varies within a segment, the most pertinent data available should be used.

[Source: Amended at 9 Ok Reg 1889, eff 5-26-92]

785:45-5-14. Hydroelectric power generation

This beneficial use is not generally dependent upon water quality.

785:45-5-15. Industrial and municipal process and cooling water

(a) Quality criteria for water used for process or cooling purposes vary with the type of industrial or municipal processes involved.

(b) This use will be protected by application of the criteria for other beneficial uses.

785:45-5-16. Primary Body Contact Recreation

(a) Primary Body Contact Recreation involves direct body contact with the water where a possibility of ingestion exists. In these cases the water shall not contain chemical, physical or biological substances in concentrations that are irritating to skin or sense organs or are toxic or cause illness upon ingestion by human beings.

(b) In waters designated for Primary Body Contact Recreation the following limits for bacteria set forth in (c) of this section shall apply only during the recreation period of May 1 to September 30. The criteria for Secondary Body Contact Recreation will apply during the remainder of the year.

(c) Compliance with 785:45-5-16 shall be based upon meeting the requirements of one of the three (3) options specified below for bacteria. Upon selection of one (1) group or test method, said method shall be used exclusively over that thirty (30) day period.

(1) Coliform Bacteria: The bacteria of the fecal coliform group shall not exceed a monthly geometric mean of 200/100 ml, as determined by multiple-tube fermentation or membrane filter procedures based on a minimum of not less than five (5) samples collected over a period of not more than thirty (30) days. Further, in no more than 10% of the total samples during any thirty (30) day period shall the bacteria of the fecal coliform group exceed 400/100 ml.

(2) Escherichia coli (E. coli): E. coli shall not exceed a monthly geometric mean of 126/100 ml based upon a minimum of not less than five (5) samples collected over a period of not more than thirty (30) days. No sample shall exceed a 75% one-sided confidence level of 235/100 ml in lakes and high use waterbodies and the 90% one-sided confidence level of 406/100 ml in all other Primary Recreation beneficial use areas. These values are based upon all collected samples. Analysis procedures shall follow EPA-600/4-85/076, "Test Methods for Escherichia coli and Enterococci in Water by the Membrane Filter Procedure."

(3) Enterococci: Enterococci shall not exceed a monthly geometric mean of 33/100 ml based upon a minimum of not less

000551

than five (5) samples collected over a period of not more than thirty (30) days. No sample shall exceed a 75% one-sided confidence level of 61/100 ml in lakes and high use waterbodies and the 90% one-sided confidence level of 108/100 ml in all other Primary Recreation beneficial use areas. These values are based upon all collected samples. Analysis procedures shall follow EPA-600/4-85/076, "Test Methods for Escherichia coli and Enterococci in Water by the Membrane Filter Procedure."

[Source: Amended at 9 Ok Reg 1889, eff 5-26-92]

785:45-5-17. Secondary Body Contact Recreation

(a) The water quality requirements for Secondary Body Contact Recreation are usually not as stringent as for Primary Body Contact Recreation.

(b) The Secondary Body Contact Recreation beneficial use is designated where ingestion of water is not anticipated.

(c) Associated activities may include boating, fishing or wading.

(d) Waters so designated shall be maintained to be free from human pathogens in numbers which may produce adverse health effect in humans.

785:45-5-18. Navigation

This beneficial use is generally more dependent upon quantity than quality of water.

785:45-5-19. Aesthetics

(a) To be aesthetically enjoyable, the surface water of the State must be free from floating materials and suspended substances that produce objectionable color and turbidity.

(b) The water must also be free from noxious odors and tastes, from materials that settle to form objectionable deposits, and discharges that produce undesirable effects or is a nuisance to aquatic life.

(c) The following criteria apply to protect this use:

(1) **Color.** Surface waters of the State shall be virtually free from all coloring materials which produce an aesthetically unpleasant appearance. Color producing substances, from other than natural sources, shall be limited to concentrations equivalent to 70 Platinum-cobalt color units.

(2) **Nutrients.** Nutrients from point source discharges or other sources shall not cause excessive growth of periphyton, phytoplankton, or aquatic macrophyte communities which impairs any existing or designated beneficial use.

