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ORIGINAL (RED)

SCREENING SITE INVESTIGATION

OF

CENTRAL CHEMICAL CORPORATION

HAGERSTOWN, MD

MD - 302

STAFF SIGNATURES

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1.0 INTRODUCTION

1.1 AUTHORIZATION

The Maryland Department of the Environment, Hazardous and Solid Waste Management Administration (MDE/HSWMA) performed this study under the United States Environmental Protection Agency (U.S. EPA) Contract Number MD88-0526-0408.

1.2 SCOPE OF WORK

MDE/HSWMA was contracted to perform a Screening Site Investigation (SSI) at the subject site using available information. The purpose of this study is to present and discuss groundwater, surface water and soil contamination found on- and off-site through earlier sampling conducted in the vicinity of the site. This information will be used in evaluating the relative potential of the site to cause human health/safety problems or ecological/environmental damages. If the site does not meet the criteria to be recommended for a Listing Site Inspection (LSI), it will be evaluated for further assessment and possible clean-up under the State Superfund Program.

1.3 EXECUTIVE SUMMARY

In June 1976, DDT was found in sediments of Antietam Creek by the EPA during a follow-up of routine sampling by the United States Geological Survey (U.S.G.S.). The occurrence of DDT was traced to the Central Chemical Corporation, indicating that the contaminant had migrated off-site.

As a result of the discovery of DDT in Antietam Creek, Central Chemical Corporation was the recipient of a Complaint and Order issued by the Maryland Water Resources Administration in 1977. The company was ordered to have an extensive hydrologic survey performed and to execute a plan which would contain or remove contaminants in the ground and prevent any discharge to waters of the State. The company opted to contain the contaminants through vegetative stabilization and a Notice of Compliance was issued in December 1979.

Central Chemical Corporation was again brought to the attention of MDE/HSWMA in March 1987 as the result of a complaint concerning a chemical dump discovered during excavation for a sewer line. Central Chemical Corporation was placed on CERCLIS as a result of the discovery of that dump.

Central Chemical Corporation processed pesticides for approximately 20 years. When chemicals were no longer needed,

they were disposed of on the site: soluble wastes were placed in a sinkhole which has since been filled and insoluble wastes were buried, some in the chemical dump which was disturbed by the excavation. The exact amount of chemicals disposed of in the sinkhole and dump are not known, but one former employee states that "hundreds of boxcar loads" of raw DDT were buried in trenches and many types of soluble waste were disposed of in the sinkhole.

In karst topography, which is present at this site, when soluble waste is disposed of in a sinkhole, there is a very high probability that the contaminants will enter the groundwater system.

Sample results indicate the presence of volatile organic compounds (VOCs), semi-volatile organic compounds, heavy metals and pesticides. The results of groundwater samples collected in 1988 and 1989 revealed the presence of DDT, chlorobenzene, benzene, dichlorobenzenes, trichloroethene, arsenic and endrin above proposed or current federal standards for those contaminants in drinking water.

The results of soil samples collected from 1976 to 1989 revealed the presence of DDT, lead, arsenic, chromium, methoxychlor, lindane, chlordane, dichlorobenzenes, benzene, chlorobenzene, tetrachloroethene, pentachlorophenol and endrin.

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Contaminants found in the groundwater have the potential to affect the health of residents using groundwater for drinking water. Contaminants found in sediments in a storm water drain inlet and in Antietam Creek indicate that those contaminants have migrated off-site and may pose a threat to aquatic organisms. Based on the evaluation of the history of the site and the contaminants found in the soil and groundwater, the Central Chemical Corporation site is recommended for a high priority Listing Site Inspection (LSI), ~~and MDE will prepare a work plan to address the above concerns~~.

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2.0 THE SITE

2.1 SITE LOCATION

Central Chemical Corporation is located on Mitchell Avenue in Hagerstown, Maryland, in the northeastern section of Washington County. The site is reached by taking Md Route 40 West to Franklin Street to McPherson Street to Salem Avenue (MD Route 58) to Mitchell Avenue. Follow Mitchell Avenue under the railroad tracks and Central Chemical Corporation will be on the left (See Figures 1 & 2).

Coordinates for the site are 39° 39' 23" N latitude and 77° 43' 81" W longitude.

2.2 SITE LAYOUT

Central Chemical Corporation was a pesticide and fertilizer manufacturing plant. The site is bordered on the southwest by Penn-Central Railroad, beyond which are residential areas; on the southeast by Mitchell Avenue, beyond which is the New York Central Ironworks property; on the northwest by a wooded lot, owned by Bester-Long, Inc.; on the north by a new residential development; and on the northeast by a shopping center and wooded lots, owned by Garland E. Groh.

The site consists of 19.022 acres. Warehouses and old building foundations occupy approximately one half of the site on the west side. A sinkhole, filled and regraded, is located south of the old maintenance shop. A refuse dump is located to the northeast of the pesticide formulation building (See Figure 2). It is believed that trenches were excavated to the east and northeast of the filled sinkhole, filled with chemical wastes and then covered over.

2.3 OWNERSHIP HISTORY

Central Chemical Corporation purchased the property from Franklin M. and Grace Howard Thomas on May 12, 1937, according to the land records of Washington County: Liber 204, Folio 100.

2.4 SITE USE HISTORY

Central Chemical Corporation was constructed sometime in the early 1930's. From that time until 1965, the plant primarily functioned as a job blender of agricultural pesticides. The company blended materials such as DDT, Sevin, TDE and chlordane with certain types of clay. The grinding and blending was accomplished using air and hammer mills and wetting agents, followed by dry packaging of the material. "Guthion", a pesticide and organic phosphate, was blended at the plant and caused nuisance odor problems in areas around the plant.

"Daconil" (tetrachloroisophthalonitrile), a fungicide and "Omite", an insecticide, were also processed at the plant.

In 1965, a fire destroyed the pesticide manufacturing building and those operations ceased. In 1968, the plant began to process fertilizers, blending mixtures containing potash, superphosphate, ammonium sulfate and nitrogen solution. This process was discontinued in 1984, and the buildings are currently rented as a paper warehouse.

2.5 PERMIT AND REGULATORY HISTORY

In 1970, a small dump was found, outside the company fence, by Maryland Department of Water Resources personnel which contained standing septic water and bags of pesticides. The Washington County Health Department (WCHD) subsequently required elimination of the dump.

From 1962 until 1972, numerous complaints were filed against Central Chemical Corporation for nuisance odors and visible emissions from the plant. A Plan for Compliance was developed for Central Chemical Corporation by the Division of Air Quality Control and went into effect on April 30, 1971. The Plan for Compliance was complete by February 14, 1972. Records for this time are incomplete, but it is believed that the meeting of the conditions for compliance did not adequately control the

emissions and that it was more economically feasible to shut down the plant than to purchase additional emissions control equipment.

In June 1976, the U.S. EPA discovered concentrations of DDT in sediment samples along Antietam Creek, the highest concentrations being found where Marsh Run enters Antietam Creek. Through follow-up sampling by Maryland Water Resources Administration personnel, the presence of DDT, as well as arsenic and lead, was traced to Central Chemical Corporation.

A Complaint and Order (C-077-432) was issued to Central Chemical Corporation in February 1977, stating that a pollution violation had occurred and ordering that an hydrologic investigation be performed as well as a plan for preventing contaminant migration. Supplemental Orders (C-0-77-432 A, B and C) added that contamination be prevented from discharging to the waters of the State.

Between November 1977 and November 1979, the site was visited by Water Resources Administration personnel ten times in order to gauge the progress of stabilization work required by the Plan for Compliance. A Notice of Compliance was issued on December 14, 1979.

In March 1987, an on-site chemical dump was discovered

during the excavation of a trench for a sewer line. As a result of this incident, the site was placed on the Comprehensive Environmental Response, Compensation and Liability Information Systems (CERCLIS) list. Samples taken at the time the trenching activities uncovered the dump revealed the presence of several pesticides, naphthalene, and volatile organic compounds. MDE/HSWMA requested that Central Chemical Corporation conduct a site evaluation to determine the impacts of these chemicals on the soil and groundwater.

Mr. Earl Faith, a former employee of Central Chemical Corporation spoke with MDE /HSWMA personnel on January 20, 1989 about the burying of chemicals on the site. Large amounts of chemicals were buried in trenches and soluble wastes were disposed of in a "quarry". The area indicated by Mr. Faith as a "quarry" coincides with the area on Figure which is labeled "filled and regraded sinkhole."

On March 9, 1989, the site was visited by MDE/HSWMA personnel for the purpose of performing a preliminary assessment. Dumping areas containing auto parts and miscellaneous trash were visible beneath a light layer of snow. Orange flags indicating the location of the borings were also visible.

2.6 PREVIOUS STUDIES

2.6.1 BAKER & WIBBERLY - HYDROLOGIC AND SOIL INVESTIGATION

The first study was performed in April 1977 to comply with the State of Maryland Water Resources Administration's Supplemental Order C-0-77-432A. The study was the result of DDT, lead and arsenic being found in sediments of Antietam Creek in 1976. The study involved a hydrologic and geologic evaluation of the site and included the drilling of test borings and the collection of groundwater samples both on and off site. The contaminants of concern in this study were lead (Pb), arsenic (As) and DDT. It was concluded that "the underlying clay strata has retained the lead, arsenic and DDT". As a result of this study, and a Consent Agreement with the State of Maryland, Central Chemical closed its refuse dump located to the northeast of the pesticide formulations area in 1978.

2.6.2 ROY F. WESTON - ENVIRONMENTAL INVESTIGATION

The site remained closed until 1987 when a trenching operation performed by and adjoining property owner (to install a sewer line) encountered part of the closed dump. MDE was informed of the event and an inspector collected samples for analysis prior to the contractor backfilling the trench. According to the results of the analyses, several pesticides,

naphthalene and volatile organic compounds were present. As a result, MDE requested that Central Chemical conduct a site evaluation to determine the impacts of these chemicals to the soil and groundwater beneath the site. The scope of work agreed upon between the State and Central Chemical in July 1988 included performing: 1) an historical review of past practices at the site, 2) a fracture trace analysis, 3) soil borings to auger refusal and 4) installation of four (4) monitoring wells. In addition, the State requested that upon completion of this phase, and following a review of the data, that the use of soil gas techniques and electromagnetic conductance, specifically EM-31, be performed if the data supported the use of these methodologies.

In October 1988, five borings were drilled at the site by Roy F. Weston, Inc., with an MDE representative present. An OVA meter was used on-site to monitor the borings. Grab water samples were also taken at borings BH-2 and BH-5 and analyzed for volatile organic compounds. The highest reading was encountered in BH-2 at 100 ppm. The results (Table) show low levels of 1,1-dichloroethane, trans-1,2-dichloroethene, chloroform, and trichloroethene. However, chlorobenzene was present at 651 ppb, above the State drinking water standard of 50 ppb, as well as benzene at 45 ppb, above the U.S. EPA Maximum Contaminant Level of 5 ppb. Toluene, ethylbenzene and xylene were also found; using EPA Method 601, 1,2-dichlorobenzene and 1,4-dichlorobenzene

were estimated.

A second grab sample was collected from the water in BH-5. The results here were consistent with BH-22 (Table), with chlorobenzene and benzene exceeding drinking water standards. Also, 1,2-dichlorobenzene and 1,4-dichlorobenzene were estimated at 820 ppb and 340 ppb respectively.

The borings were drilled as deep as thirty-six (36) feet and encountered black material, yellow powder, black and gray waste material, green seams, black and gray silt and clay, brown sand and silt and white powder. Strong petroleum odors were noted during the drilling. Analysis of the soil samples (dated March 23,1989) revealed the presence of:

acetone	- 0.11 ppm
chloroform	- 0.002 to 0.013 ppm
tetrachloroethene	- 0.007 ppm
benzene	- 0.005 to 0.036 ppm
toluene	- 0.003 to 0.031 ppm
chlorobenzene	- 0.034 to 4.6 ppm
m-xylene	- 0.005 to 9.2 ppm
o&p-xylene	- 0.009 to 7.5 ppm
1,3-dichlorobenzene	- 0.006 to 12 ppm
1,2-dichlorobenzene	- 0.015 to 81 ppm
1,4-dichlorobenzene	- 0.045 to 180 ppm
ethylbenzene	- 0.046 to 0.097 ppm
1,2,4-trichlorobenzene	- 2.8 to 210 ppm
naphthalene	- 0.87 ppm
phenanthrene	- 0.5 to 1.7 ppm
fluoranthene	- 1 ppm
Alpha-BHC	- 110 ppm
Delta-BHC	- 260 ppm
4,4'-DDE	- 130 to 840 ppm
4,4'-DDD	- 2100 to 22,000 ppm
4,4'-DDT	- 130 to 76,000 ppm
antimony	- 2.0 ppm
arsenic	- 5.8 to 313.0 ppm
beryllium	- 2.3 ppm

cadmium	- 1.1 ppm
chromium	- 7.7 to 46.6 ppm
copper	- 20.6 to 319.0 ppm
nickel	- 10.7 to 39.1 ppm
lead	- 14.2 to 50.8 ppm
zinc	- 52.7 to 655.0 ppm
selenium	- 0.209 ppm (EP TOX)

The concentrations of benzene and 1,4-dichlorobenzene exceed the maximum contaminant levels for drinking water standards (5 mcg/l and 75 mcg/l, respectively).

In April of 1989, Roy F. Weston, Inc. performed a geophysical study in the dump area and in the sinkhole and installed seven monitoring wells. Ground Penetrating Radar (GPR) and Electro-Magnetic Conductance (EM-31) were the methods employed. The GPR was performed to elucidate the stratigraphy over the dump area and sinkhole and to pick up any anomalies that would indicate buried material. The EM-31 was run in both the quadrature and in-phase modes to monitor conductance and magnetics in the dump and sinkhole.

2.6.2.1 GROUND PENETRATING RADAR (GPR)

Results of the GPR survey at the dump are shown in Figure 4-1 in the Weston Report (Reference 11). Only two traverses were included in the report. In order to properly evaluate the results, all the data must be presented. The method was used to determine bedrock elevations. However, in the two profiles which are presented, it is possible that the white areas are either

fill or are conductive materials. About 160 feet along the traverse is a disturbed area that should be investigated with borings or by excavation. GPR was not originally recommended because of the probable presence of clay, which interferes with the resolution. It appears from the limited data presented that the GPR indicates that 46,000 cubic yards of fill material may be in the dump. Perhaps the additional traverses would show more information.

2.6.2.2 EM-31

EM-31 with a penetration of approximately 18 feet was run over the dump and the sinkhole. The quadrature phase measures conductance and can be used to define a plume where ionic specie are present. The in-phase measures the response of the instrument to metallic objects.

Within the dump there appears to be a plume of conductive material (Figure 16, adapted from Weston). The plume is defined within the shaded area. Background conductance at this site appears to be 10 mmhos/m. The area within the dump has conductance from 30 to 110 mmhos/m according to the study. This is significantly enough above background to warrant further investigation and to suspect that ionic materials are present causing a conductance above background. The Weston report interprets "these increased conductivities most likely reflect

the thickening, more saturated and fine-grained unconsolidated materials within" the dump. It is true that saturated materials are more conductive than background, however, it is unlikely that this factor accounts for such high conductance. Samples collected from borings in October 1988 show that within the dump area the soil was contaminated with arsenic up to 313 ppm, chromium up to 46.6 ppm, copper up to 319 ppm, lead up to 50.8 ppm, nickel up to 39.1 ppm and zinc up to 646 ppm. The boring logs note that "bright green powder...white powder with plastic layers (product ?), plastic layers, paper; white powdery and dark green clay, slightly moist white powder" were present in Boring #1. Other borings in the dump area have similar materials listed in the logs. It is more probable to suspect that the higher conductivity values in the dump could come from these metals rather than any other factor.

In addition, the in-phase data shows several areas where metallic targets are suggested. The area in the northwestern corner has some particularly high values that need to be explained. There are additional areas that should have further investigation. Locations where geophysics were performed are shaded in red in Figure 15.

While the overhead lines interfered with the GPR over the sinkhole, according to the Weston Report (the traverses were not provided), there was only "minimal affect on the EM-31". Background conductivity values in the sinkhole were 1- to 20

mmhos/m. Elevated values at the boundaries of the study area were attributed to cultural features such as the platform scale and the utility pole. The magnetic anomaly just south of the sinkhole is associated with a steel drainage culvert. Therefore it appears that no plumes or magnetic anomalies are present in the sinkhole based upon the available data.

2.6.2.3 GROUNDWATER INVESTIGATION

According to an agreement with MDE, Weston drilled seven monitoring wells in April 1989 at the Central Chemical site. the wells were located based upon the regional groundwater flow to the southeast and upon the fracture traces identified by Weston (Figure 6).

In situ permeability tests were run on three wells: MW-2, 3 and 5. Tests could not be performed on wells 6 and 7 because of slumping in the wells. Also, MW-1 and MW-4 were not tested because they were completed in caverns. The variation in permeability among the three wells was from 2.56 to 1042 feet/year. This variability can be attributed to the fractures and solution cavities that develop as a result of fluid migration, even within a small area.

Six of the seven wells were sampled in May 1989 for VOCs, pesticides and total inorganics. MW-4 could not be sampled

because of insufficient water. The pH in the monitoring wells varied from 6.2 to 6.7, in which Weston attributes to be rainwater reaching equilibrium with the CO_3 ion in the carbonate rock. Normally the pH in karst topography is 7 or 8. However, according to a report by Slaughter and Darling (1962), the on-site well (Wa-Bi-19) was measured for pH and the pH was 3.0. Well Wa-Bi-19 is 318 feet deep with casing to 38 feet. The report concluded that there was chemical contamination of groundwater at the site. In addition to the anomalous pH, the total iron was 35 ppm as compared to .00-1.8 which is normally found in the Conococheague limestone. Sulfate was 2560 ppm as compared to a normal value of 8.4 - 60 ppm for that lithology.

