



ITT CORPORATION

Project No. 846538

August 1985

Final Report

Engineering Supervision
Clearing and Plugging Sixty-Six Abandoned Wells
Volume 1

Tar Creek Superfund Site
Picher, Oklahoma

Oklahoma Water Resources Board
Oklahoma City, Oklahoma

RESPONSIVE TO THE NEEDS OF ENVIRONMENTAL MANAGEMENT

1004289



1.0 INTRODUCTION

On September 7, 1984, IT Corporation (IT) contracted by the Oklahoma Water Resources Board (OWRB) to perform the Engineering Supervision for the plugging and abandonment of sixty-six wells near Picher, Oklahoma (Figure 1). This was done in conjunction with E.P.A. Project CX 810192-01-0 also known as Phase I of the Tar Creek Superfund project. The objective of the Tar Creek project was to plug and abandon sixty-six wells known to be conduits for the migration of acid mine water from the underground mine workings of the Boone Formation to the underlying Roubidoux aquifer. This is explained in more detail in the feasibility investigation attached as Appendix B.

The regional geology is illustrated on the cross section in Figure 2. The base of the Boone Formation is at approximately 430 feet below ground surface. The Roubidoux Aquifer occurs at approximately 870 feet below ground surface. The depth of the wells ranged from 800 to 1200 feet. The Roubidoux Aquifer is a principal source of water for domestic, industrial, and agricultural purposes in Northeastern Oklahoma and Southeastern Kansas.

This report documents the procedures and difficulties involved in locating, cleaning and plugging the sixty-six wells and describes the costs incurred during the completion of this project. This report is organized into the following sections:

- o Section 2.0, Location of the Wells
- o Section 3.0, Clearing and Plugging Operations
- o Section 4.0, Project Costs
- o Section 5.0, Project Health and Safety

2.0 LOCATION OF THE WELLS

The location for about thirty-eight of the sixty-six abandoned wells were established by the OWRB prior to the start of work by IT. The remaining twenty-eight wells, with the exception of five, were located during the field operations. The well locations are summarized in Table 1 and shown on Figure 3.

A considerable effort was made by IT and the OWRB to locate the twenty-eight wells through the use of earth moving equipment such as bulldozers, backhoes, and scrapers. IT Corporation coordinated with the OWRB and the KDHE in the review of old mine maps, aerial photography and surveying reports in an attempt to locate these sites. Due to the lack of well information and the altered topography from mine spoil material, five wells proved extremely difficult to locate. A decision was made by IT and the OWRB to discontinue looking for the five wells.

Eight of the sixty-six wells were found to be shallow in depth and were therefore not plugged through the Tar Creek project. Two wells were determined to have been properly sealed by the former owner, Eagle-Picher Mining Company, after a review of their plugging and abandonment report. Three were reported in use by the landowner. One well was not plugged because the owner would not grant an easement, which prevented operations on his property. The wells that were not plugged may require remedial action in the future.

All of the remaining forty-seven wells were located and plugged. A summary of the activities completed at each of the sixty-six wells is presented in Table 2.

The following is a summary of the status of the sixty-six wells.

Wells plugged and sites restored	43
Wells technically not feasible to reach total depth Cement cap placed on mine floor	4
Wells not located	4
Wells found to be shallow	7
Wells being used	3
Wells plugged properly by others	2
Wells not recommended for plugging due to high cost	2
Easement not granted	<u>1</u>
Total	66

The specific status of individual wells is presented in Appendix A.