(3) **Solids (suspended and/or settleable).** The surface waters of the State shall be maintained so as to be essentially free of floating debris, bottom deposits, scum, foam and other materials, including suspended substances of a persistent nature, from other than natural sources.

(4) **Taste and Odor.** Taste and odor producing substances from other than natural origin shall be limited to concentrations that will not interfere with the production of a potable water

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Reference 20

OKLAHOMA FEDERAL LISTED, PROPOSED, AND CANDIDATE (Cat. 1 & 2) T/E SPECIES

January 1994

COUNTY	SPECIES	CLASSIFICATION
Adair	Bald eagle	Endangered
	Gray bat	Endangered
	Indiana bat	Endangered
	Ozark big-eared bat	Endangered
	Peregrine falcon	Endangered
	Bat Cave isopod	Category 2 Candidate
	Eastern small-footed bat	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Ozark chinquapin (*Castanea pumila* var. ozarkensis)	Category 2 Candidate
	Royal catchfly (*Silene regia*)	Category 2 Candidate
Alfalfa	Bald eagle	Endangered
	Interior least tern	Endangered
	Peregrine falcon	Endangered
	Whooping crane C/H	Endangered
	Piping plover	Threatened
	Arkansas River speckled chub	Category 2 Candidate
	Ferruginous hawk	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Mountain plover	Category 2 Candidate
	Northern goshawk	Category 2 Candidate
	Swift fox	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
	White-faced ibis	Category 2 Candidate
Atoka	Bald eagle	Endangered
	Piping plover	Threatened
	Alligator snapping turtle	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Cumberland sand grass (*Calamovilfa arcuata*)	Category 2 Candidate
	Small-headed pipewort (*Eriocaulon kornickianum*)	Category 2 Candidate
Beaver	Bald eagle	Endangered
	Interior least tern	Endangered
	Peregrine falcon	Endangered
	Whooping crane	Endangered
	Arkansas darter	Category 1 Candidate
	Arkansas River shiner	Category 1 Candidate
	Arkansas River speckled chub	Category 2 Candidate
	Black rail	Category 2 Candidate
	Ferruginous hawk	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Mountain plover	Category 2 Candidate
	Swift fox	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
	White-faced ibis	Category 2 Candidate
Beckham	Whooping crane	Endangered
	Ferruginous hawk	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
	White-faced ibis	Category 2 Candidate

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Comanche	Bald eagle	Endangered
	Black-capped vireo	Endangered
	Interior least tern	Endangered
	Peregrine falcon	Endangered
	Whooping crane	Endangered
	Piping plover	Threatened
	Ferruginous hawk	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Mountain plover	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
	White-faced ibis	Category 2 Candidate
	Fissa sedge (*Carex fissa*)	Category 2 Candidate
	Slender dodder (*Cuscuta attenuata*)	Category 2 Candidate
Cotton	Bald eagle	Endangered
	Interior least tern	Endangered
	Whooping crane	Endangered
	Ferruginous hawk	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Prairie mole cricket	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Texas kangaroo rat	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
Craig	Peregrine falcon	Endangered
	Neosho madtom	Threatened
	Western prairie fringed orchid	Threatened
	Arkansas darter	Category 1 Candidate
	Alligator snapping turtle	Category 2 Candidate
	Blue sucker	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Neosho mucket	Category 2 Candidate
	Paddlefish	Category 2 Candidate
	Prairie mole cricket	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
Creek	Bald eagle	Endangered
	Interior least tern	Endangered
	Peregrine falcon	Endangered
	Piping plover	Threatened
	Cerulean warbler	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Prairie mole cricket	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
	Fissa sedge (*Carex fissa*)	Category 2 Candidate
Custer	Bald eagle	Endangered
	Interior least tern	Endangered
	Peregrine falcon	Endangered
	Whooping crane	Endangered
	Arkansas River speckled chub	Category 2 Candidate
	Ferruginous hawk	Category 2 Candidate
	Loggerhead shrike	Category 2 Candidate
	Texas horned lizard	Category 2 Candidate
	Western snowy plover	Category 2 Candidate
	White-faced ibis	Category 2 Candidate

Ark River S. Chub

Reference 21

NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR

BELLVUE, OKLA.