Among the volatiles which were later encountered were chloroform, benzene and ethylbenzene. Only benzene and chlorobenzene were above the MCL. Metals were also detected with beryllium, cadmium, copper, mercury, nickel and zinc present. Alpha-BHC, Beta-BHC, Delta-BHC and dieldrin were among the pesticides which were detected.

As a result of the groundwater sampling, Weston performed an analysis of the likelihood of human exposure to the chemicals present at the site. According to the report, the main migration pathway is the groundwater, however since Weston identified no domestic water supply in the area, they concluded that there are no receptors for the compounds of concern. They also concluded

that the concentrations that were present would not be expected to produce adverse health effects.

Weston has further recommended studies to facilitate the closure of the dump area which would include:

1. the drilling of five additional monitoring wells to confirm boundary conditions
2. drill two deep wells to determine the vertical extent of contamination
3. sample wells on-site for VOCs, pesticides and total metals
4. perform packer tests in three wells to determine permeability and water chemistry in each fracture
5. drill five borings in the dump and analyze
6. repair wells MW-6 and 7 where slumping occurred
7. drill two borings in the sinkhole to confirm whether contamination exists
8. conduct a feasibility study to close the quarry
9. inventory domestic wells in the area.

2.6 REMEDIAL ACTION TO DATE

Under Complaint and Order C-O-77-432 and Supplemental Orders C-O-77-432-A, B and C, remedial action was taken to insure that there would be no migrating of contaminants through surface water runoff or through groundwater. To prevent surface water run-off,

stabilization of unvegetated and disturbed areas was required and these goals were accomplished in December 1979.

3.0 ENVIRONMENTAL SETTING

3.1 WATER SUPPLY

Hagerstown receives its drinking water via public water supplied by the Richard Wilson Filtration Plant, located on the Potomac River northwest of Williamsport, Maryland. The river flows to the south.

The service area of the public water system includes a 3-mile radius of the site and also extends beyond the 3-mile radius of the site.

Within a 3-mile radius of the site, there have been 271 well applications filed since 1969: 14 are listed as industrial wells, 25 as monitoring wells, 12 as farming wells and 219 as domestic wells. Within a one mile radius, only 14 well applications have been filed since 1969: 9 listed as domestic wells and 5 as monitoring wells (MDE Division of Residential Sanitation, 1989).

The Washington County Health Department (WCHD) only samples new wells, but will sample older wells at the request of the owner. Consequently, they do not have an accurate list of home wells being used for drinking water in the area. A house-to-house survey would be necessary to create an accurate listing of

existing wells. However, it is estimated that, combining the well applications and a groundwater study(Slaughter and Darling, 1962), at a minimum, 341 wells and springs are used for drinking water within a three mile radius. Therefore, approximately 1300 people are dependent upon groundwater as a drinking water source.

Sharpsburg, Maryland has a surface water intake on the Potomac River which serves approximately 1200 people. Sharpsburg is located 13.5 miles south of the site. There are also three springs that supply drinking water located downstream of the site: St. James School, 6.3 miles, which serves 200 people and Boonesboro, 10.8 miles and Keedysville, 11.2 miles, which combined serve 2100 people.

3.2 SURFACE WATER

Surface water runoff travels to the south and enters the Hagerstown stormwater drainage system. The stormwater system flows underground through drain lines to Walnut Street (approximately one mile) where the stormwater flow empties out of a box culvert and into an unnamed tributary to Marsh Run. The unnamed tributary flows southwest past the pond at City Park and then joins Marsh Run, which flows beside Memorial Boulevard, southeast in a concrete drainage way and feeds Antietam Creek (See Figure 4).

In 1976, sediment samples were taken from Antietam Creek. Analysis of the samples revealed the presence of DDT, lead, arsenic and other contaminants. The highest levels of DDT and lead were found in the sediments of Antietam Creek where it is joined by an unnamed tributary (also known as Marsh Run by town residents).

Some on-site surface water runoff travels into a depression, at the bottom of which is a sinkhole (approximately two feet in diameter). This depression and sinkhole are located to the north of the entrance to Central Chemical Corporation and south of the filled sinkhole, inside the fence.

There are several bodies of surface water within a 3-mile radius, including Antietam Creek (two miles southeast), Marsh Run (1.5 miles south), Hamilton Run (1.5 miles west) and the previously mentioned unnamed tributary to Marsh Run (1.1 miles southwest). There are seven or more unnamed small streams, some which feed Antietam Creek and some which feed Conococheague Creek, within the 3-mile radius. There are six or more unnamed small ponds within the 3-mile radius.

Antietam Creek and several other small streams are used for recreational purposes, primarily fishing. Surface waters are also used for irrigation of commercial crops and commercial

livestock watering.

3.3 GEOLOGY

The site is located in the Hagerstown Valley which is the eastern-most major structure in the Valley and Ridge Province. This province is characterized by rolling hills with topographic reliefs of approximately 150 feet which are the result of differential erosion of shales adjacent to carbonates. South Mountain, seven miles to the east, is the next closest major structural feature of this area. This mountain, which is cored with Cambrian-aged metasediments, is the dividing line between the Valley and Ridge Province and the Blue Ridge Province which is farther to the east.

The structural geology of the site area is explained as a sedimentary sequence of Cambrian-to-Silurian limestones, dolomites and cherts, with minor shale stringers, which have experienced multiple episodes of deformation. The deformations have generated tight, overturned folding and a complex system of faulting and jointing (See Figures 7). This network of fractures have been shown to exert a profound influence upon the hydrology of the region by: (a) affecting the direction that groundwaters are transported and (b) aiding the development of a pronounced secondary porosity within the original matrix of carbonate minerals. Secondary porosity is often developed to such a degree

that solution channels, sinkholes and caverns are formed, mostly within the upper 50 feet of the rock. This is characteristic of the development of early karst terrain.

3.4 GROUNDWATER

Public water is available to all homes within a 3-mile radius but records are not complete enough to differentiate between private and public water sources. Records of the MDE indicate that 271 wells have been drilled in a 3-mile radius of the area since 1969, of which 14 are located in a one mile radius of the site. According to Slaughter and Darling (1962), there are an additional 65 wells and 14 springs within a 3-mile radius of the site. The nearest known well is on location and is owned by Central Chemical Corporation. This well was completed in 1950. However, the exact location of this well is not known.

While it can be shown that the surface water drains to the south (See Figure 4), groundwater probably flows both east and west because of the site's location on the crest of an anticlinal feature. According to an earlier study, (Baker-Wibberly, Inc., 1977), bedding planes dip between 55-70^0 westward in the northern portion of the site and between 30-45^0 to the east when south of a postulated northwest-southeast fault that cuts across the spine of the anticline. The positioning of the site upon the arch or, "axial plane", of the anticline will cause the groundwater to

flow in opposing directions along bedding planes depending on where one is located exactly on the site.

It should be remembered that, as a result of the complexity of the limestone fracture system, groundwater transportation routes may proceed in many different directions. Virtually all formations in this region act as aquifers in response to the fracture network, and any aquitards can only be described as leaky. All formations have several subzones of greater porosity which allow relatively greater flows of water within the formation. These subzones are often discontinuous and extremely difficult to trace, but are thought to be interconnected by the fracture network. Surface expression of this network is most easily observed as trellis and rectangular drainage patterns, but can also be seen through the use of air photometry in "fracture trace" analyses. Rose diagram analyses (Baker-Wibberly, Inc., 1977) of fracture traces seen within the study area suggest a pattern which consists of both northeast/southwest and northwest/southeast joint families. The Rose analyses were complimented in 1988 by an unpublished MDE study which utilized air photometry to outline fractures at the Central Chemical site which later were verified by a field examination (See Figure 6). The dip angles of the fracture planes are not apparent, but are believed to be either vertical or steeply inclined to the east in a fashion consistent with the structural style of the region (See Figure 4). The linear extent of the on-site fractures is not

discernable because of landfill practices, but probably continues beneath the disrupted surface underneath the site.

Another consideration that relates geologic structures with the development of solution channels is that of the location of the fractures on the structures themselves. USGS studies of this area suggest that water flow is enhanced along joint patterns that occur along the crests of anticlines when compared to flow through fracture systems found in synclinal structures. This phenomenon is explained as the result of stress-field orientations which are more apt to open fissures in areas of convex folding. Conversely, areas undergoing concave flexing will still fracture, but will tend to squeeze shut many of the weakness planes. The more easily water can pass through a fracture, the quicker that fracture will succumb to dissolution forces.

There are three formations that produce water within a 3-mile radius of the site. These are: the Conococheague Limestone, the Stonehenge Limestone and the Rockdale Run formation. The Conococheague Limestone is the formation that the site rests upon.

The Conococheague Limestone of Cambrian age, is thought to be between 2000 and 2600 feet thick. The formation is best described as an argillaceous, laminated, dark slate-blue limestone with interbedded dolomites in the basal sandy portion.

Faulting has sometimes disturbed its normal underlying sequence with regard to the overlying Beekmantown Group.

Slaughter and Darling (1962) state that transmissivity values of the Conococheague range between 2,200 to 19,000 gpd/ft. According to this same report, well depths in this formation are between 40-500 feet and yield from 15-235 gpm of water (See Table 1). The well that is located on-site is completed in this formation. This well is 318 feet deep and originally yielded 45 gpm in 1950 when it was used for industrial purposes by the Central Chemical Corporation. Hydraulic conductivities are variable in karst terrains, but locally range from 2.24×10^{-2} to 2.50×10^{-3} cm/sec in this formation.

Overlying the Conococheague unit is the Ordovician-aged Stonehenge Limestone. This formation, a member of the Beekmantown Group, is approximately 500-800 feet in thickness and is composed of a massively-bedded clayey limestone which grades upward into thin conglomerate beds. Transmissivities of this unit are from 2000 to 200,000 gpd/ft. Well depths in the Stonehenge range between 70-910 feet and yield from 1.5-600 gpm. The hydraulic conductivities range from 2.2×10^{-1} to 2.198×10^{-3} cm/sec. according to pumping tests performed in this aquifer.

The third unit of concern is the Rockdale Run Formation of Ordovician age. Like the underlying Stonehenge Limestone, this

formation also is a member of the Beekmantown Group and is made up of alternating limestones and dolomites that are between 1690-2550 feet thick. The basal section of this formation consists of a cryptozoon chert, approximately 100-200 feet thick, overlain by stromatolitic silty limestones and dolomites. Transmissivity figures for the Rockdale Run Formation are from 10-127,000 gpd/ft and well depths range from 19 to 230 feet. Yields from these wells are from 1.0-30 gpm. Hydraulic conductivities range from 9.85×10^{-6} to 1.25×10^{-1} cm/sec., depending on whether they are measured in fractured zones or in competent bedrock.

3.5 SOILS

The site rests upon a soil type classified as the Hagerstown silt loam which is a deep, well-drained, mature, red-to-orange soil which develops during the weathering of limestones. Analyses of this material show the mechanical composition to be 10% clay, 10% sand and 80% silt with an organic content adequate to support a variety of crops. Soils thicknesses vary considerably from 0 to 40 feet thick over bedrock, depending on the slope of the terrain. In this particular area, slopes are between 0 and 15%.

The surface of the Hagerstown silt loam often has a friable or crumbly character which affects the rate of water percolation. These surface permeabilities generally range from 0.06 to 0.6

inches per hour which is sufficient to prevent flooding except during unusually heavy rainfalls.

The Hagerstown soils are considered to be the most important soils in Maryland. The soils are capable of supporting a large variety of commercial agricultural and wood crops with only a moderate need for expensive fertilizers. The fine particle size of the soil makes it susceptible to erosion but, with properly designed farming techniques, erosion is easily controlled.

3.6 CLIMATE AND METEOROLOGY

The site is 560 feet above sea level. Normal precipitation, measured over a 30 year period, is 38.84 inches per year, although rainfall measured 33.67 and 31.16 inches in 1987 and 1988 respectively. Average temperature, measured over the same period, is 53.5 degrees fahrenheit. These values were obtained from John Stiller, of the University of Maryland's State Climatology Office and were taken from the Hagerstown measuring station. The climate of the area is influenced by the height and breadth of the mountains which interfere with wind patterns, a phenomenon known as the "shadow effect". The net precipitation of this area is low and is calculated to be between 2.84 and 4.84 inches per year.

3.7 LAND USE AND POPULATION DISTRIBUTION

In the immediate vicinity of the site, land use is industrial, residential and commercial, but primarily residential. The Washington County Planning Commission reports that, according to the 1980 U.S. Census, the population of Hagerstown is 34,132.

3.8 SENSITIVE ENVIRONMENTS

There are no coastal wetlands within two miles of the site. Fresh water wetlands of less than five acres are located approximately 1500 feet southeast of the site (a one acre, unnamed pond) and 0.8 miles northeast of the site (Hamilton Run).

According to the United States Department of the Interior, Fish and Wildlife Service, Maryland is a habitat for the peregrine falcon, bald eagle, Indiana bat, eastern cougar, Maryland darter (fish), swamp pink, Canby's dropwort, Harperella, small whorled pogonia and sandplain gerardia.

4.0 WASTE TYPES AND QUANTITIES

4.1 PRELIMINARY INFORMATION

From approximately 1935 until 1965, pesticides were blended and packaged at this site. Mr. Robert Boone, MDE/HSWMA Regional Inspector, conducted an interview on January 20, 1989 with Earl Melvin Faith, a former employee of Central Chemical Corporation. Mr. Faith was employed at Central Chemical Corporation during the 1950's until 1965 as a supervisor overseeing warehouse operations.

"Mr. Faith said that when raw materials became defunct and were banned by the government, he was informed via company directives to bury said materials either in an old stone quarry which held approximately 15 feet of water (for soluble waste) or to bury the materials in 40 x 5 feet deep trenches throughout areas east/northeast form the quarry (for insoluble wastes). Mr. Faith said that he was personally responsible for the disposal of the following wastes during this period of time and said that it was acceptable practice for land disposal back then.

Wastes disposed of in a quarry (now abandoned) included bags of crystallized copper sulfate, bags of powdered chlordane, bags of powdered sulfur, bags of powdered arsenic and other soluble wastes. Wastes disposed of in earthen trenches included bags of

unusable lime and sulfur (Dow Chemical), several thousand gallons of chlordane which was disposed in bags, 50-60 tons of Para Screen" which was used to mix with an insecticide and disposed of in 55 gallon fiber drums, cyanide gas canisters, sulfuric acid canisters, muriatic acid canisters, approximately fifty 55 gallon drums of 2-4,5T and a couple of hundred tons of DDT in fiber 55 gallon drums" (Memo to Central Chemical file from Robert Boone).

On February 22, 1989, Alan Williams and Laura Myers-Paligo, MDE/HSWMA, interviewed Mr. Faith again. Mr. Faith spoke about the hazardous waste mentioned above and added that he had buried "Dyrene". On this occasion, Mr. Faith stated that he had also buried large quantities of raw DDT in bags, "hundreds of boxcars", and that, one time only, some waste had been hauled to a county landfill.

The limited data presented by the GPR performed by Weston indicates that 46,000 cubic yards of fill material may be in the dump.

4.2 ANALYTICAL RESULTS

On June 22, 1976, 11 sediment samples were collected along Antietam Creek. Samples 6 - 11 were collected downstream from Central Chemical corporation. Samples 6 - 10 have elevated levels of DDT (2.059 - .047 ppm). All samples have elevated

levels of arsenic (5.07 - 1.03 ppm) and lead (1070 - 5 ppm). Levels of DDT and lead are highest at the site of sample 6, the first sample point downstream of Central Chemical Corporation. All samples also have elevated levels of chromium (80 - 11 ppm), with the highest level being from sample point 4, upstream of Central Chemical Corporation (See Table 1).

Four soil samples were collected on August 3, 1976. Two were collected from drainage ditches on Central Chemical Corporation property and one from a drain inlet pipe and one from a storm drain inlet. All samples had elevated levels of lead, arsenic and DDT. Sample 1, a drainage ditch, contained 188 ppm lead, 53.75 ppm arsenic, and 1.867 ppm DDT. Sample 2, a drainage ditch, contained 100.5 ppm lead, 16.17 ppm arsenic and 6535 ppm DDT. Sample 3, a drain inlet pipe, contained 124 ppm lead, 34 ppm arsenic and 6931 ppm DDT. Sample 4, a storm drain inlet, contained 138.5 ppm lead, 16.5 ppm arsenic and 46.68 ppm DDT. The storm drain where sample 4 was collected leads to an unnamed tributary and then to Antietam Creek (See Table 2).

Soil borings were collected on October 28 and 29, 1976 from seven locations at several depths at Central Chemical Corporation. Sample 1 revealed concentrations of lead (up to 325 ppm), arsenic (up to 20.85 ppm) and DDT (up to 471 ppm). Sample 2 revealed concentrations of lead (93.5 ppm), arsenic (16.28) and DDT (119.5 ppm). Sample 3 revealed concentrations of lead (up to

197 ppm), arsenic (up to 300 ppm) and DDT (653.6 ppm). Sample 4 revealed concentrations of lead (31 ppm), arsenic (38 ppm) and DDT (85 ppm). Sample 5 revealed concentrations of lead (114.5 ppm), arsenic (17.7 ppm) and DDT (70.7 ppm). Sample 6 revealed concentrations of lead (up to 90.8 ppm), arsenic (up to 39.3 ppm) and DDT (up to 1646.4 ppm). Sample 7 revealed concentrations of lead (up to 89.1 ppm), arsenic (2.17 ppm) and DDT (up to 27.3 ppm) (See Table 2).

Soil borings were collected between April 26 and May 2, 1977 from 23 locations at several depths. Samples revealed elevated concentrations of lead, arsenic and DDT. Concentrations of lead ranged from 4.6 to 1020 ppm. Concentrations of arsenic ranged from 3.9 to 306 ppm. Concentrations of DDT ranged from 0.33 to 392.9 ppm (See Table 3).