TABLE 1
LOCATION OF PLUGGED WELLS

WELL	LOCATION
	OKLAHOMA WELLS
OK-1 (Goodeagle Midas)	Sec. 1, T28N, R22E, 1899' West of SE corner Sec 1, 602' North to well
OK-2 (Birddog)	Sec. 13, T29N, R22E, 963' West of SE corner, Sec. 13, 350' North to well
OK-3 (Adams)	Sec. 23, T29N, R22E, 2173' South of NE corner, Sec. 23, 1018' West to well
OK-4 (Eagle Picher Power Plant)	USGS Piezometer well
OK-5 (Goodeagle)	Sec. 25, T29N, R22E, 819' North, 291' East of the center of Sec. 25
OK-6 (B & R Old Potter)	Sec. 25, T29N, R22E, 754' South of NE corner of Sec. 25, 358' West to well
OK-10 (Brewster)	Sec. 15, T29N, R23E, 1121' South of NE corner, Sec. 15, 467' West of well
OK-11 (Beck No. 1)	Sec. 15, T29N, R23E, 1785' East of SW corner, Sec. 15, 759' North to well
OK-12 (Consolidated No. 2)	504' North, 230' West of SE corner, Sec. 16
OK-14 (Lucky Syndicate)	Sec. 17, T29N, R23E, 1668' East, 1521' North of SW corner, Sec. 17
OK-15 (Velie Lion)	Sec. 19, T29N, R23E, 2147' North on NS center Sec. line 169' West to well
OK-16 (Netta)	Sec. 20, T29N, R23E, 625' West, 146' South of NE corner, Sec. 20.
OK-17 (Mahutska)	Sec. 21, T29N, R23E, 2167' East of NW corner Sec. 21, 2081' South to well

TABLE 1
 (Continued)
 LOCATION OF PLUGGED WELLS

WELL	LOCATION
OKLAHOMA WELLS	
OK-18 (Royal)	Sec. 21, T29N, R23E, 1683' West of SE corner Sec. 21, 989' North to well
OK-20 (Massell)	Sec. 23, T29N, R23E, 919' South, 663' West of NE corner, Sec. 23
OK-21 (Kropp)	Sec. 23, T29N, R23E, 2491' North, 681' East of SE corner, Sec. 23
OK-26 (Rialto)	Sec. 29, T29N, R23E, 2010; West of NW corner Sec. 29, 1586' South to well
OK-27 (Laviron Ramage)	Sec. 29, T29N, R23E, 175' North on NS center Sec Line 143' West to well
OK-28 (Admiralty No. 3)	Sec. 29, T29N, R23E, 782' North on NS center Sec. line, 241' East
OK-29 (Lucky Bill)	Sec. 30, T29N, R23E, 924 South of NE corner Sec. 30, 949' West to well
OK-30 (Lottson)	Sec. 30, T29N, R23E, 746' South, 674' East of NW corner, Sec. 30.
OK-31 (Central Hill)	Sec. 31, T29N, R23E, 1296' East of West Line on centerline 38' North to well of Sec. 31
OK-32 (Consolidated No. 6)	Sec. 32, T29N, R23E, 1050' West, 6122 South of NE corner of Sec. 32
OK-34 (Whitebird)	Sec. 35, T29N, R23E, 2460' West, 254' South of North East Corner Sec. 35
OK-35 (Buckeye No. 1)	Sec. 35, T29N, R23E, 586' East, 485' North of SE corner of Sec. 35

TABLE 1
 (Continued)
 LOCATION OF PLUGGED WELLS

WELL	LOCATION
OKLAHOMA WELLS	
OK-36 (Buckeye No. 2)	Sec. 35, T29N, R23E
OK-37 (Discard)	Sec. 17, T29N, R24E, 779' East on Stateline from Highway 66, 726 South to well
OK-38 (Bendene)	Sec. 19, T29N, R24E, 787' South of NE corner of Sec. 19, 618' West to well
OK-39 (Waxahachie)	Sec. 31, T29N, R24E, 710' West on EW center Sec. 31 Line 134' North
OK-40 (Lancaster)	Sec. 32, T29N, R24E, 802' East on centerline from west line Sec. 32, 279' North
KANSAS WELLS	
K-1 (Southern)	654' EL & 275' SL, SE/4, Sec. 2, T35S, R23E
K-2 (Black Eagle)	848' SL & 217' EL, SW/4, Sec. 2, T35S, R23E
K-3 (Big John E)	260' SL & 240' WL, SW/4, Sec. 2, T35S, R23E
K-4 (Consolidated)	203' EL & 637' NL, NW/4, Sec. 3, T35S, R23E
K-5 (Big John D)	808' SL & 558' EL, SE/4, Sec. 3, T35S, R23E
K-7 (Big John I)	200' WL & 58' NL, NW/4, Sec. 11, T35S, R23E
K-8 (Tulsa-Quapaw)	553' SL & 619 WL, NE/4, Sec. 11, T35S, R23E
K-9 (Bendelari)	226' EL & 73' SL, SE/4, Sec. 11, T35S, R23E
K-10 (Eagle-Picher) (Jarrett P-54)	586' EL & 913 NL, NE/4, Sec. 12, T35S, R23E