LAKE HEYBURN, OKLA.

20KC-7

20KC-6

OKLAHOMA CITY NE

BRISTOW

OKLAHOMA CITY NE

BRISTOW, OKLA.

BRISTOW

SLICK, OKLA.

SCALE 1:24 000

Other information concerning the wetland resources depicted on this document may be available. For information, contact:

Regional Director (ARDE) Region II
U.S. Fish and Wildlife Service
P.O. Box 1306
Albuquerque, New Mexico 87103

SPECIAL NOTE

This document was prepared primarily by stereoscopic analysis of high altitude aerial photographs. Wetlands were identified on the photographs based on vegetation, visible hydrology, and geography in accordance with *Classification of Wetlands and Deep-Water Habitats of the United States* (An Operational Draft), Cowardin, et al, 1977. The aerial photographs typically reflect conditions during the specific year and season when they were taken. In addition, there is a margin of error inherent in the use of the aerial photographs. Thus, a detailed on the ground and historical analysis of a single site may result in a revision of the wetland boundaries established through photographic interpretation. In addition, some small wetlands and those obscured by dense forest cover may not be included on this document.

Federal, State and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, State or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, State or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

SYMBOLOGY EXAMPLE



NOTES TO THE USER

- Wetlands which have been field examined are indicated on the map by an asterisk (*).
- Dominance type (either vegetative or sedentary animal) can be added to the map by the interested user.
- Additions or corrections to the wetlands information displayed on the map are solicited. Please forward such information to the address indicated.
- Some areas designated R4SB, R4SBW, or R4SBJ (intermittent streams) may not meet the definition of wetlands.

AERIAL PHOTOGRAPHY

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U.S. DEPARTMENT OF TH
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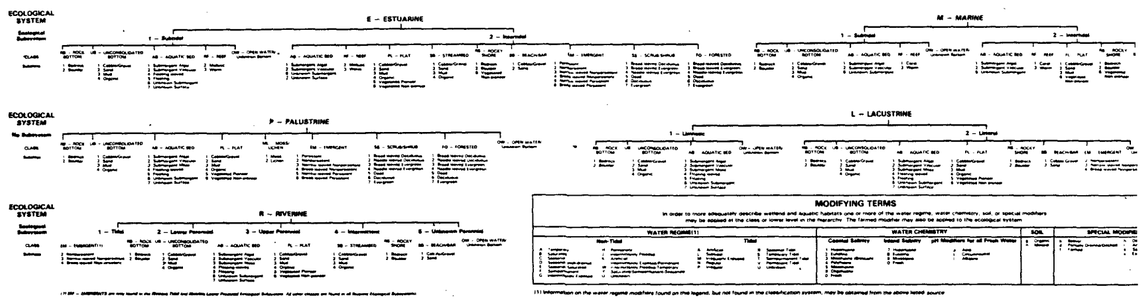
Prepared by Office of Biologica
for the National Wetlands Inv

U.S. DEPARTMENT OF THE INT
FISH AND WILDLIFE SERVICE

Prepared by Office of Biological Service
for the National Wetlands Inventory

WETLAND LEGEND

0 – Primarily represents upland areas, but may include unclassified wetlands such as man-modified areas, non photo-identifiable areas and/or unintentional omissions.



MODIFYING TERMS

In order to more adequately describe wetland and aquatic habitats one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The farmed modifier may also be applied to the ecological system.

WATER REGIME[1]						WATER CHEMISTRY			SOIL	SPECIAL MODIFIERS
Non-Tidal		Tidal				Coastal Salinity	Inland Salinity	pH Modifiers for all Fresh Water		
A Temporary	F Intermittent	K Artificial	V Semipermanent Tidal			1 Hyperhaline	7 Hypersaline	5 Acid	b Beaver	h Diked/Impounded
B Saturated	G Intermittent Flooded	L Subtidal	W Permanent Tidal			2 Euhaline	8 Eusaline	6 Circumneutral	d Partly Drained/Ditched	x Excavated
C Seasonal	H Permanent	M Irregularly Exposed				3 Mixohaline (Brackish)	9 Oligosaline	7 Alkaline		
D Intermittent Saturated	J Intermittent Exposed	N Regularly Exposed				4 Polyhaline	0 Fresh			
E Permanent Saturated		P Permanently Flooded				5 Mesohaline				
						6 Oligohaline				