The two monitoring wells sampled on May 16, 1977 contained lead, arsenic and DDT. In MW-A-5, the concentration of DDT was 0.33 ppb. In MW-E-7A, the concentration of arsenic was 1970 ppb and the concentration of DDT 2.20 ppb. Lead was present in both wells, but the concentration was less than 50 ppb (See Table 4).

One surface water sample was collected on May 16, 1977 from an abandoned quarry located 1200 feet south of the Central Chemical Corporation. The results indicate the presence of DDT at a concentration of 0.36 ppb, lead at less than 50 ppb and arsenic at less than 20 ppb (See Table 4).

ORIGINAL (RED)

A soil sample was collected on March 27, 1987 from the dump area. The sample revealed elevated concentrations of chlordane (424 ppm), methoxychlor (9800 ppm), 4,4'DDE (734 ppm), 4,4'DDD (345 ppm), 4,4'DDT (3700 ppm), lindane 15 ppm), 1,2-dichlorobenzene (45 ppm), 1,4-dichlorobenzene (14 ppm), chlorobenzene (16 ppm) and (2-butanone) (29 ppm) (See Table 5).

Soil samples were collected from seven borings on October 25 and 26, 1988. Samples revealed the presence of acetone (110 ppb), chloroform (13 ppb), tetrachloroethene (8 ppb), benzene (17 ppb), toluene (31 ppb), chlorobenzene (4600 ppb), xylenes (9200 ppb), 1,2-dichlorobenzene (81000 ppb), 1,3-dichlorobenzene (1200 ppb), 1,4-dichlorobenzene (180,000 ppb), ethylbenzene (53 ppb), 1,2,4-trichlorobenzene (210 ppm), naphthalene (3.7 ppm), pentachlorophenol (0.83 ppm), phenanthrene (8.4 ppm), fluoranthene (3 ppm), benzo(a)pyrene (0.091 ppm), pyrene (0.18 ppm), chrysene (0.15 ppm), anthracene (0.3 ppm), bis(2-ethylhexyl)phthalate (5.9 ppm), di-n-butylphthalate (11 ppm), arsenic (313 ppm), beryllium (2.3 ppm), chromium (46.6 ppm), copper (319 ppm), nickel (39.1 ppm), lead (50.8 ppm), zinc (646 ppm), alpha-BHC (110 ppm), beta-BHC (790 ppm), delta-BHC (260 pm), DDE (1200 ppm), DDD (22,000 ppm) and DDT (76,000 ppm). (See Tables 6 & 7).

Groundwater samples were collected from two bore holes on

October 25 and 26, 1988. Methylene chloride (50 ppm) and acetone (26 ppm) were present in BH-5. The samples from BH-2 revealed the presence of 1,1-dichloroethane (2.0 ppb), chloroform (up to 12 ppb), trichloroethene (3 ppb), benzene (45 ppb), toluene (7 ppb), chlorobenzene (651 ppb), 1,3-dichlorobenzene (27 ppb), 1,2-dichlorobenzene (270 ppb), 1,4-dichlorobenzene (630 ppb) and ethylbenzene (up to 97 ppb) (See Tables 6 & 7).

Five soil samples were collected on and off-site on April 27, 1989. Results revealed the presence of DDT (798 ppm), DDD (0.860 ppm), DDE (43 ppm), chlordane (31 ppm), alpha-BHC (2.5 ppm), beta-BHC (2.5 ppm), lindane (0.46 ppm), delta-BHC (0.57 ppm) and endrin (40 ppm) (See Table 8).

Groundwater samples were collected on May 17 and 18, 1989. Samples from MW-1 revealed the presence of chloroform (2 ppb), 1,1,1-trichloroethane (1 ppb), 1,2-dichlorobenzene (up to 2.2 ppb), chlorobenzene (1 ppb), mercury (0.48 ppb), alpha-BHC (0.8 ppb), beta-BHC (up to 2.4 ppb), lindane (0.1 ppb), delta-BHC (up to 3 ppb) and dieldrin (up to 6 ppb) (See Tables 9 & 10).

Samples from MW-2 revealed the presence of benzene (19 ppb), toluene (1.3 ppb), chlorobenzene (182 ppb), total xylene (2.1 ppb), 1,2-dichlorobenzene (6.9 ppb), 1,4-dichlorobenzene (22 ppb), ethylbenzene (5.0 ppb), xylenes (4 ppb), acetone (168 ppb), isopropyl alcohol (250 ppb), arsenic (0.01 ppm), copper (33.8

ppb), zinc (23.7 ppb), mercury (0.001 ppm), alpha-BHC (0.5 ppb), beta-BHC (5 ppb) and delta-BHC (up to 12 ppb).

Samples from MW-3 revealed the presence of benzene (11 ppb), chlorobenzene (8.8 ppb), 1,2-dichlorobenzene (1.9 ppb), 1,4-dichlorobenzene (6.1 ppb), zinc (20.8 ppb), alpha-BHC (up to 3.9 ppb), beta-BHC (up to 7.8 ppb), and delta-BHC (up to 19 ppb).

Samples from MW-5, revealed the presence of benzene (14 ppb), chlorobenzene (109 ppb), total xylene (1 ppb), 1,2-dichlorobenzene (5.8 ppb), 1,4-dichlorobenzene (12 ppb), copper (25.5 ppb), zinc (54.3 ppb), alpha-BHC (up to 12 ppb), beta-BHC (4 ppb), lindane (3 ppb) and delta-BHC (up to 14 ppb).

Duplicate samples from MW-5 revealed the presence of benzene (8.7 ppb), chlorobenzene (80 ppb), total xylene (1.1 ppb), 1,2-dichlorobenzene (5.2 ppb), 1,4-dichlorobenzene (13 ppb), copper (27.1 ppb), zinc (57.5 ppb), alpha-BHC (23 ppb) and delta-BHC (16 ppb).

Samples from MW-6 revealed the presence of chloroform (2 ppb), 1,2-dichlorobenzene (2 ppb), chlorobenzene (1 ppb), arsenic (0.003 ppb), beryllium (38.3 ppb), cadmium (5 ppb), copper (55.9 ppb), nickel (379 ppb), zinc (512), alpha-BHC (1 ppb), beta-BHC (2 ppb), lindane (0.2 ppb), delta-BHC (0.5 ppb), and dieldrin (0.4ppb).

Samples from MW-7 revealed the presence of chloroform (12 ppb), 1,1-dichloroethane (2 ppb), zinc (56.8), alpha-BHC (3 ppb), beta-BHC (57 ppb), lindane (1 ppb), delta-BHC (8 ppb), dieldrin (3 ppb) and endrin (3 ppb).

Figure 8 indicates the locations of sediment samples collected off-site in 1976 (Table 1). Samples 0291, 0277 and 0000 were collected upstream and east of the site. They are background samples with low concentrations of DDT and relatively low concentrations of lead and arsenic. Sample 0251 is slighty upstream of the site and has a low concentration of DDT and a relatively low concentration of lead, but has an elevated concentration of arsenic (5.07 ppm). Sample 0001 is downstream of the site, at the confluence of Marsh Run and Antietam Creek. This sample has a high concentration of DDT (2.059 ppm), an extremely high concentration of lead (1070 ppm) and an elevated level of arsenic (4.89 ppm), but this sample has a lower concentration of arsenic than Sample 0251, upstream of the site. Farther downstream of the site, Samples 0229, 0203 and 0134 reveal diminishing levels of DDT, lead and arsenic. Stormwater from the site enters an unnamed tributary which enters Marsh Run prior to Marsh Run joining Antietam Creek. These samples and subsequent investigation led to a Complaint and Order being issued to Central Chemical Corporation for a pollution violation in relation to the release of DDT, as well as lead and arsenic,

to the waters of the State.

Figure 9 is a map which depicts concentrations of DDT found in soil samples collected from bore holes in the dump area (Table 7). The DDT concentrations were converted to percent and the contours are presented logarithmically in percent to aid interpretation. The contours in this figure indicate the presence of an elongated plume.

Figure 10 is a map which depicts concentrations of chlorobenzene found in soil samples collected from bore holes in the dump area (Table 6). The chlorobenzene concentrations are presented logarithmically in ppb. As in Figure 9, the contours indicate the presence of an elongated plume.

Figure 11 indicates the location of soil samples collected on- and off-site that revealed the presence of pesticides such as DDT, chlordane, endrin and alpha, beta, delta and gamma-BHC (Table 8). Sample 5 is a background sample from an adjacent property located northwest of the site and reveals low concentrations of total pesticides. Sample 3 was collected from the west side of the site, outside the property line, from an area where two drains discharge. This sample contained the highest concentration of total pesticides (860.88 ppm). Sample 4 contained the next highest concentration of total pesticides (241.87 ppm) and was collected from the northwest corner of the

site near the pesticide storage building. Sample 2 was collected upgradient of a storm drain and contained concentrations of total pesticides (168.99 ppm). Sample 1 was collected from the storm drain, downgradient of Sample 2, and contained 67.15 ppm total pesticides. Some of these pesticides have migrated off-site and may pose a risk to human and/or environmental health.

Figures 12, 13 and 14 (Table 10) indicate the location of monitoring wells which were sampled by Weston. In Figure 12, total VOCs in groundwater were found to be present up to 203 ppb. Several VOCs are known or suspected carcinogens and have been assigned an MCL for public drinking water by the U.S. EPA. The highest concentrations occur in the dump area in MW-2 (203 ppb) and south of the filled sinkhole in MW-5 (108 ppb). Figure 13 depicts the levels of total metals found in groundwater. Total metals are highest (990 ppb) in MW-6, located next to the warehouse and lowest (0.480) in MW-1, north of the access road. Figure 14 depicts the levels of total pesticides found in groundwater. Total pesticides are highest (57 ppb) in MW-7, on the west side of the property and lowest (0 ppb) in MW-6, located next to the warehouse.

Figure 15 depicts the areas of the property that were surveyed with Ground Penetrating Radar (GPR) and EM-31.

5.0 FIELD TRIP REPORT

5.1 SITE OBSERVATIONS

On March 9, 1989, the site was visited by Robert Boone and Laura Myers-Paligo, MDE/HSWMA. Mr. Boone related his interview with Earl Faith, indicating that Mr. Faith accompanied him to the site and pointed out the location of the "quarry" where soluble wastes were dumped and the location of earthen trenches where insoluble wastes were dumped. Mr. Boone stated that the area that Mr. Faith referred to as a "quarry" was the same area marked on Figure 2 as "filled and regraded sinkhole". The ground at the site was snow covered, but areas of dumping were still visible. Stakes with orange flags were also visible; these indicate the location of borings performed on October 25-27, 1988.

To the south of the "filled and regraded sinkhole" is a depression containing a smaller sinkhole (approximately two feet in diameter).

In April of 1989, Mary-Linda Adams and Jon Mattes visited the site. They met with Dr. Fred Bop of Roy F. Weston, Inc., Central Chemical Corporation's consulting firm to discuss Weston's sampling plan.

ORIGINAL (RED)

5.2 PERSONS CONTACTED

1. Barbara Brown
   MD Department of the Environment - HSWMA
   (301) 631-3487

2. Robert Boone
   MD Department of the Environment - HSWMA
   (301) 791-4787

3. Raymond Ludlow
   MD Department of the Environment - WMA
   (301) 631-3654

4. Greg Anderson
   MD Department of the Environment - WMA
   (301) 631-3707

5. Kirk Warner, Assistant Superintendent
   Hagerstown Water Department
   (301) 790-3200, ext. 174

6. Bob Gudmundson
   Washington County Planning Commission
   (301) 733-4702

7. Earl Melvin Faith
   Hagerstown Street Department
   (301) 790-3200, ext. 179

8. David Schwartz, President
   Central Chemical Corporation
   (301) 733-4702

9. Dr. Fred Bop
   Roy F. Weston, Inc.
   (301)

6.0 TOXICOLOGICAL EVALUATION

6.1 INTRODUCTION

Sediment samples were collected from 11 locations along Antietam Creek on June 22, 1976. Organic analyses were performed by TSD-Chemical and Biological Investigations Laboratory. Metals analyses were performed at the U.S. EPA Annapolis Field Office.

On August 3, 1976, personnel from the Maryland Water Resources Administration (MD/WRA) collected soil samples from two drainage ditches on the Central Chemical Corporation property and from two drainage inlets leading from the property. On October 28 and 29, 1976, personnel from the Maryland Water Resources Administration (MD/WRA) conducted soil borings and collected 15 split spoon samples from Central Chemical Corporation property. The samples collected on August 3, October 28 and 29, 1976 were analyzed for arsenic, lead and DDT by the MD/WRA laboratory.

Between April 26 and May 2, 1977, Baker-Wibberly & Associates, Inc. performed 33 test borings and collected 62 soil samples at the site. The soil samples were analyzed for arsenic, lead and DDT. On May 16, 1977, Baker-Wibberly & Associates, Inc. collected water samples from two monitoring wells and an abandoned quarry. All samples were analyzed for arsenic, lead and DDT. The Baker-Wibberly report does not indicate where the samples were analyzed.

On March 27, 1987, personnel from MD/DHMH collected one soil sample from the Central Chemical dump area which was analyzed for EP Toxicity Organics, organics and volatile organics by the MD/DHMH laboratory.

Between October 25 and 28, 1988, Weston, Inc. performed borings, collected soil samples from seven bore holes and collected water samples from two bore holes at the site. The two water samples were split with MDE. The soil samples collected by Weston were analyzed for volatile organics, semi-volatiles, inorganics, pesticides and herbicides by Weston. The water samples were analyzed for volatile organics, both for Weston and MDE.

On April 27, 1989, MDE personnel collected five soil samples which were analyzed for pesticides by the MD-DHMH laboratory.

On May 17 and 18, 1989, MDE personnel collected samples from seven monitoring wells which were split with Weston. The MDE samples were analyzed for total metals, volatile organics and pesticides by the MD-DHMH laboratory. The samples taken by Weston were analyzed for volatile organics, pesticides and inorganics by Weston.

Contaminants successfully analyzed and revealed in the data include heavy metals, pesticides, volatile organic compounds (VOCs)

and semi-volatile organic compounds. The main contaminants of concern are lead, arsenic, chromium, pesticides and VOCs. Arsenic, pesticides and VOCs were present in groundwater in excess of the U.S. EPA's Maximum Contaminant Level (MCL), Proposed Maximum Contaminant Level (PMCL), or the National Interim Primary Drinking Water Regulation (NIPDWR), hereafter referred to as the Interim Maximum Contaminant Level (IMCL).

Lead, arsenic, chromium, pesticides and VOCs were present in soil in excess of the U.S. EPA's MCL, PMCL or IMCL. The MCL is a standard for public water systems, but it is used as a standard for soil because there are no standards set for soil and contaminants that are in the soil have the potential for migrating to the groundwater. Concentrations of lead in one sample also exceed the U.S. EPA's 10-day health advisory for lead in soil (500 ppb).

6.2 ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

6.2.1 GROUNDWATER

The two monitoring wells sampled on May 16, 1977 contained lead, arsenic and DDT. Concentrations of DDT were present up to 2.20 ppb. Concentrations of arsenic were above the U.S. EPA's Maximum Contaminant Level (MCL) for arsenic, 0.05 ppb (See Table 4).

Groundwater samples were collected from two bore holes on October 25 and 26, 1988. The samples revealed the presence of methylene chloride, acetone, 1,1-dichloroethane, chloroform, trichloroethene, benzene, toluene, chlorobenzene, 1,3-dichlorobenzene, 1,2-dichlorobenzene, 1,4-dichlorobenzene and ethylbenzene. The U.S. EPA's MCL or PMCL was exceeded for several contaminants: benzene (5 ppb MCL), trichloroethene (5 ppb MCL), 1,4-dichlorobenzene (75 ppb MCL) and chlorobenzene (100 ppb PMCL) (See Table 6).

Groundwater samples were collected from six monitoring wells on May 17 and 18, 1989. Samples revealed the presence of 1,1-dichloroethane, chloroform, 1,1,1-trichloroethane, 1,2-dichlorobenzene, 1,4-dichlorobenzene, chlorobenzene, benzene, toluene, xylenes, acetone, isopropyl alcohol, arsenic, beryllium, cadmium, copper, mercury, nickel, zinc, alpha-BHC, beta-BHC, lindane, delta-BHC, dieldrin and endrin. The U.S. EPA's MCL, IMCL or PMCL was exceeded for several contaminants: benzene (5 ppb MCL), arsenic (5 ppb IMCL), endrin (0.2 ppb IMCL) and chlorobenzene (100 ppb PMCL) (See Tables 9 and 10).

6.2.2 SOIL/SEDIMENT

On June 22, 1976, 11 sediment samples were collected along Antietam Creek. Samples 6 - 11 were collected downstream from

Central Chemical corporation. Samples 6 - 10 have elevated levels of DDT (2.059 - .047 ppm). All samples have elevated levels of arsenic (5.07 - 1.03 ppm) and lead (1070 - 5 ppm). Levels of DDT and lead are highest at the site of sample 6, the first sample point downstream of Central Chemical Corporation. All samples also have elevated levels of chromium (80 - 11 ppm), with the highest level being from sample point 4, upstream of Central Chemical Corporation. The U.S. EPA's IMCL was exceeded for lead (50 ppb IMCL) and arsenic (5 ppb IMCL) (See Table 1).

Four soil samples were collected on August 3, 1976. Two were collected from drainage ditches on Central Chemical Corporation property and one from a drain inlet pipe and one from a storm drain inlet. All samples had elevated levels of lead, arsenic and DDT. The storm drain where sample 4 was collected leads to an unnamed tributary and then to Antietam Creek. The U.S. EPA's IMCL was exceeded for lead and arsenic (See Table 2).

Soil borings were collected on October 28 and 29, 1976 from seven locations at several depths at Central Chemical Corporation. Samples revealed elevated concentrations of lead, arsenic and DDT. The U.S. EPA's IMCL was exceeded for lead and arsenic (See Table 2).