TABLE 1
 (Continued)
 LOCATION OF PLUGGED WELLS

WELL	LOCATION
KANSAS WELLS	
K-12 (Treece City Well)	195' EL & 150' N State Line Road, NW/4, Sec. 13, T35S, R23E
K-13 (Blue Mound)	173' EL & 493' N State Line Road NE/4, Sec. 13, T35S, R23E
K-14 (Wilbur)	1154' EL & 480' NL, NE/4, Sec. 14, T35S, R23E
K-19 (C. Y. Semple)	818' EL & 2248 NL, NE/4, Sec. 10, T35S, R24E
K-20 (Clark-Boska)	151' SL & 102' EL, NW/4, Sec. 10, T35S, R24E
K-21 (Ballard)	338' SL & 937' WL, NE/4, Sec. 10, T35S, R24E
K-23 (Iron Mountain)	1165' NL & 1310 WL, SW/4, Sec. 10-35-24-E
K-26 (Goodeagle Refinery)	2000' WL & 320' N, State Line Road, NW/4, Sec. 19, T35S, R24E

TABLE 2
 JUNE 30, 1985
 STATUS OF SIXTY-SIX WELLS

<u>Name</u>	<u>Category</u>	<u>Easement Status</u>	<u>Locating Status</u>	<u>Site Preparation</u>	<u>Well Clearing Depth</u>	<u>Logging Status</u>	<u>Plugging Status</u>
OKLAHOMA WELLS							
1 - Midas	A	Granted	Located	Completed	1005 ft.	Completed	Completed
2 - Bird Dog	A	Granted	Located	Completed	Total Depth	Completed	Completed
3 - Adams	A	Granted	Located	Completed	Total Depth	Completed	Completed
4 - Power House	A	Granted	Located	Completed	Total Depth	Completed	Completed
5 - Goodeagle	A	Granted	Located	Completed	Total Depth	Completed	Completed
6 - Old Potter	B	Granted	Located	Completed	303 ft.	Completed	Completed
7 - S. S. & G	C	Granted	Not Located	Not Started	Not Started	Not Started	Not Started
8 - C. Y. Semple	F	N/A	N/A	N/A	N/A	N/A	N/A
9 - Scott	D	N/A	Located	Completed	260 ft.	N/A	N/A
10 - Brewster	A	Granted	Located	Completed	Total Depth	Completed	Completed
11 - Beck #1	A	Granted	Located	Completed	Total Depth	Completed	Completed
12 - Cons. No. 2 (old)	A	Granted	Located	Completed	540 ft.	Completed	Completed
13 - Netta White	C	Not Granted	Not Located	Not Started	Not Started	Not Started	Not Started
14 - Lucky Syndicate	A	Granted	Located	Completed	1040 ft.	Completed	Completed
15 - Velie Lion	A	Granted	Located	Completed	450 ft.	Completed	Completed
16 - Netta	A	Granted	Located	Completed	Total Depth	Completed	Completed
17 - Muhustska	A	Granted	Located	Completed	Total Depth	Completed	Completed
18 - Royal	A	Granted	Located	Completed	420 ft.	Completed	Completed

TABLE 2
 JUNE 30, 1985
 STATUS OF SIXTY-SIX WELLS

<u>Name</u>	<u>Category</u>	<u>Easement Status</u>	<u>Locating Status</u>	<u>Site Preparation</u>	<u>Well Clearing Depth</u>	<u>Logging Status</u>	<u>Plugging Status</u>
OKLAHOMA WELLS							
19 - Tulsa	G	Granted	Not Located	Not Started	Not Started	Not Started	Not Started
20 - Massell	A	Granted	Located	Completed	775 ft.	Completed	Completed
21 - Kropp	A	Granted	Located	Completed	Total Depth	Completed	Completed
22 - Mission	F	N/A	N/A	N/A N/A	N/A	N/A	N/A
23 - Ontario	E	N/A	N/A	N/A N/A	N/A	N/A	N/A
24 - Dobson	H	Not Granted	Located	Not Started	Not Started	Not Started	Not Started
25 - Ice Plant	C	Granted	Not Located	Not Started	Not Started	Not Started	Not Started
26 - Admiralty No. 2 (Rialto)	A	Granted	Located	Completed	700 ft.	Completed	Completed
27 - Lavrion Ramage	B	Granted	Located	Completed	215 ft.	Completed	Completed
28 - Admiralty No. 3	A	Granted	Located	Completed	580 ft.	Completed	Completed
29 - Lucky Bill	A	Granted	Located	Completed	Total Depth	Completed	Completed
30 - Lottson No. 2	B	Granted	Located	Completed	280 ft.	Completed	Completed
31 - Central Mill No. 2	A	Granted	Located	Completed	Total Depth	Completed	Completed
32 - Consolidated No. 6	A	Granted	Located	Completed	885 ft.	Completed	Completed
33 - George Van Pool	D	N/A	N/A	N/A N/A	N/A	N/A	N/A
34 - Whitebird	A	Granted	Located	Completed	240 ft.	Completed	Completed
35 - Buckeye No. 1	A	Granted	Located	Completed	407 ft.	Completed	Completed