[1] Information on the water regime modifiers found on this legend, but not found in the classification system, may be obtained from the above listed source

5-mi. end

Not To Scale

SCALE 1:24 000

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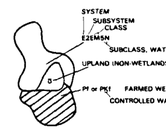
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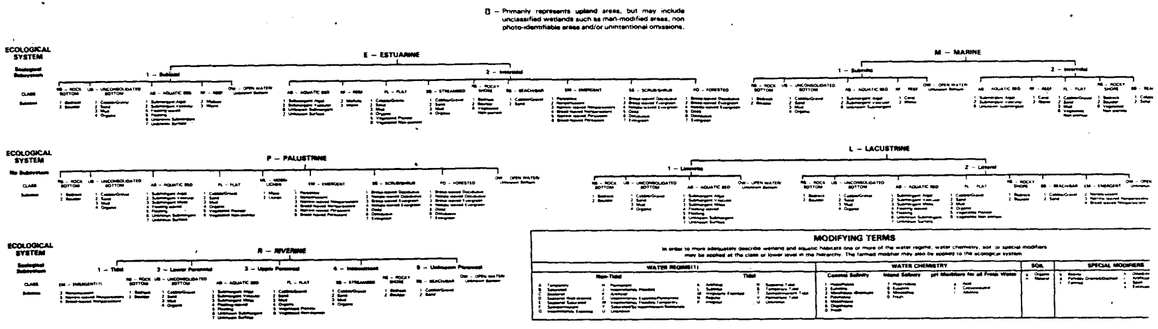
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B Saturated	G Intermittent Flooded	L Subtidal	W Permanent Tidal			2 Euhaline	8 Eusaline	6 Circumneutral	d Partly Drained/Ditched	x Excavated
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D Intermittent Saturated	J Intermittent Exposed	N Regularly Exposed				4 Polyhaline	0 Fresh			
E Permanent Saturated		P Permanently Flooded				5 Mesohaline				
						6 Oligohaline				

000557

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

BELLVUE QUADRANGLE
OKLAHOMA—CREEK CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NW/4 BRISTOW 15' QUADRANGLE

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

INDUSTRIAL & SOLID WASTE SERVICE
Oklahoma State Dept. of Health
N. E. 10th Street & Stonewall
Oklahoma City, Oklahoma 73152

LAKE HEYBURN QUADRANGLE
OKLAHOMA—CREEK CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 BRISTOW 15' QUADRANGLE

Mapped, edited, and published by the Geological Survey
Control by USGS and NOS/NOAA
Topography by photogrammetric methods from aerial photographs taken 1972. Field checked 1973
Projection and 10,000-foot grid ticks: Oklahoma coordinate system, north zone (Lambert conformal conic)
1000-metre Universal Transverse Mercator grid ticks, zone 14, shown in blue. 1927 North American datum
Red tint indicates area in which only landmark buildings are shown
Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

UTM GRID AND 1973 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000
CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
AND BY THE OKLAHOMA GEOLOGICAL SURVEY, NORMAN, OKLAHOMA 73069
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route U. S. Route State Route

BRISTOW, OKLA.
SW/4 BRISTOW 15' QUADRANGLE
N3545—W9622.5/7.5
1973
AMS 6755 IV SW—SERIES V883

Mapped, edited, and published by the Geological Survey
Control by USGS and NOS/NOAA
Topography by photogrammetric methods from aerial photographs taken 1972. Field checked 1973
Projection and 10,000-foot grid ticks: Oklahoma coordinate system, north zone (Lambert conformal conic)
1000-metre Universal Transverse Mercator grid ticks, zone 14, shown in blue. 1927 North American datum
Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