Soil borings were collected between April 26 and May 2, 1977 from 23 locations at several depths. Samples revealed elevated

concentrations of lead, arsenic and DDT. The U.S. EPA's IMCL was exceeded for lead and arsenic (See Table 3).

A soil sample was collected on March 27, 1987 from the dump area. The sample revealed elevated concentrations of chlordane, methoxychlor, 4,4'DDE, 4,4'DDD, 4,4'DDT, lindane, 1,2-dichlorobenzene and 1,4-dichlorobenzene as well as chlorobenzene and (2-butanone). The U.S. EPA's MCL, IMCL or PMCL was exceeded by chlordane (2 ppb PMCL), methoxychlor (100 ppb IMCL), lindane (4 ppb IMCL), 1,2-dichlorobenzene (600 ppb PMCL) and 1,4-dichlorobenzene (75 ppb MCL) (See Table 5).

Samples were collected from seven borings on October 25 and 26, 1988. Samples revealed the presence of VOCs, semi-volatile compounds, inorganics and pesticides. The U.S. EPA's MCL, IMCL and PMCL was exceeded by benzene (5 ppb MCL), chlorobenzene (100 ppb PMCL), tetrachloroethene (5 ppb PMCL), 1,2- and 1,3-dichlorobenzene (600 ppb PMCL), 1,4-dichlorobenzene (75 ppb MCL), pentachlorophenol (200 ppb PMCL), arsenic (5 ppb IMCL), chromium (50 ppb IMCL) and lead (5 ppb IMCL) (See Tables 6 and 7).

Five soil samples were collected on and off-site. Results revealed the presence of DDT, DDD, DDE, chlordane, alpha-BHC, beta-BHC, lindane, delta-BHC and endrin. The U.S EPA's IMCL or PMCL was exceeded by chlordane (2 ppb PMCL), lindane (4 ppb IMCL) and endrin (0.2 ppb IMCL) (See Table 8).

6.2.3 SURFACE WATER

One surface water sample was collected from an abandoned quarry located 1200 feet south of the Central Chemical Corporation. The results indicate the presence of DDT, lead and arsenic (See Table 4).

6.2.4 BURIED OBJECTS

The interview in Section 4.0 with a former employee states that there are buried canisters of cyanide gas, muriatic acid and sulfuric acid at Central Chemical Corporation.

6.3 POTENTIAL ENVIRONMENTAL AND HUMAN EXPOSURE PATHWAYS

Potential environmental pathways include those related to human exposure to contaminated soil, surface water, groundwater and the food chain. Potential human exposure to contaminants include direct contact with and inhalation of soil, ingestion of water through use of residential wells and direct contact with surface water and sediment. There is open access to the dump area, so there is a threat of exposure to children or other persons in the vicinity of the site. There is also a potential for contaminated dust to accumulate on shoes and tires and therefore carry contamination off-site.

Contaminants have been shown to have migrated off-site. DDT, DDE, chlordane, alpha-, beta-, gamma- and delta-BHC and endrin were detected in sediment in a storm drain that receives run-off from Central Chemical. The storm drain empties into an unnamed tributary to Marsh Run and Antietam Creek (See Figure 1). In 1976, DDT was detected in Antietam Creek and the source was traced to Central Chemical Corporation. There is a potential for contaminants on-site to adversely affect aquatic life in the unnamed tributary, Marsh Run and Antietam Creek.

Some of the contaminants, particularly DDT and chlordane, are persistent in the environment and can be bioaccumulated in the food chain. A threat to human health from bioaccumulation exists when people eat organisms belonging to a food chain that included the contaminant.

6.4 DEMOGRAPHICS

The site is located in the City of Hagerstown in Washington County. There are residential areas and a shopping center in close proximity to the site. The population of Hagerstown is 34,132. Approximately 1300 people are dependent on groundwater as a drinking water source within a 3-mile radius of the site.

6.5 HEALTH EFFECTS OF CONTAMINANTS FOUND

6.5.1 LEAD

Elevated lead concentrations were found in on-site soil samples (up to 1020.0 ppm) and off-site sediment samples (up to 1070 ppm). Lead is considered to be a hazardous substance and a priority toxic pollutant by the U.S. EPA. The IMCL for lead in public drinking water is 50 ppb and the PMCL is 5 ppb. Lead may enter the body through inhalation of dusts, ingestion and skin and eye contact. Children, especially those under two years of age, are most threatened by exposure to lead, which can cause permanent damage to the developing nervous system leading to mental retardation or more subtle learning, behavioral or psychological problems. Lead also effects blood forming organs, causing anemia, and can damage other body systems such as the kidneys (MDE/TESH). Exposure to lead presents a hazard to reproduction, and exerts a toxic effect on conception, pregnancy and the fetus. Studies, using animals, suggest that lead may have adverse effects on the immune system. Lead has been shown to reduce or eliminate populations of bacterial and fungi normally found on leaf surfaces and in soil (Clement Associates, 1985 and Sittig, 1985).

6.5.2 ARSENIC

Arsenic was found in groundwater and soil samples on-site (up

to 1.97 ppm and 300 ppm, respectively) and sediment samples off-site (up to 5.07 ppm). Arsenic is considered a carcinogen, a hazardous waste constituent, a hazardous substance in some forms and a priority toxic pollutant by the U.S. EPA. The IMCL for arsenic in public drinking water is 50 ppb. Arsenic enters the human body through skin, eyes or respiration or ingestion. Arsenic compounds may produce contact dermatitis and skin sensitization, skin cancer and lung cancer. Skin cancer in humans is associated with exposure to arsenic compounds in drinking water, drugs and occupational environment. Arsenic compounds have been reported to be teratogenic, fetotoxic and embryotoxic in several animal species. An increased incidence of multiple malformations among children born to women occupationally exposed to arsenic have been reported. Arsenic compounds have been found to cause chromosomal damage in animals and chromosome aberrations in humans (Clement Associates, 1985 and Sittig, 1985).

6.5.3 CHROMIUM

Chromium was found in on-site soil samples (up to 46.6 ppm). Chromium is considered a hazardous waste constituent and a priority toxic pollutant by the U.S. EPA. The hexavalent form of chromium (+ 6) is considered to be a primary carcinogen, inducing cancer at the site of administration only, in animals and humans. The IMCL for chromium in public drinking water is 50 ppb. Chromium compounds act as allergens which cause dermatitis to exposed skin.

Inhalation of hexavalent chromium salts causes irritation and inflammation of the nasal mucosa and ulceration and of the nasal septum. Hexavalent chromium also produces kidney damage in humans and animals. The kidneys and respiratory system are more sensitive than the liver to the toxic effects of hexavalent chromium. Hexavalent chromium compounds can cause DNA and chromosomal damage in humans and animals (Clement Associates, 1985).

6.5.4 BENZENE

Benzene was found in on-site groundwater (up to 45 ppb) and soil (up to 17 ppb). Benzene is considered a carcinogen by the International Agency for Research on Cancer (IARC) and a hazardous substance, a hazardous waste and a priority toxic pollutant by the U.S. EPA. The MCL for benzene in public drinking water is 5 ppb. Chronic exposure to benzene has been shown to cause leukemia in humans and aplastic anemia with a latent period of up to ten years. Benzene exposure is associated with chromosomal damage in animals and humans. Exposure to very high concentrations of benzene can be fatal within minutes. Liquid and vapor phases of benzene may cause irritation to the eyes, skin and upper respiratory tract. Liquid aspirated into the lungs may cause pulmonary edema and hemorrhage (Clement Associates, 1985 and Sittig, 1985).

6.5.5 CHLOROBENZENE

Chlorobenzene was found on-site in groundwater (up to 651 ppb)

and soil (up to 4600 ppb). Chlorobenzene is considered a hazardous substance, a hazardous waste and a priority toxic pollutant by the U.S. EPA. The PMCL for chlorobenzene in public drinking water is 100 ppb. The State of Maryland recommends 50 ppb chlorobenzene in drinking water. Chlorobenzene is a component of DDT. Chlorobenzene enters the body through inhalation, ingestion and eye and skin contact and may cause irritation of the eyes, throat and skin, drowsiness, incoherence and liver damage. Chlorobenzene is soluble in alcohol, benzene and chloroform, all of which are present in the groundwater and soil at the site (Sittig, 1985).

6.5.6 DICHLOROBENZENE

Dichlorobenzene (1,2-,1,3- and 1,4-) (DAB) were found on-site in groundwater (up to 900 ppb) and soil (up to 180,000 ppb). Dichlorobenzenes are considered to be hazardous substances, hazardous wastes and priority toxic pollutants by the U.S. EPA. The MCL for 1,4 dichlorobenzene in public drinking water is 75 ppb. The PMCL for 1,2- and 1,3-dichlorobenzene in public drinking water is 600 ppb. Routes of entry for dichlorobenzene include inhalation, ingestion, eye and skin contact for 1,4-DAB and also skin absorption for 1,2-DAB. DAB has been known to cause hemolytic anemia and liver necrosis, and 1,4-DAB has been found in human fat tissues. Other health effects of DAB include headaches, irritation of eyes and nose, skin blistering, liver and kidney damage, weight loss, jaundice and cirrhosis (Sittig, 1985).

6.5.7 TRICHLOROETHENE (TCE)

TCE was found in groundwater samples on-site (up to 3 ppb). It is considered to be an animal carcinogen by the IARC and a hazardous substance, a hazardous waste and a priority toxic pollutant by the U.S. EPA. The MCL for TCE in public drinking water is 5 ppb. Routes of entry to the body include inhalation, ingestion, skin absorption and skin and eye contact. Irritation to eyes, nose and throat may be a result of exposure to TCE vapor. Liquid TCE may cause dermatitis after prolonged or repeated skin contact. Acute exposure to TCE depresses the central nervous system and unconsciousness and death have been reported (Sittig, 1985).

6.5.8 PENTACHLOROPHENOL

Pentachlorophenol (PCP) was found in an on-site soil sample (0.83 ppm). It is considered to be a hazardous substance, a hazardous waste and a priority toxic pollutant by the U.S. EPA. The PMCL for pentachlorophenol in public drinking water is 200 ppb. PCP is a bactericide, fungicide and slimicide which is used for wood preservation. It is also used as an insecticide because of it's biological properties as a chlorinated hydrocarbon. Routes of entry to the body include inhalation, ingestion, skin absorption and eye and skin contact. Chronic exposure to PCP may result in

headache, irritation of eyes, nose and throat, muscle weakness, chloracne, weight loss and liver and kidney damage (Sittig, 1985).

6.5.8 PESTICIDES

Endrin was found in a groundwater sample on-site (3 ppb) and soil samples on-site (up to 40 ppm). It is considered to be a hazardous substance, a hazardous waste and a priority toxic pollutant by the U.S. EPA. The IMCL for endrin in public drinking water is 0.2 ppb. Endrin can enter the body through inhalation, ingestion, skin absorption and eye and skin contact and mainly effects the central nervous system. Endrin is persistent in the environment, strongly bioaccumulated by aquatic organisms and is highly toxic to mammals, aquatic and terrestrial wildlife after acute exposure.

Dieldrin was found in groundwater samples on-site (up to 6 ppb). Dieldrin is considered to be a hazardous substance, a hazardous waste and a priority toxic pollutant by the EPA. Dieldrin is also considered an animal carcinogen by IARC and may be a human carcinogen. There is no MCL set for dieldrin, but to protect human health, the permissible concentration in water is preferably zero. Dieldrin may enter the body through inhalation, ingestion, skin absorption and skin and eye contact. Acute health effects include nausea, headaches, vomiting, irritability and

weakness, with severe exposure possibly causing convulsions and death. Chronic health effects can occur at some time after exposure and last for an unspecified amount of time. Chronic effects may include cancer, liver and central nervous system damage, skin rash, delayed convulsions, reduced fertility and damage to a developing fetus. Dieldrin is concentrated in breast milk and thereby may be transferred to breast-feeding infants. Dieldrin is very persistent in the environment, bioaccumulates in the fat tissues of humans and wildlife and is toxic to freshwater and marine organisms. Dieldrin is very toxic to terrestrial wildlife and domestic animals at low levels.

DDT, lindane, chlordane and methoxychlor were found in soil samples on-site (up to 76,000 ppm, 15 ppm, 424 ppm and 9800 ppm, respectively). DDT was also found in sediment samples off-site (up to 2.059 ppm). DDT is considered to be a hazardous substance, a hazardous waste, a priority toxic pollutant and a potential carcinogen by the U.S.EPA. There is no MCL set for DDT, but the EPA has determined that a level of 0.00024 ug/l in water will impose a lifetime cancer risk of 1 in 100,000 (10^{-5}).

DDT may enter the body through inhalation, ingestion, skin absorption and eye and skin contact. Acute effects of exposure to DDT include a prickling sensation in the tongue mouth and lower face, dizziness, abdominal pain, headache, nausea, and loss of muscle control and tremors. Very high exposures can cause

convulsions and death. Chronic exposure to DDT may cause adverse effects to the liver, kidneys and the central nervous system and damage to a developing fetus. Prolonged exposure may irritate the eyes, skin and nose. DDT is very persistent in the environment, migrates through run-off, erosion and volatilization, bioaccumulates in the fat tissues of wildlife and humans, is toxic to aquatic organisms and has been determined to decrease the reproductive success of many bird species. DDT has a low water solubility, but is soluble in benzene and acetone, both of which are present in the soil and groundwater at the site.

Lindane and chlordane are considered to be hazardous substances, hazardous wastes and priority toxic pollutants. Both are also considered carcinogens, lindane by the U.S. EPA and chlordane by the National Cancer Institute (NCI). Lindane was also found in groundwater samples on-site (up to 3 ppb). The IMCL for lindane in public drinking water is 4 ppb and the PMCL is 0.2 ppb. Lindane enters the body through inhalation, ingestion, skin absorption and eye and skin contact and can cause several symptoms, including: irritation of eyes, nose and throat, headaches, respiratory problems, aplastic anemia and muscle spasms. Lindane is fairly persistent in the environment and is toxic to, and bioaccumulates in, aquatic organisms.

The PMCL for chlordane in public drinking water is 2 ppb. Chlordane enters the body through inhalation, ingestion, skin

absorption and skin and eye contact. Effects of exposure include blurred vision, ataxia, coughing, abdominal pain and irritability. Chronic exposure may result in liver damage and enzyme changes in the body and chlordane may act as a cumulative neurotoxin. Chlordane is very persistent in the environment and strongly bioaccumulates in, and is highly toxic to, aquatic organisms.

Methoxychlor is considered to be a hazardous substance by the U.S. EPA. The IMCL is 100 ppb. Methoxychlor may enter the body through inhalation and ingestion and has been known to cause trembling, convulsions and kidney and liver damage in animals (Clement Associates, 1985 and Sittig, 1985).

6.5.9 CYANIDE

Canisters of cyanide gas are reported to be buried on-site. The type of cyanide gas is not known, but the toxicity of the gas is based on the cyanide ion and not on other constituents of the gas. The gas is flammable and poisonous. It may enter the body through inhalation and skin and eye contact. Low exposures will cause immediate eye and nose irritation. Other symptoms of exposure are constriction of the chest, confusion, headache, unconsciousness and feeble and rapid respiration. In the case of a large dose, death will occur within a few minutes (Handbook or Toxic and Hazardous Chemicals and Carcinogens, 1985).

6.6 EVALUATION AND DISCUSSION

Samples collected by MDE personnel were analyzed by the Maryland Department of Health and Mental Hygiene's laboratory (MD-DHMH Lab). Though the results are not Contract Laboratory Program (CLP) data, the MD-DHMH Laboratory has provided reliable results in the past. Samples collected by the consulting firm, Weston, were analyzed at the Weston Laboratory, a CLP lab. Weston added a qualifier to some of the results: "* indicates a result below exact quantification." This indicates that a contaminant was present but that it is not possible to determine the exact quantity of the substance.

Groundwater and soils on the site are contaminated with volatile organic compounds, heavy metals and pesticides. There are 341 residential wells with a 3-mile radius of the site. If the 1300 residents are drinking this water, there is a potential health risk for those residents. Individuals coming in direct contact with contaminated soils will be at direct risk of exposure via dermal contact, inhalation and ingestion of soils. A portion of the site is fenced, but the dump area where many soil contaminants are found is not secured.

To the northeast of the site is a new residential development, to the east of the site is a shopping center and west and southwest of the site there is another residential area. The area of the

site that is not fenced has been used as a dumping ground. These are indications that the area has traffic (foot or vehicular) moving through it and those individuals will be at risk of exposure.

Soil contaminants picked up by surface water may enter the storm water drainage system and be carried to an unnamed tributary to Marsh Run which empties into Antietam Creek. Several of the contaminants are toxic to aquatic life. Several of the pesticides are known to be persistent in the environment and to bioaccumulate within organisms.

Based on the evaluation of the site at this time, the site is considered to be a potential public health threat. The groundwater and soil at the site are contaminated with VOCs, heavy metals and pesticides that pose a toxicological threat to human and aquatic life and some contaminants have already migrated off-site.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Samples collected by MDE personnel were analyzed by the Maryland Department of Health and Mental Hygiene's laboratory (MD-DHMH Lab). Though the results are not Contract Laboratory Program (CLP) data, the MD-DHMH Laboratory has provided reliable results in the past. Samples collected by the consulting firm, Weston, were analyzed at the Weston Laboratory, a CLP lab. In order to expedite the whole process of environmental clean-up, the concept of using available sampling results, not necessarily CLP data, to complete the SSI report was proposed to and accepted by Region III of the U.S. EPA. This Available Information Screening Site Inspection (AISSI) will be followed by a Listing Site Investigation (LSI).