TABLE 2
 JUNE 30, 1985
 STATUS OF SIXTY-SIX WELLS

<u>Name</u>	<u>Category</u>	<u>Easement Status</u>	<u>Locating Status</u>	<u>Site Preparation</u>	<u>Well Clearing Depth</u>	<u>Logging Status</u>	<u>Plugging Status</u>
OKLAHOMA WELLS							
37 - Discard	A	Granted	Located	Completed	350 ft.	Completed	Completed
38 - Bendene	A	Granted	Located	Completed	534 ft.	Completed	Completed
39 - Waxahachie	B	Granted	Located	Completed	239 ft.	Completed	Completed
40 - Lancaster	A	Granted	Located	Completed	Total Depth	Completed	Completed
KANSAS WELLS							
1 - Southern	A	Granted	Located	Completed	Total Depth	Completed	Completed
2 - Black Eagle	A	Granted	Located	Completed	245 ft.	Completed	Completed
3 - Big John E	A	Granted	Located	Completed	Total Depth	Completed	Completed
4 - Consolidated No. 7	A	Granted	Located	Completed	750 ft.	Completed	Completed
5 - Big John D	A	Granted	Located	Completed	530 ft.	Completed	Completed
6 - Clifford Jarrett	E	N/A	N/A	N/A	N/A	N/A	N/A
7 - Big John I	A	Granted	Located	Completed	512 ft.	Completed	Completed
8 - Tulsa Quapaw	A	Granted	Located	Completed	Total Depth	Completed	Completed
9 - Bendelari	A	Granted	Located	Completed	550 ft.	Completed	Completed
10 - Jarrett (P-54)	A	Granted	Located	Completed	1005 ft.	Completed	Completed
11 - Jarrett (P-53)	C	Granted	Not Located	Not Started	Not Started	Not Started	Not Started
12 - Treece City Well	A	Granted	Located	Completed	Total Depth	Completed	Completed
13 - New Blue Mound	A	Granted	Located	Completed	Total Depth	Completed	Completed

TABLE 2
 JUNE 30, 1985
 STATUS OF SIXTY-SIX WELLS

<u>Name</u>	<u>Category</u>	<u>Easement Status</u>	<u>Locating Status</u>	<u>Site Preparation</u>	<u>Well Clearing Depth</u>	<u>Logging Status</u>	<u>Plugging Status</u>
KANSAS WELLS							
14 - Wilbur	A	Granted	Located	Completed	1405 ft.	Completed	Completed
15 - M.E. Coe	G	Granted	Located	Completed	290 ft.	Not Started	Not Started
16 - Swalley	D	N/A	N/A	N/A	N/A	N/A	N/A
17 - West Side	E	N/A	N/A	N/A	N/A	N/A	N/A
18 - L. D. Brewster	D	N/A	N/A	N/A	N/A	N/A	N/A
19 - C. Y. Semple	A	Granted	Located	Completed	Total Depth	Completed	Completed
20 - Clark	A	Granted	Located	Completed	Total Depth	Completed	Completed
21 - Ballard	A	Granted	Located	Completed	740 ft.	Completed	Completed
22 - Iron Mountain	D	N/A	N/A	N/A	N/A	N/A	N/A
23 - Iron Mountain	A	Granted	Located	Completed	760 ft.	Completed	Completed
24 - Beck Boyalty	D	N/A	N/A	N/A	N/A	N/A	N/A
25 - Bunker Hill	D	N/A	N/A	N/A	N/A	N/A	N/A
26 - Goodeagle Refinery	A	Granted	Located	Completed	339 ft.	Completed	Completed