UTM GRID AND 1973 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

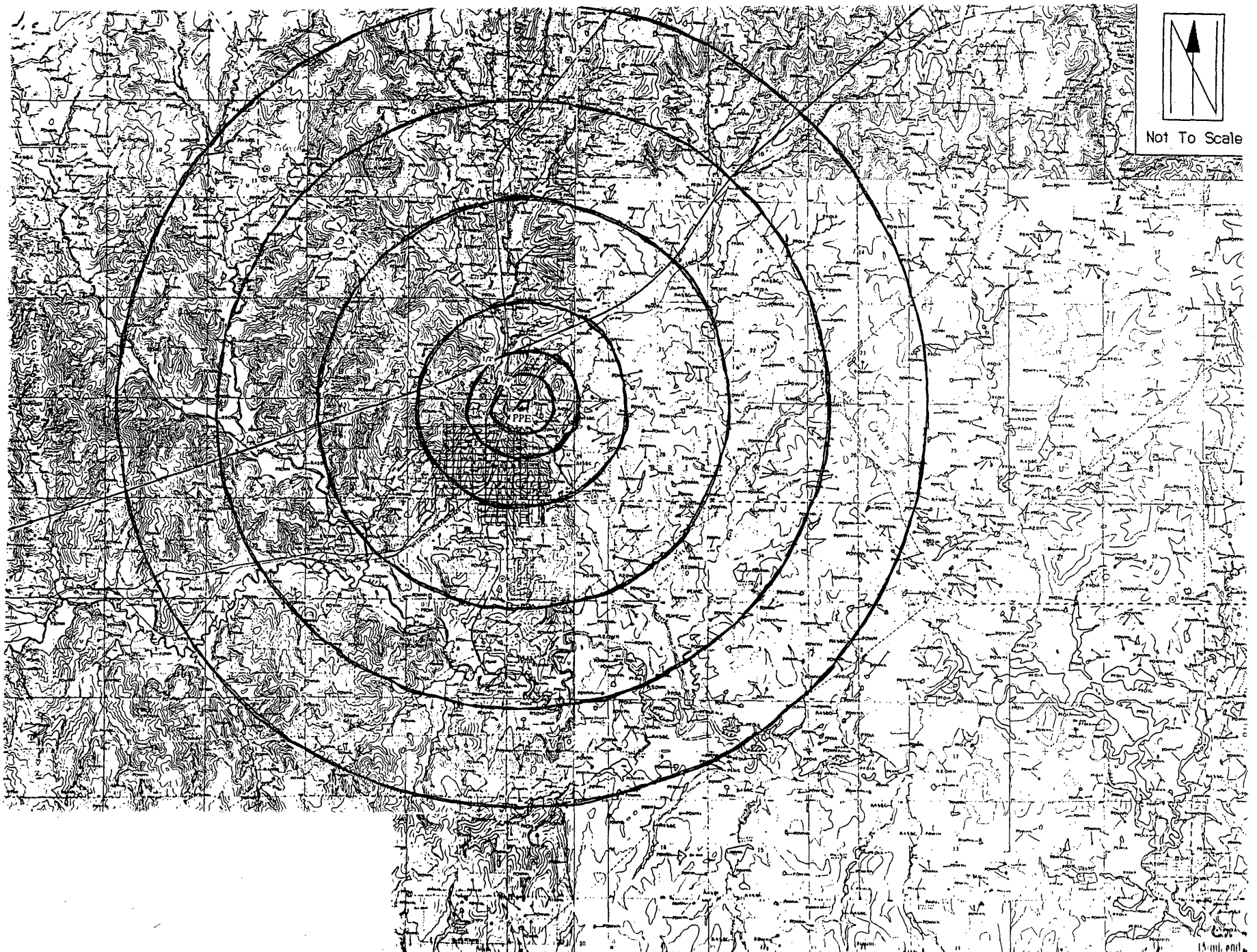
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SLICK, OKLA.
SE/4 BRISTOW 15' QUADRANGLE
N3545—W9615/7.5
1973
AMS 6755 IV SE—SERIES V883


PPE
Not To Scale

Reference 22

MEMORANDUM

December 14, 1994

To: File
Wilcox Oil Company, Bristow, Creek Co.