High levels of VOCs, pesticides and heavy metals were detected in the groundwater and soils at the site. The majority of samples were taken in the dump area where high levels would be expected. However, pesticides, lead and arsenic were also found in several areas off-site, indicating contaminant migration. These contaminants are toxic to aquatic life and pesticides bioaccumulate in the fat tissues of aquatic organisms and humans. Approximately 1300 residents may rely on groundwater for drinking water, indicating that there is a threat to public health. Based on the above evaluation, the Central Chemical Corporation site is recommended for a high priority LSI ~~and MDE will prepare a work plan to address the above concerns~~.

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7. Slaughter, Turbit H. and Darling, John M. The Water Resources of Allegany and Washington Counties. Maryland Department of Geology, Mines and Water Resources. Bulletin No. 24. 1962.

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10. United States Department of the Interior, Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants. 1989.

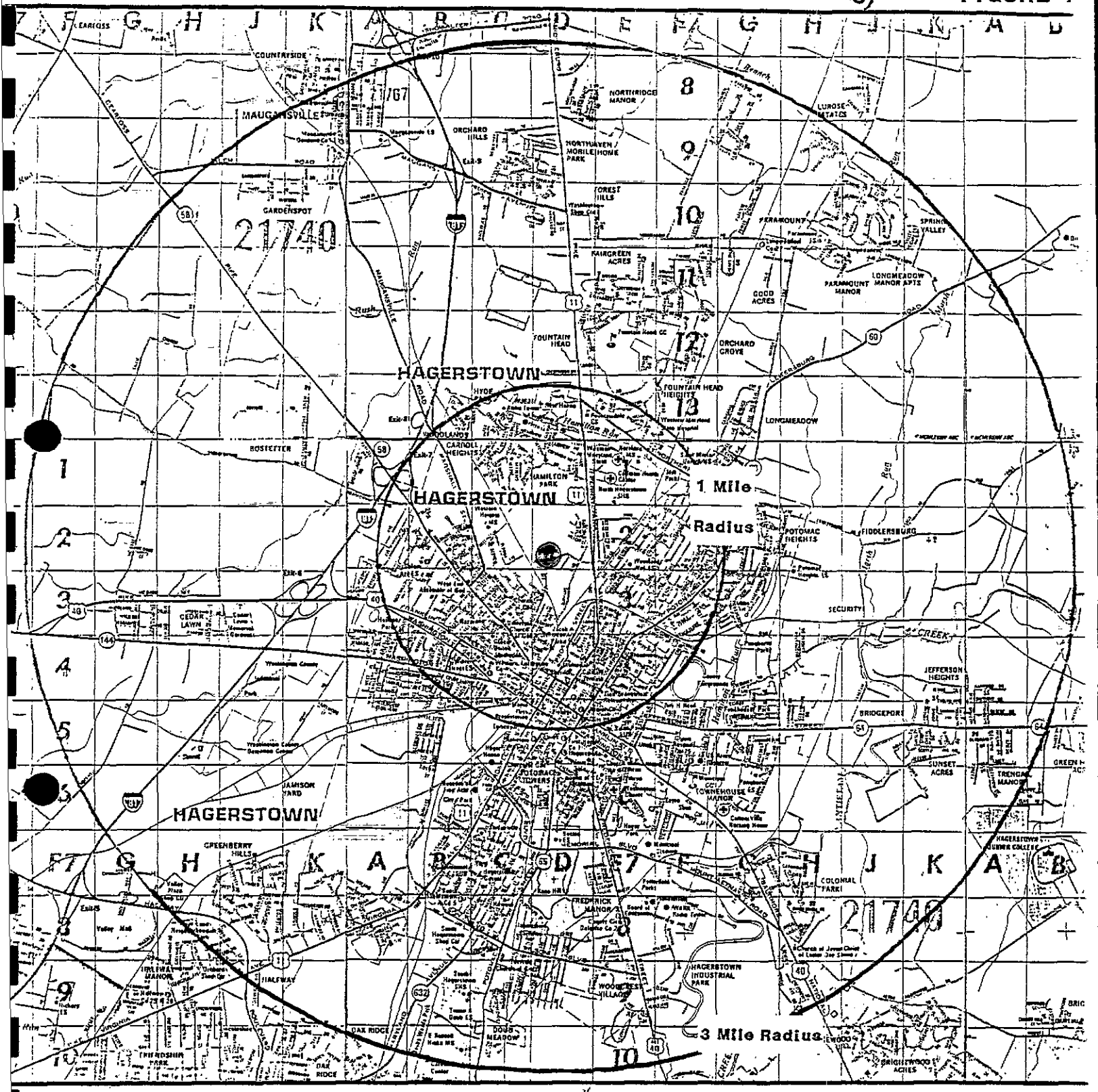
11. Weston, Inc., Roy F. Phase I Environmental Investigation, Central Chemical Corporation. 1989.

SECTION 9.0

FIGURES

ORIGINAL (RED)

FIGURE 1



HIGHWAY MAP, CENTRAL CHEMICAL SITE

0 1/2 1

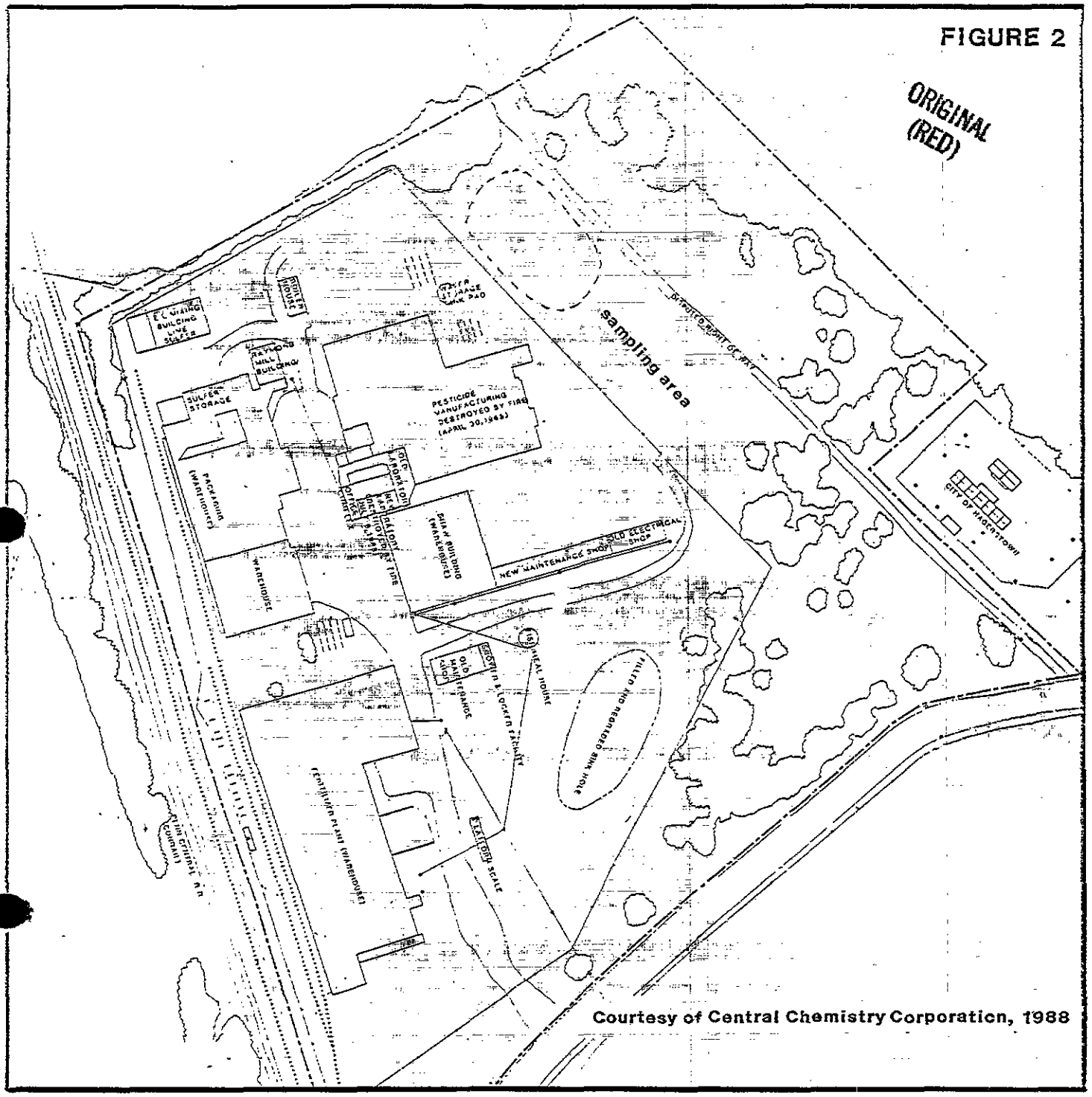
scale in miles

N

CEN-024280

FIGURE 2

ORIGINAL (RED)



Courtesy of Central Chemistry Corporation, 1988

SITE LAYOUT MAP

0 100 200

scale in feet

N

KEY

- BUILDINGS AND FORMER BUILDINGS
- FENCE
- RAILROADS
- TANK CRADLES
- ROADS
- PROPERTY BOUNDARY
- POWER LINES
- TREE LINE

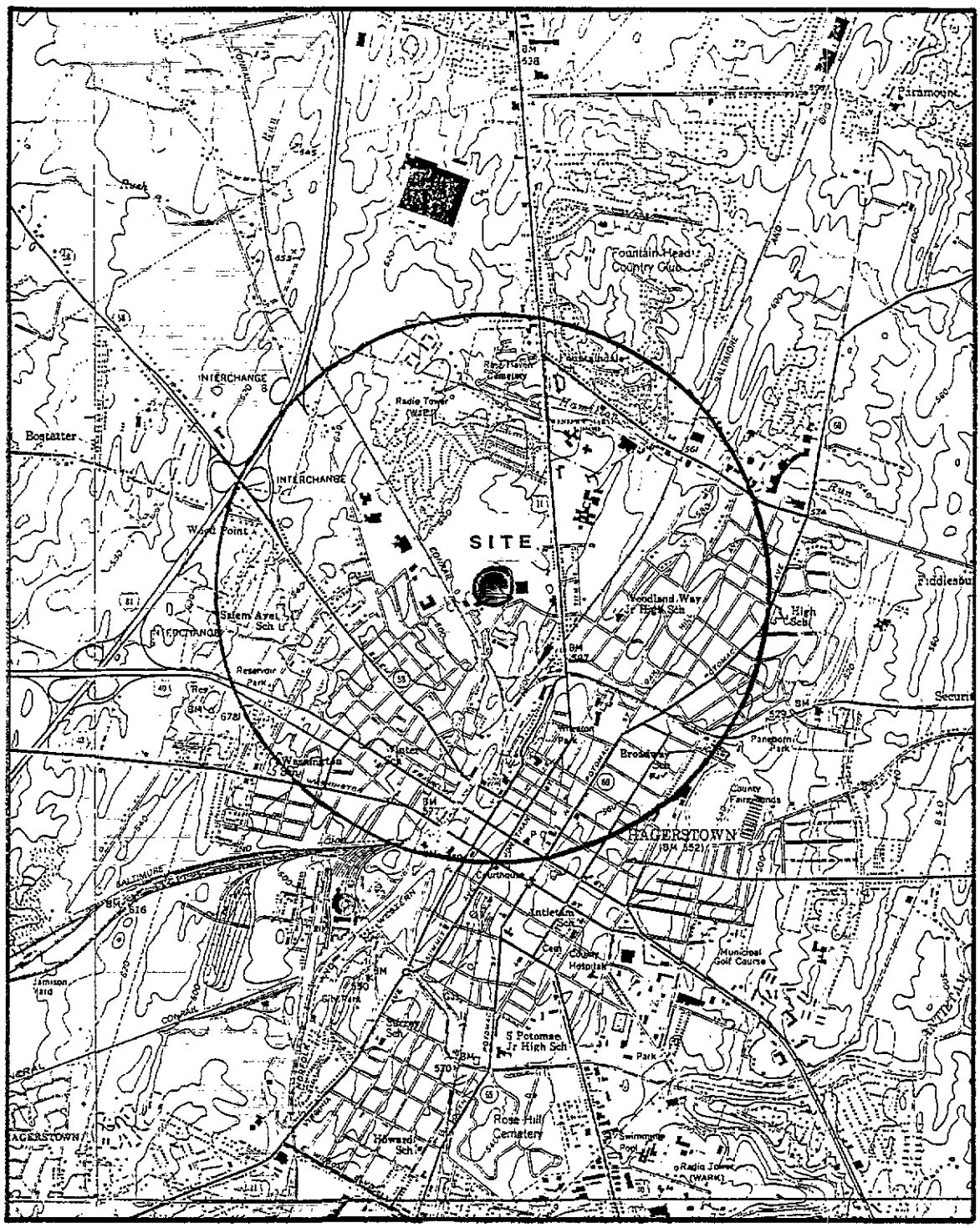
CEN-024281

AR100502

FIGURE 3

ORIGINAL (RED)

TOPOGRAPHIC MAP OF HAGERSTOWN



U.S.G.S. topographic maps

1971–1985

N

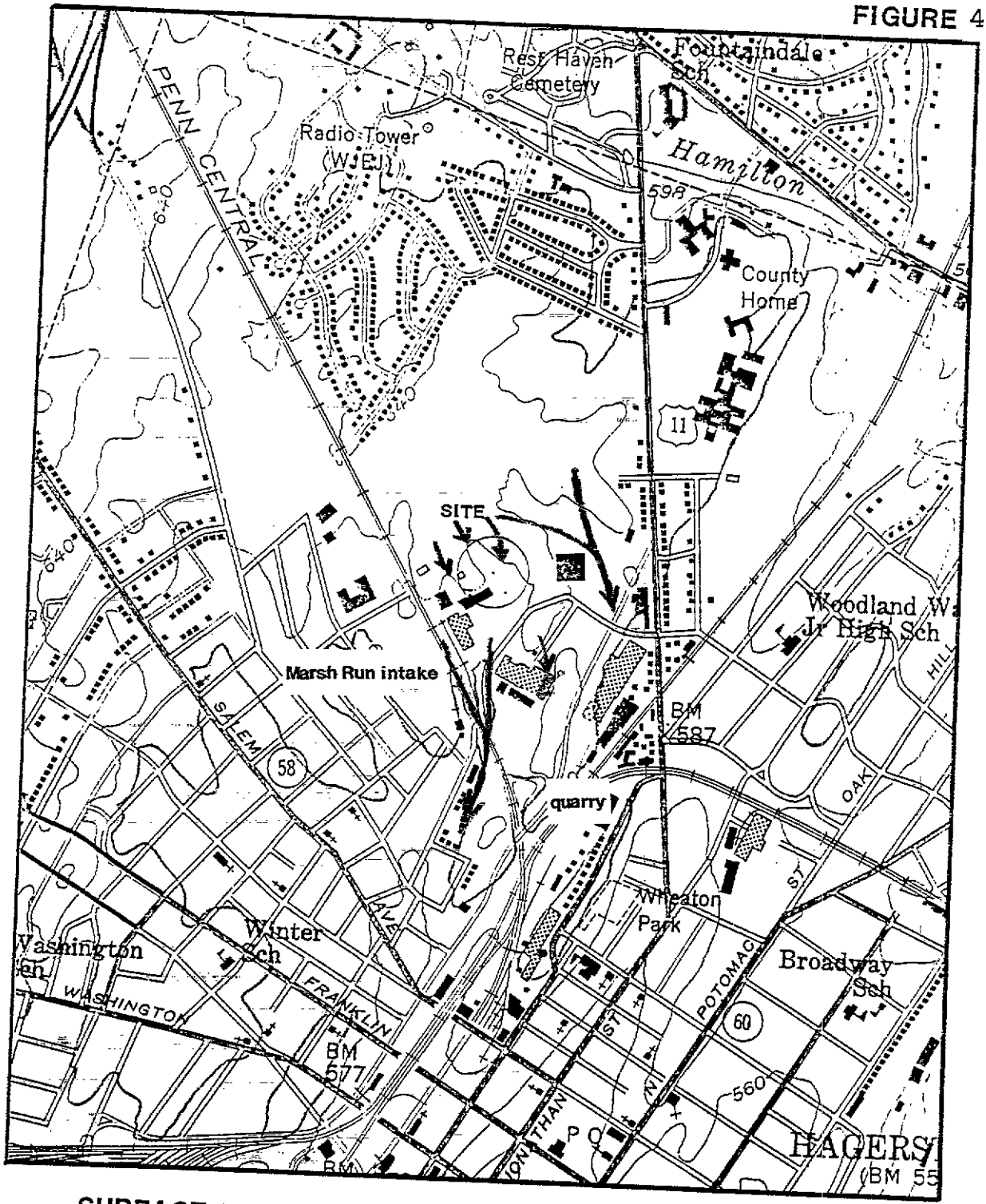
0 2000 4000

scale in feet

one mile radius

FIGURE 4

ORIGINAL (RED)