From: Hal Cantwell
Env. Spec. Supr. 4

Re: Population Data for Site

Wednesday, December 14, 1994 I accessed the GEMS database to extract the census population data for the area surrounding the Wilcox Oil Company, Bristow, Creek County. The data is from the 1983 data set as this was the most recent year available.

The site coordinates used were:
Latitude: 35°50'31"
Longitude: 96°23'02"

The extract data is as follows:

0-¼ mile	¼-½ mile	½-1 mile	1-2 mile	2-3 mile	3-4 mile	TOTAL
0	0	1,836	2,691	1,017	517	6,061

Reference 23

Oklahoma Biological Survey
Oklahoma Natural Heritage Inventory

OKLAHOMA BIOLOGICAL SURVEY
111 E. Chesapeake Street
Norman, Oklahoma 73019-0575, USA
(405) 325-1985
FAX: (405) 325-7702

RECEIVED
SEP 0 9 1994
Superfund Program

Scott Stegmann
Department of Enviromental Quality
1000 Northeast Tenth Street
Oklahoma City, OK 73117-1212

September 7,1994

Dear Mr. Stegmann,

This letter is in response to your request for information on possible endangered species or other elements of biological significance at the following sites:

AT & SF Roadhouse
Ben Franklin Refining Company
Chicago, Rock Island, & Pacific Roadhouse
Mercury Oil Refining Company
M&M Plating Company
Rock Island Roadhouse - Haileyville
10th Street Sludge
Tide Water Associated Oil Company
United States Smelting
Victory Metals
Wilcox Oil Company

The Oklahoma Natural Heritage Inventory maintains a database on the status and location of rare species and significant ecological communities in Oklahoma. We have reviewed the information currently in the Heritage Inventory database and found no records of on site-elements. However, elements were found within a five mile radius from the sites. These are listed on the attached table.

The Heritage Inventory database is the most current comprehensive one available on the rare biota of Oklahoma. However, such a database is only as complete as the information that has been collected. For this reason, we cannot state for certain whether or not a given site harbors rare species or significant communities. We suggest you also contact the Environmental Division of the Oklahoma Department of Wildlife Conservation, as they may have site specific information of which we are unaware.

Additional information from our databases is available on the internet through *ftp* at *obssunϕ2.uoknor.edu*. Login user *ftpuser*, password *ftpuser*, then cd pub/heritage.

000563

Thank you for the opportunity to respond to your request.

Sincerely,

for Ian H. Butler
Data Coordinator

IHB.bas

cc: Ron Suttles, Okla. Dept. of Wildlife Conservation, Oklahoma City
Supervisor, U.S. Fish and Wildlife Service, Tulsa

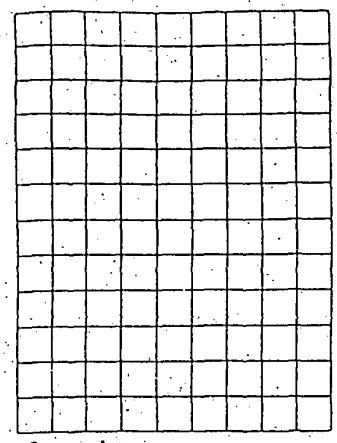
Attachments: area map of the occurence

OKLAHOMA NATURAL HERITAGE INVENTORY
TABLE OF PROXIMAL ELEMENT OCCURRENCES

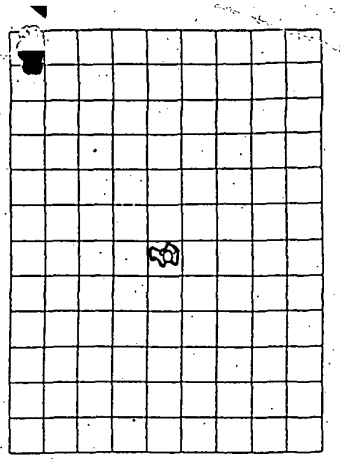
REQUESTED BY: Department of Enviromental Quality
DATE OF REQUEST: August 9, 1994

SITE SPECIES NAME	STATUS FED	STATE	ONHI RANK GLOBAL	STATE	LAST SEEN
SITE NAME: Mercury Oil Refining Company					
Phrynosoma cornutum (Texas Horned Lizard)	C2	P	G5	S2S3	1993
SITE NAME: 10th Street Sludge					
Phrynosoma cornutum (Texas Horned Lizard)	C2	P	G5	S2S3	1993