SURFACE AND SHALLOW GROUNDWATER FLOW DIRECTIONS

0 1200 2400

scale in feet

N

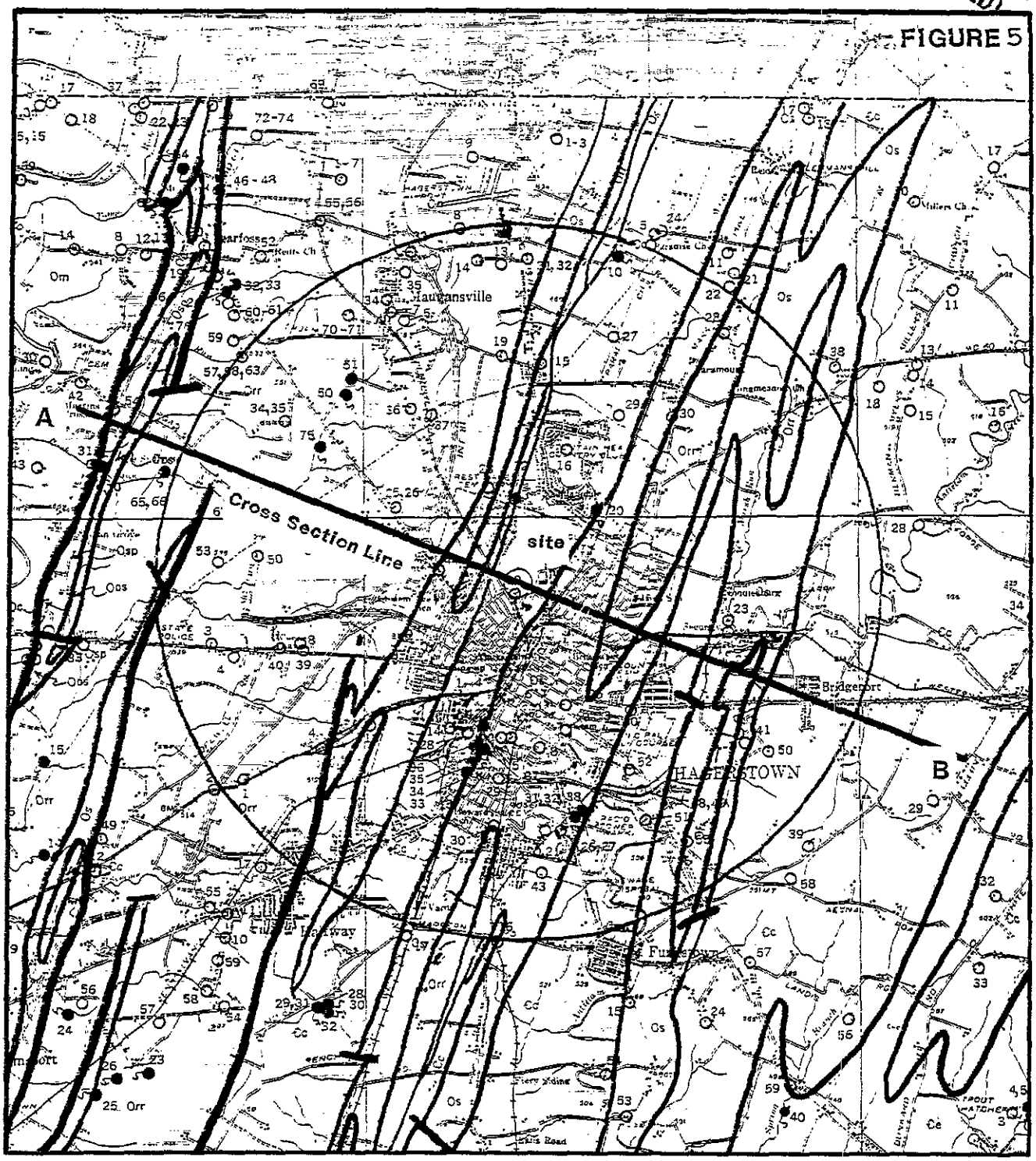
runoff directions

U.S.G.S. topographic maps 1971—1985

AR100504
CEN-024283

ORIGINAL (RED)

FIGURE 5



GEOLOGIC MAP OF HAGERSTOWN AREA

N

Orr Rockdale Run Formation

Os Stonehenge Limestone

Cc Conococheague Limestone

0 1 2

scale in miles

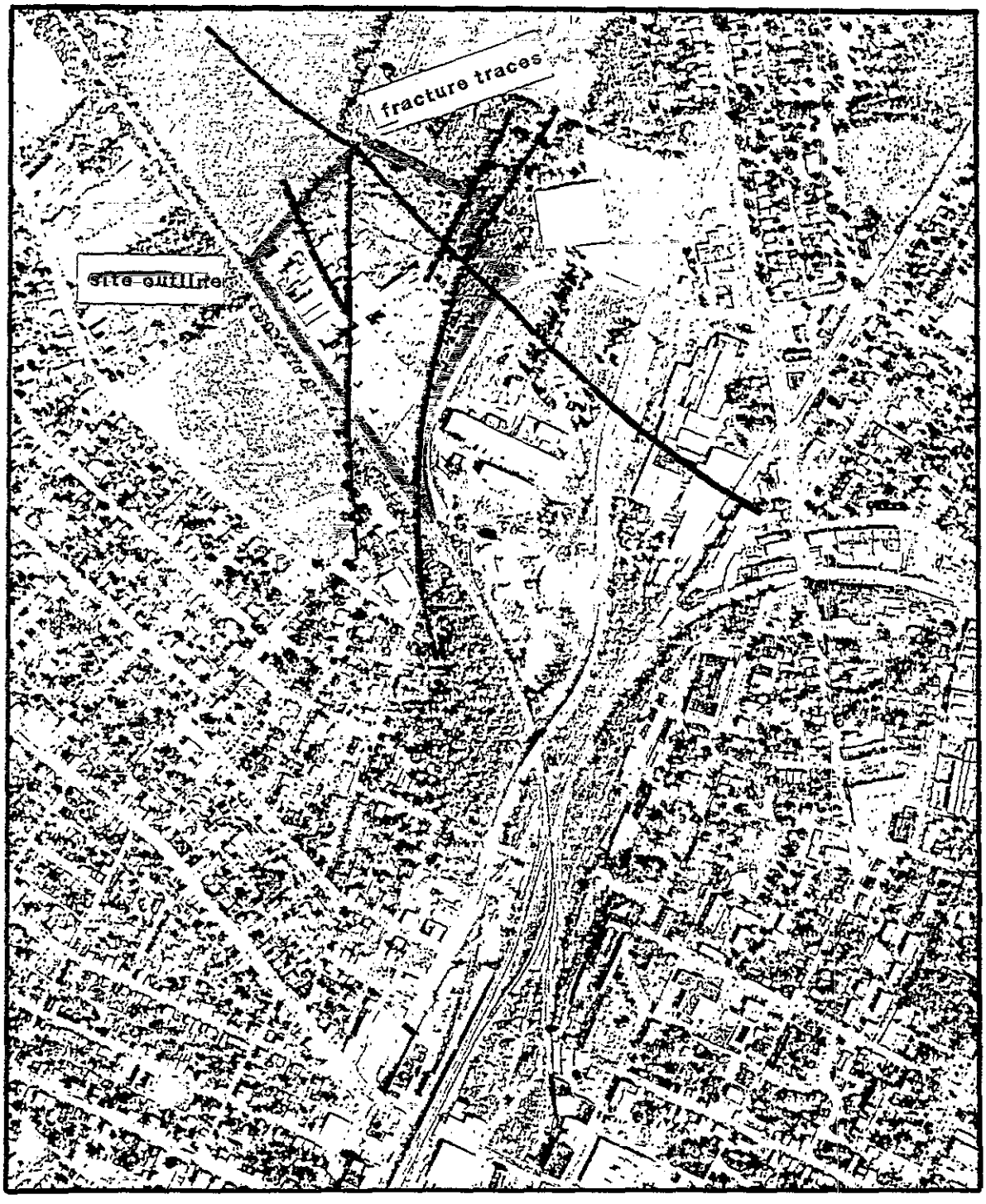
CEN-024284

Maryland Dept. of Geology, Mines, and Water Resources, 1962

AR100505

FIGURE 6

ORIGINAL (RED)



FRACTURE TRACES, CENTRAL CHEMICAL AREA

0 700 1400

scale in feet

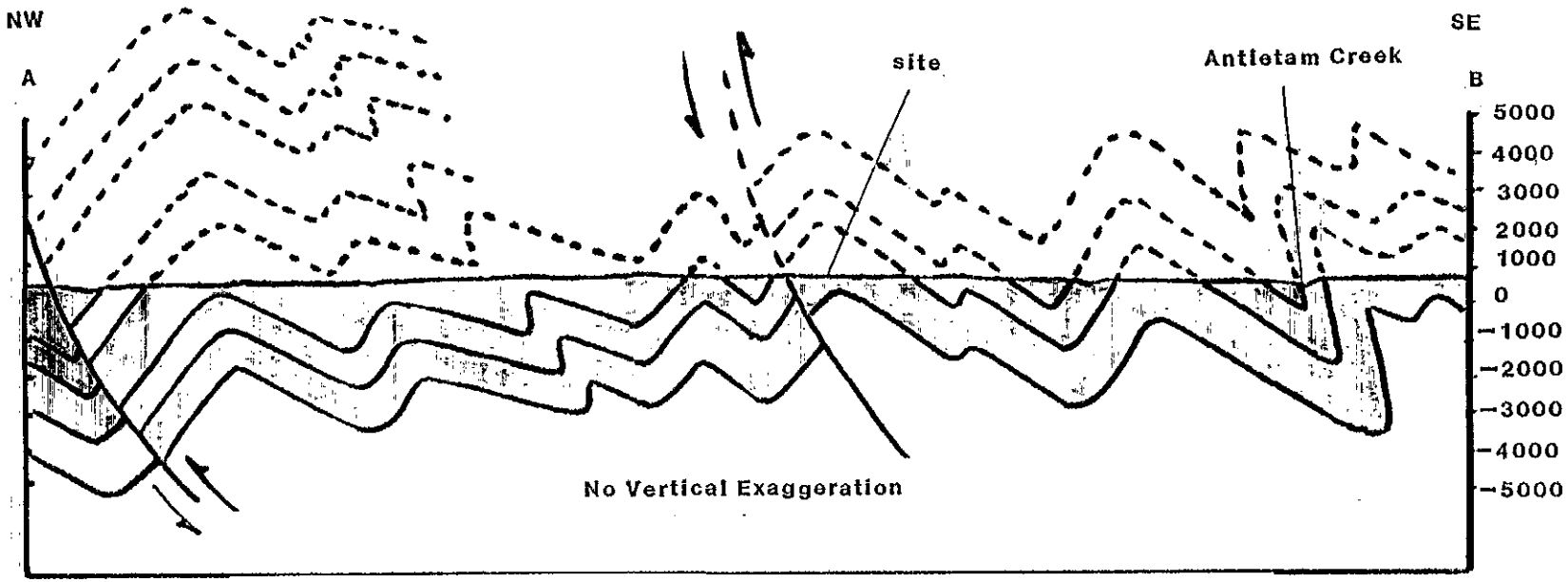
N

photo from U.S.G.S., 1963,

AHB 1—DD—6 & AHB 1—DD—7

CEN-024285

AR100506



STYLIZED GEOLOGIC CROSS SECTION, HAGERSTOWN AREA

0 5000 10,000

scale in feet

values in feet with respect to sea level

KEY

N

- Martinsburg Shale
- Chambersburg Limestone
- St. Paul Group
- Pinesburg Station Dolomite
- Rockdale Run Formation
- Stonehenge Limestone
- Conococheague Limestone

MDE J. Mattes, 1989

FIGURE 7

ORIGINAL (RED)

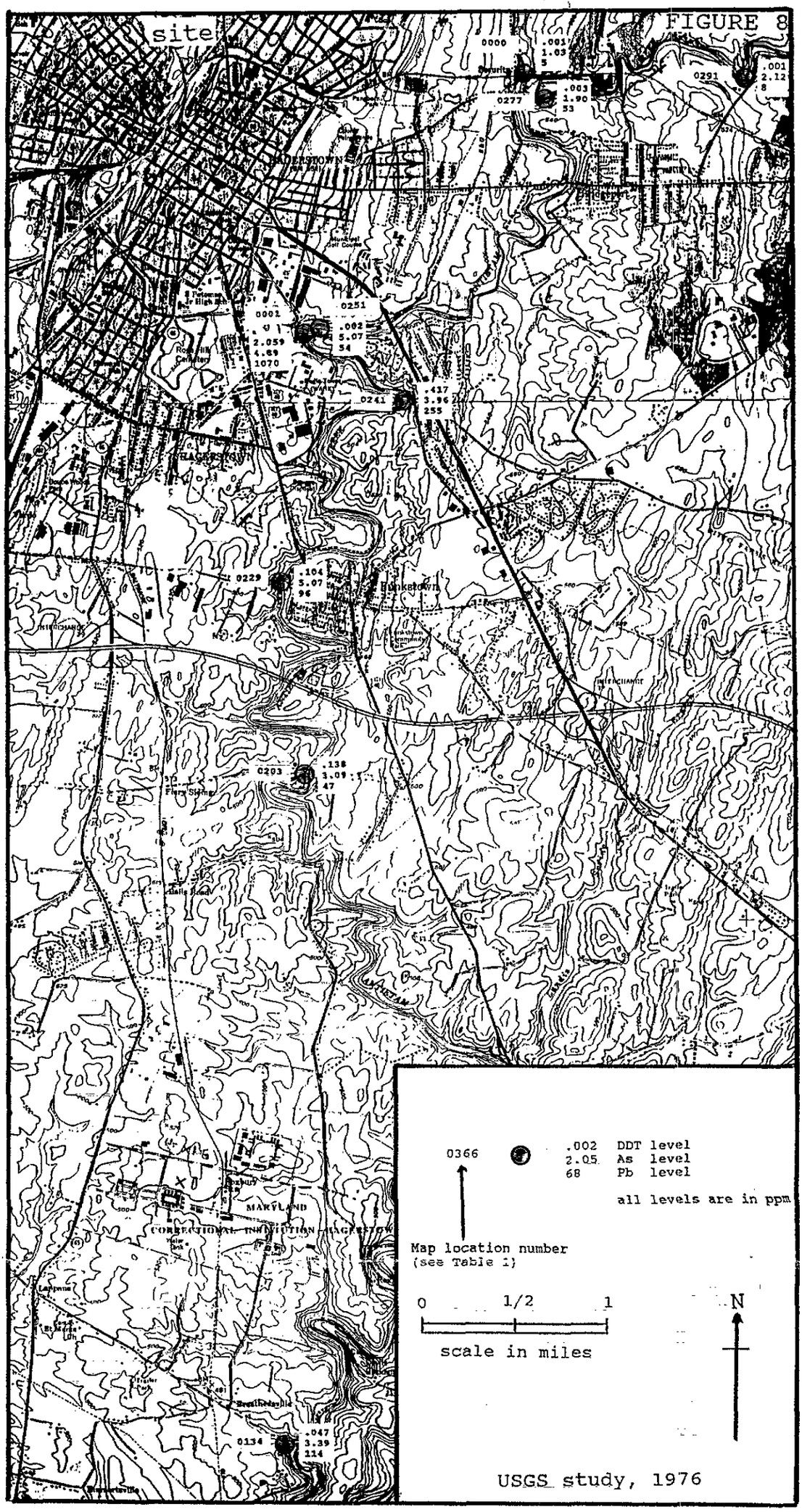
CEN-024286

AR100507

OFF-SITE CONTAMINATION IN SEDIMENTS, HAGERSTOWN AREA

FIGURE 8

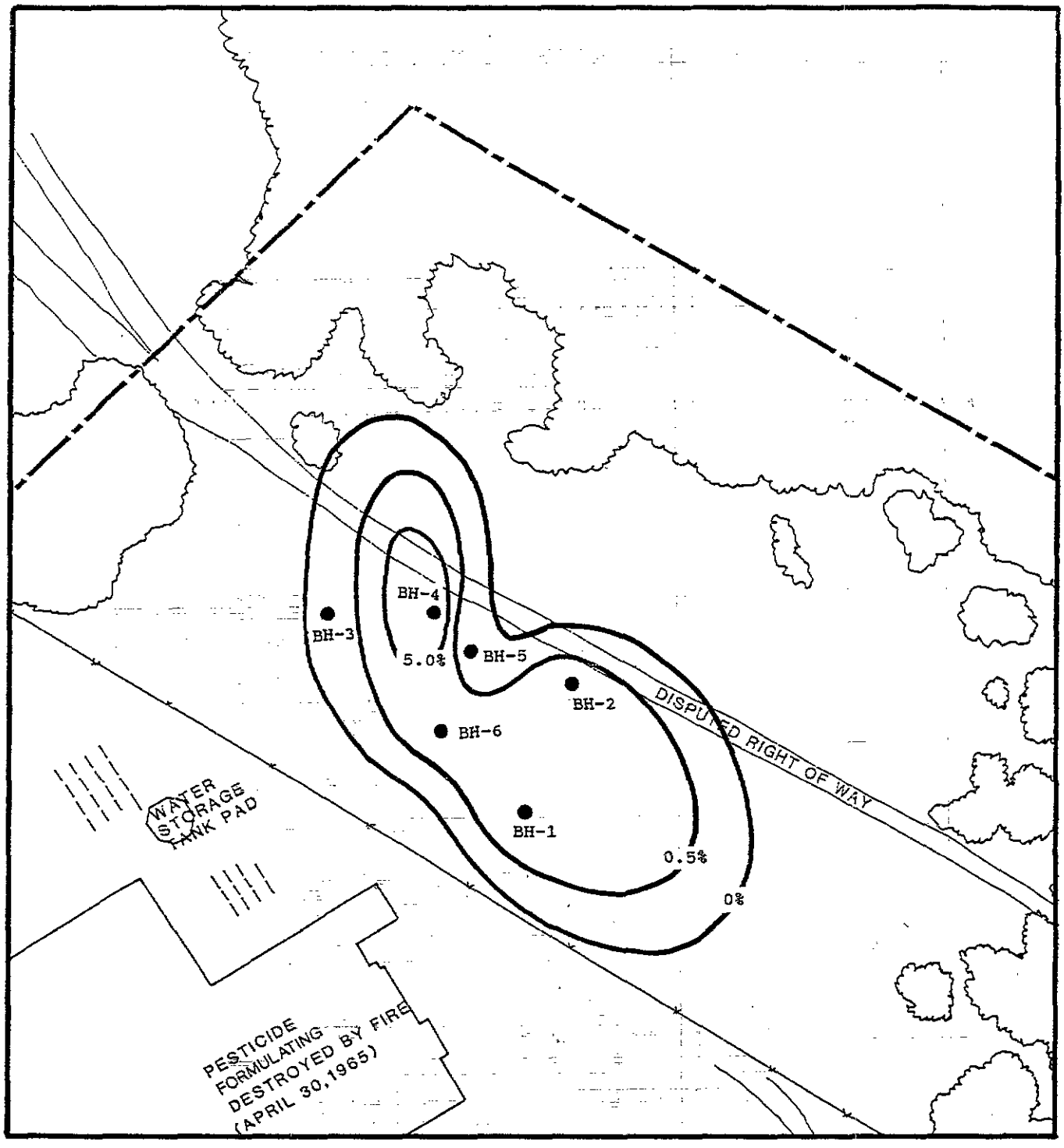
ORIGINAL (RED)



DDT ANALYSIS RESULTS OF SOIL FROM DUMP AREA

ORIGINAL (RED)

FIGURE 9



0 50 100

scale in feet

N

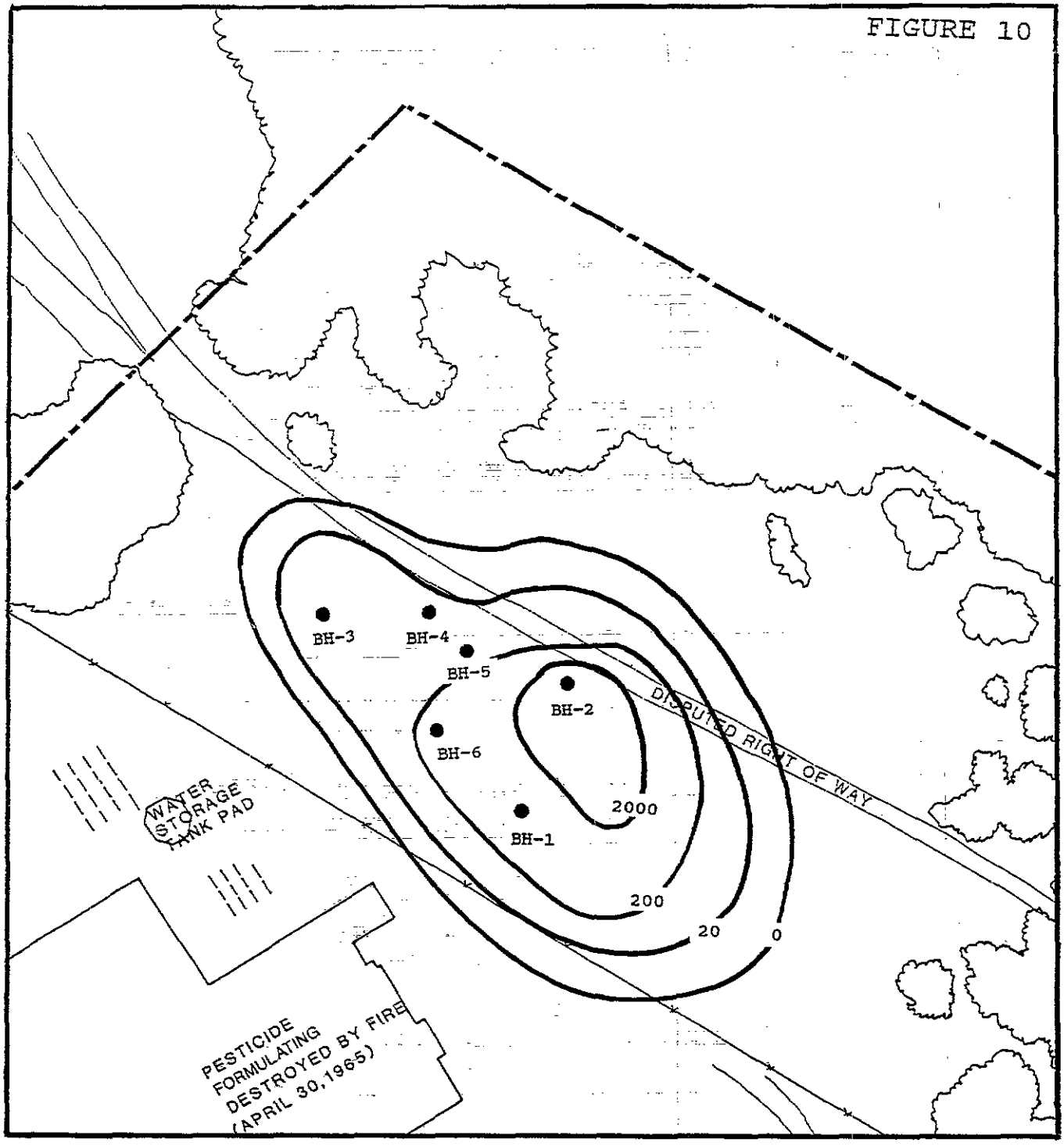
contours are presented logarithmically in percent

courtesy of Central Chemical Corporation, 1988

ORIGINAL (RED)

CHLOROBENZENE ANALYSIS RESULTS OF SOIL FROM DUMP AREA

FIGURE 10



0 50 100

scale in feet

N

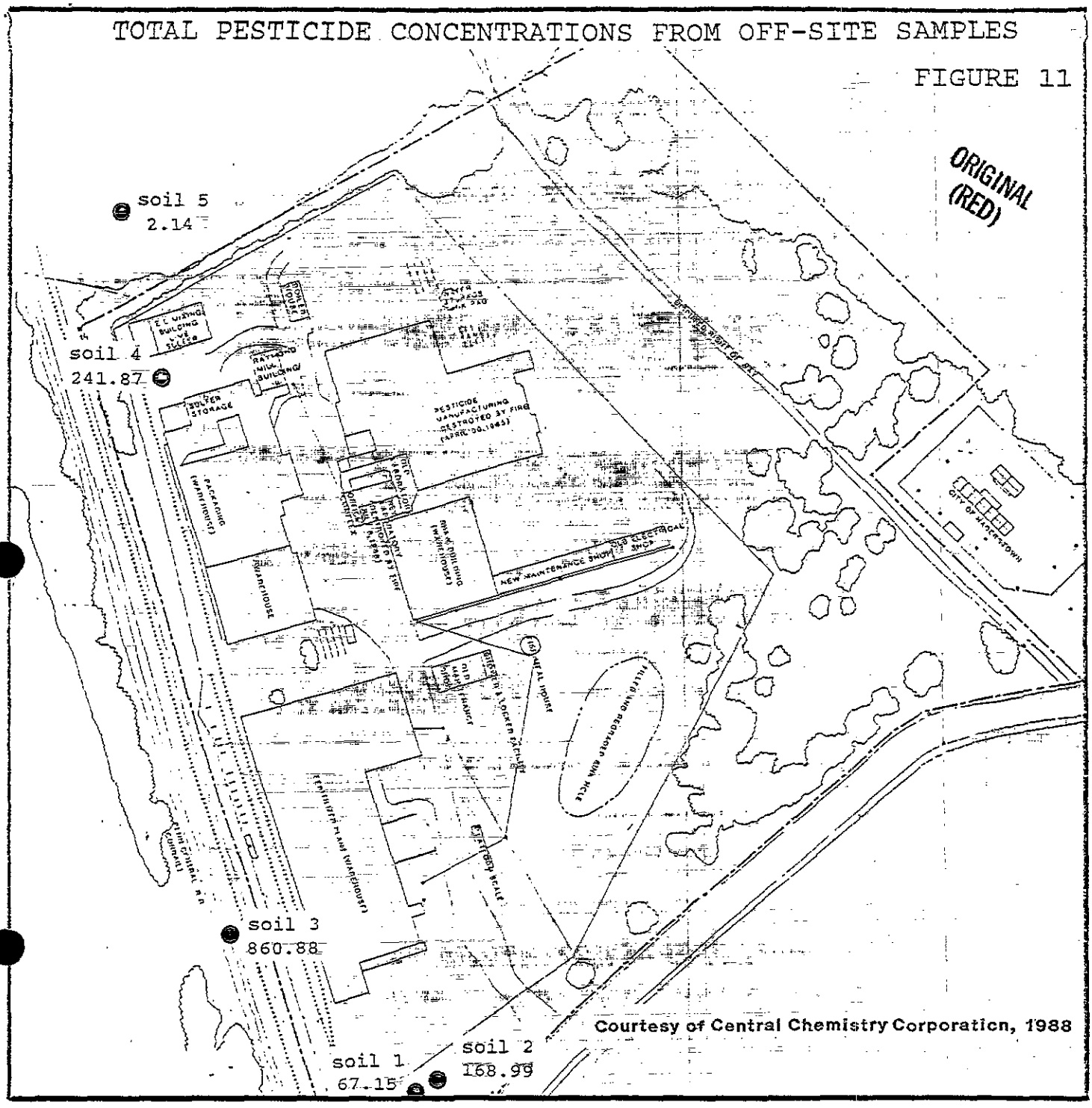
contours are presented logarithmically in ppb

courtesy of Central Chemical Corporation, 1988

TOTAL PESTICIDE CONCENTRATIONS FROM OFF-SITE SAMPLES

FIGURE 11

ORIGINAL (RED)



0 100 200

scale in feet

N

KEY

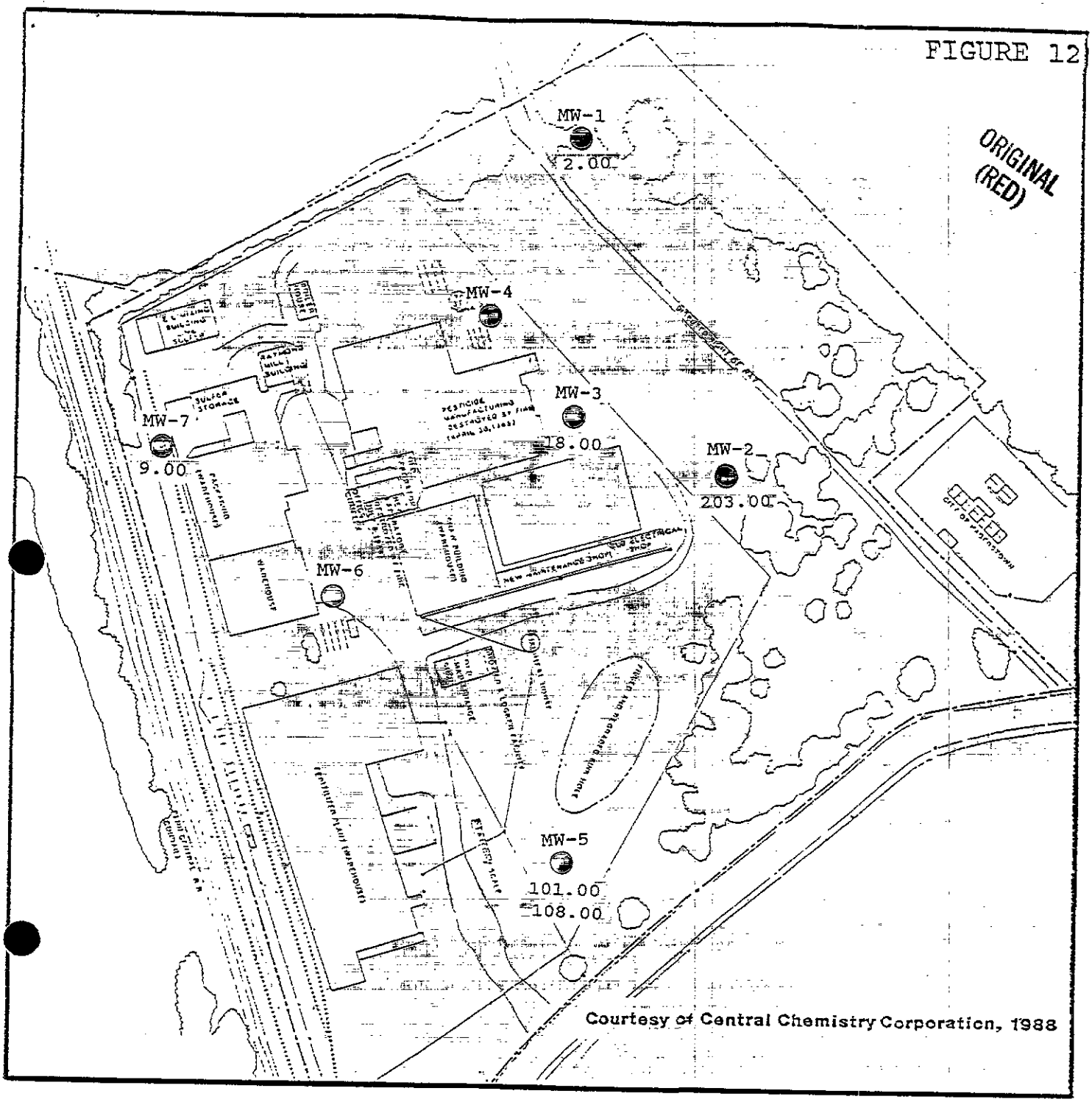
- BUILDINGS AND FORMER BUILDINGS
- FENCE
- RAILROADS
- TANK CRADLES
- ROADS
- PROPERTY BOUNDARY
- POWER LINES
- TREE LINE

soil 1 sampling point

all values are in ppm

CEN-024290
AR100511

FIGURE 12



0 100 200

scale in feet

N

KEY

BUILDINGS AND FORMER BUILDINGS

FENCE

RAILROADS

TANK CRADLES

ROADS

PROPERTY BOUNDARY

POWER LINES

TREE LINE

WESTON SAMPLING PROJECT

TOTAL VOC CONCENTRATIONS

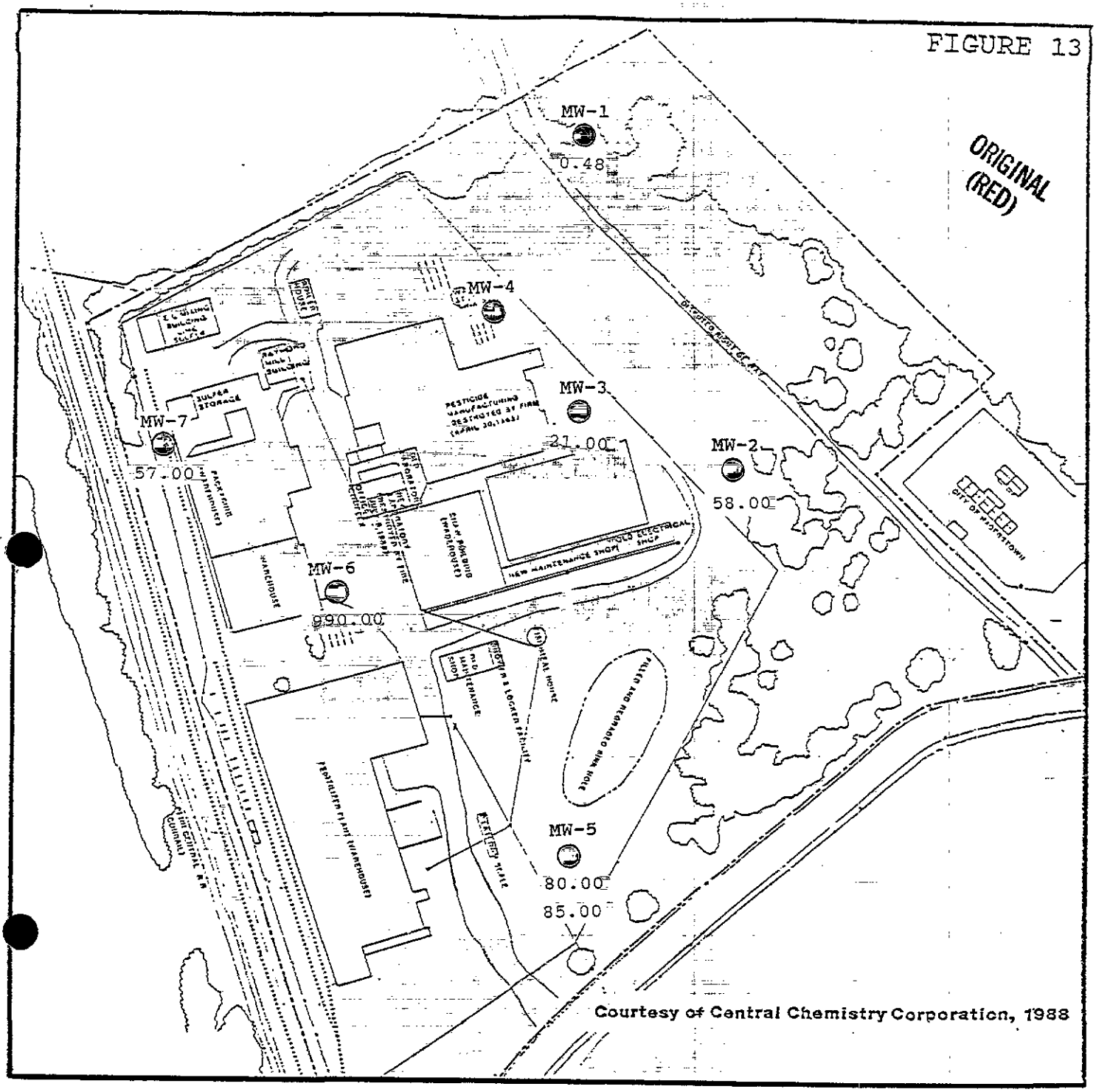
MW-1 monitoring well

all values are in ppb

CEN-024291

AR100512

FIGURE 13



0 100 200

scale in feet

N

KEY

- BUILDINGS AND FORMER BUILDINGS
- FENCE
- RAILROADS
- TANK CRADLES
- ROADS
- PROPERTY BOUNDARY
- POWER LINES
- TREE LINE