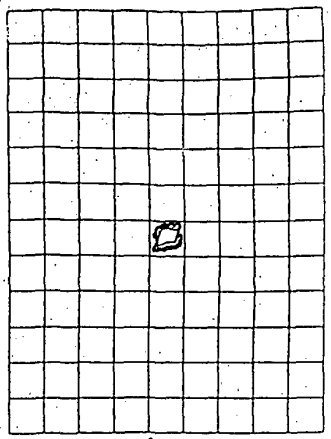
Reference 24



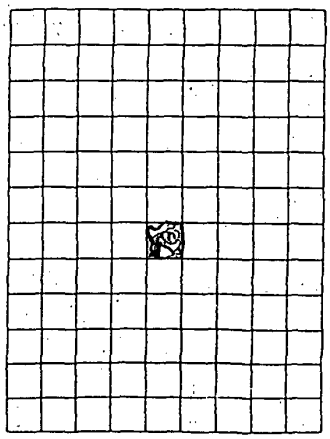
On-site



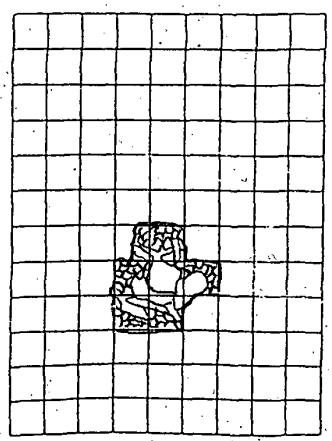
0 - ¼ mi. about 4.5 acres



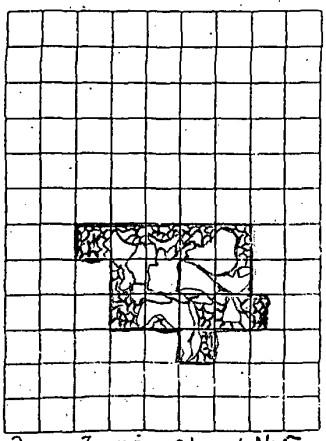
¼ - ½ mi. about 7 acres



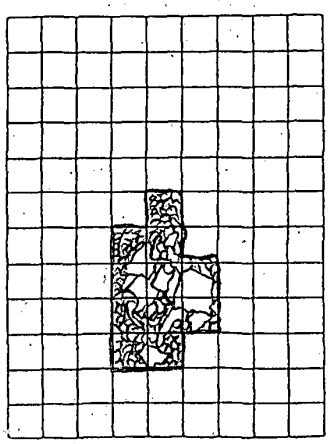
½ - 1 mi. about 9 acres



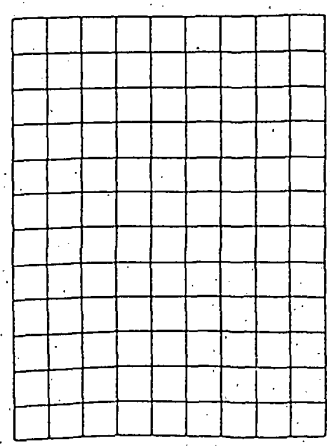
1 - 2 mi. about 65 acres

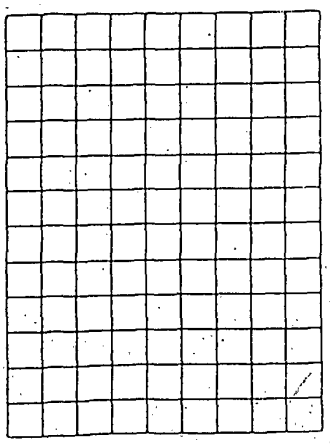


2 - 3 mi. About 145 acres



3 - 4 mi. about 112 acres





SITE NAME: Wilcox Oil Co.

DATE COMPLETED: 08.08.94.

COMPILED BY: Karen Khalafian

½ cm^2 = 10 acres

Form for determining area of wetlands on 50% copy of USGS maps.