WESTON SAMPLING PROJECT

TOTAL METALS

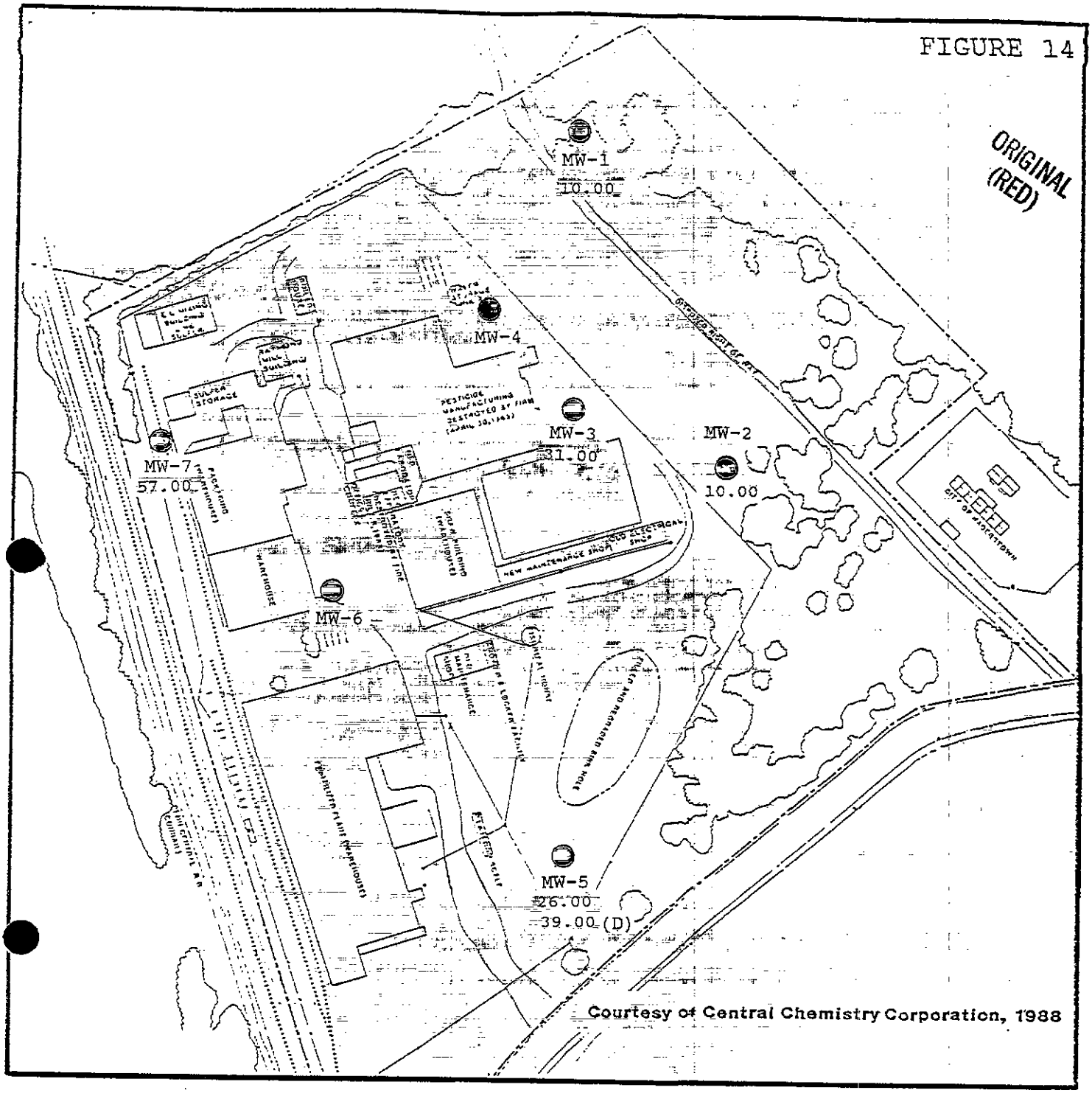
Monitoring well

all values are in ppb

CEN-024292
AR100513

FIGURE 14

ORIGINAL (RED)



0 100 200

scale in feet

N

KEY

- BUILDINGS AND FORMER BUILDINGS
- FENCE
- RAILROADS
- TANK CRADLES
- ROADS
- PROPERTY BOUNDARY
- POWER LINES
- TREE LINE

WESTON SAMPLING PROJECT

TOTAL PESTICIDES

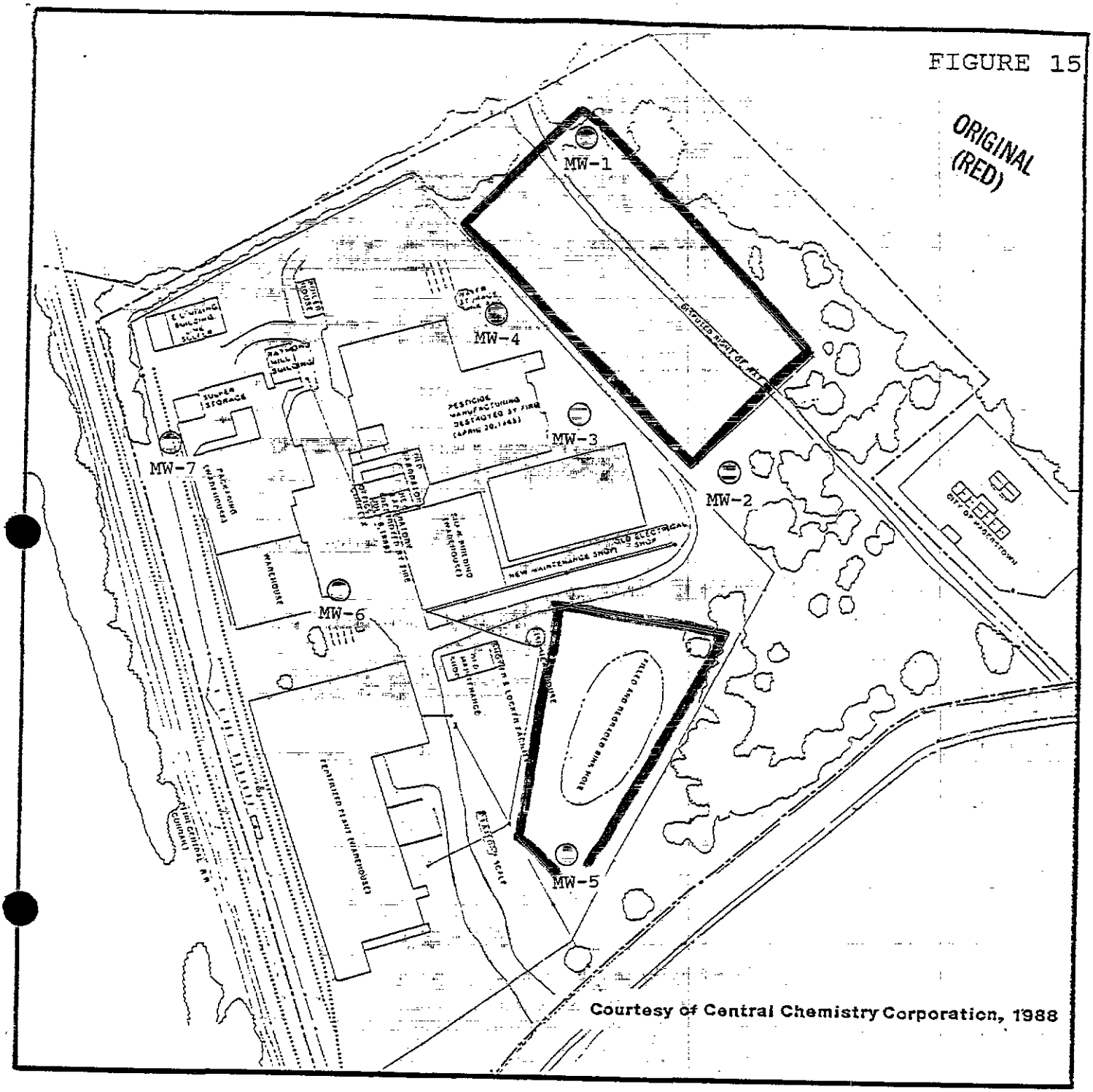
MW-1 monitoring well
10.00

all values are in ppb

CEN-024293
AR100514

FIGURE 15

ORIGINAL (RED)



WESTON SAMPLING PROJECT

0 100 200

scale in feet

N

KEY

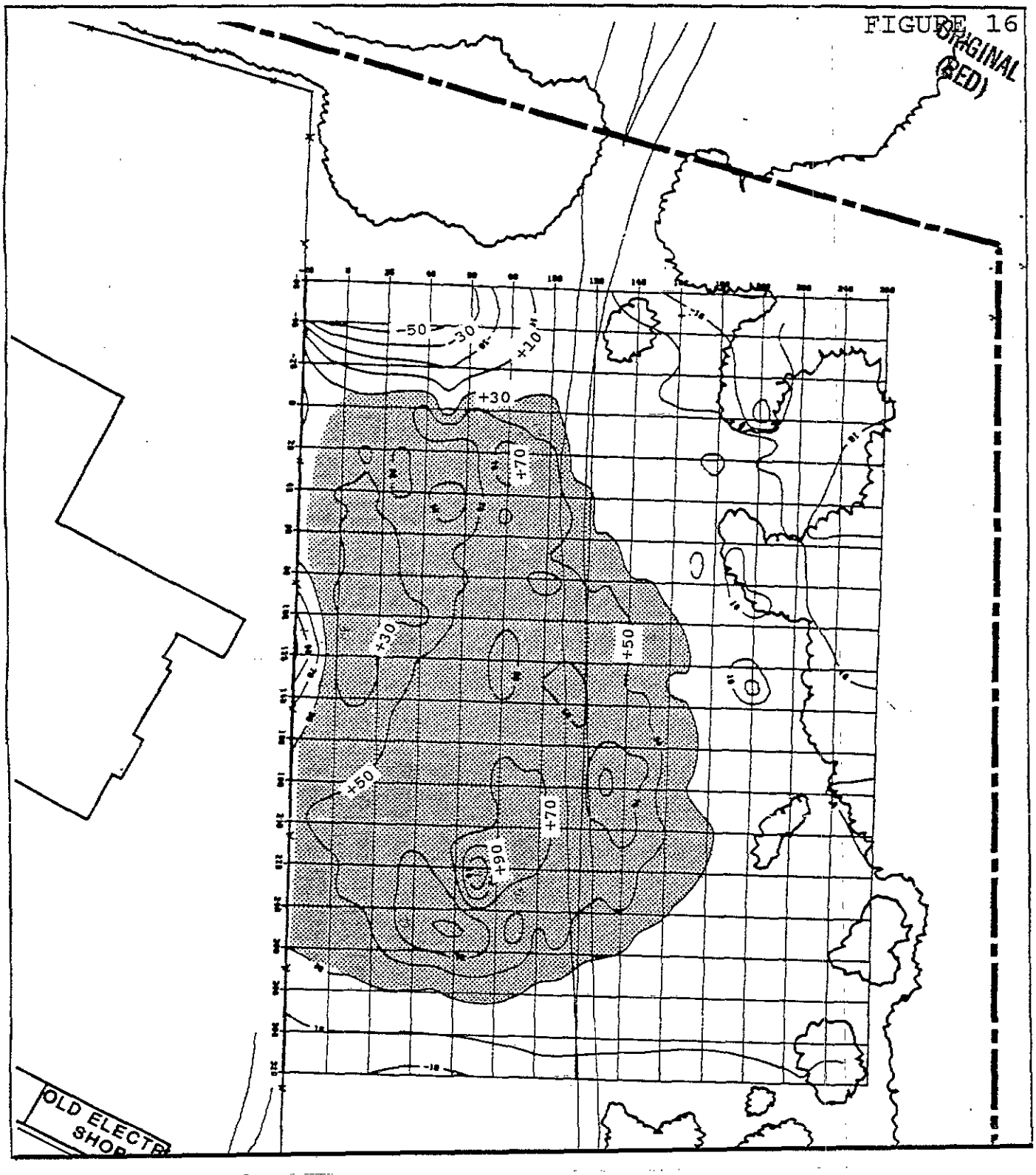
- BUILDINGS AND FORMER BUILDINGS
- FENCE
- RAILROADS
- TANK CRADLES
- ROADS
- PROPERTY BOUNDARY
- POWER LINES
- TREE LINE

MW-1 monitoring well

GPR and EM-31 survey

CONTOUR PLOT OF EM-31 CONDUCTIVITY

FIGURE 16



contour interval is 20 MMHOS/M

CEN-024295

EM-31 run in quadrature component

from Roy F. Weston, Inc., August, 1989

APPENDIX A

TABLES

TABLE 1

6/22/76

SAMPLE NO. (ppm)	Lead	Arsenic	DDT
1-ANT 0366	68.000	2.050	0.002
2-ANT 0291	8.000	2.120	0.001
3-ANT 0277	53.000	1.900	0.003
4-MRS 0000	5.000	1.030	0.001
5 ANT 0251	54.000	5.070	0.002
6-UAK 0001	1070.000	4.890	2.059
7-ANT 0241	255.000	3.960	0.417
8-ANT 0229	96.000	5.070	0.104
9-ANT 0203	47.000	3.090	0.138
10-ANT 0134	114.000	3.390	0.047
11-ANT 0044	36.000	4.090	0.003

Sediment samples collected off-site along Antietam Creek. Organics analyzed by TSD Chemical and Biological Investigations Laboratory. Metals analyzed by U.S. EPA at Annapolis Field Office.

TABLE 2

8/3/76

(ppm)	SOIL 1	SOIL 2	SOIL 3	SOIL 4
Lead	188.000	100.500	124.000	138.500
Arsenic	53.750	16.170	34.000	16.500
DDT	1.867	6535.000	6931.980	46.680

Soil/sediment samples taken from drainage ditches and storm water drainage inlets at Central Chemical Corporation. Analyzed by Maryland Water Resources Administration (MD/WRA).

10/28-29/76

	SOIL 1A .5'-.5'*	SOIL 1B 2'-3'	SOIL 1C 8'-9'	SOIL 2A .5'-.5'	SOIL 3A 0'-1'	SOIL 3B 1'-2'	SOIL 4A 0'-1'	SOIL 5A 0'-1.5'	SOIL 6A 1'-2'	SOIL 6B 3'-4'	SOIL 6C 8'-9'	SOIL 7A 0'-1'	SOIL 7B 1'-2'	SOIL 7C 2'-3.5'
Lead (ppm)	395.000	201.000	32.200	93.500	97.250	197.000	31.000	114.500	90.750	15.000	18.650	89.100	79.250	15.750
Arsenic (ppm)	20.850	11.700	8.138	16.275	180.000	300.000	38.000	17.680	39.250	3.715	3.775			2.170
DDT (ppm)	176.000	25.110	471.000	119.480	653.600	300.300	85.050	70.680	1646.400	34.656	1.520	27.300	16.875	

* These depths were transcribed directly from a letter, to Central Chemical from Herb Sachs, MD/WRA. Soil boring samples, analyzed by MD/WRA.

ORIGINAL (RED)

TABLE 3

SOIL ANALYSES
SHOWN IN PARTS PER MILLION
4/26/ TO 5/2/77

BORING	DEPTH OF SAMPLE			
A-1	0' to 1.5'	4.5' to 6.0'	8.0' to 9.5'	11.0' to 12.0'
Total Lead	68.6	35.0	7.5	10.7
Total Arsenic	41.0	71.1	77.5	13.2
D.D.T.	117.2	0.41	*0.05	0.33
A-3	0' to 2.0'	4.5' to 6.0'	8.0' to 9.5'	11.0' to 12.0'
Total Lead	1020.0	17.8	8.9	22.9
Total Arsenic	22.8	63.3	20.7	21.4
D.D.T.	55.2	0.19	0.80	*0.05
A-5	0' to 2'	4.5' to 6.0'	8.0' to 9.5'	11.0' to 12.0'
Total Lead	317.7	15.0	18.5	16.7
Total Arsenic	12.4	17.5	19.7	12.4
D.D.T.	273.2	3.17	0.56	20.2
A-7	0' to 2.0'	4.5' to 6.0'	8.0' to 9.5'	11.0' to 12.0'
Total Lead	41.0	16.3	10.4	9.0
Total Arsenic	13.3	11.6	9.8	12.1
D.D.T.	2.72	0.29	*0.05	0.49
B-2	0' to 2.0'	4.5' to 6.0'	8.0' to 9.5'	11.0' to 12.0'
Total Lead	16.4	72.7	4.4	10.8
Total Arsenic	20.3	306.0	12.7	12.9
D.D.T.	1.26	*0.05	0.22	0.15
B-5	0' to 2'	4.5' to 6.0'	10' to 11.5'	
Total Lead	20.7	16.0	12.1	
Total Arsenic	15.1	13.7	11.0	
D.D.T.	38.2	0.21	0.26	
B-7 +80	0' to 2.0'	4.5' to 6.0'	8.0' to 9.5'	11.0' to 12.0'
Total Lead	75.0	31.2	12.5	4.6
Total Arsenic	20.4	15.7	12.7	3.9
D.D.T.	392.9	14.5	28.0	0.27

* Less than

TABLE 3 (CONT.)

ORIGINAL (RED)

C-2	0' to 1.5'
Total Lead	8.7
Total Arsenic	13.6
D.D.T.	1.55

C-3	0' to 1.5'
Total Lead	20.7
Total Arsenic	16.4
D.D.T.	3.15

C-3A 15' N.W. of C-3	4.5' to 6.0'	8.0' to 9.5'	11.0' to 12.0'
Total Lead	15.9	17.9	88.8
Total Arsenic	17.1	11.9	156.0
D.D.T.	4.8	0.28	0.83

C-4	0' to 2'	4.5' to 6.0'	8.0' to 9.5'	11.0' to 12.0'
Total Lead	61.0	39.0	10.6	16.9
Total Arsenic	23.6	13.8	12.0	9.4
D.D.T.	160.0	17.1	5.26	16.0

D-3	0' to 1.5'
Total Lead	9.7
Total Arsenic	12.2
D.D.T.	0.96

D-4	0' to 2.0'	5.0' to 6.5'	8.0' to 9.5'
Total Lead	266.0	24.9	17.4
Total Arsenic	33.3	21.1	16.2
D.D.T.	124.0	178.0	27.3

D-6	0.5' to 2'	4.5' to 6.0'
Total Lead	48.3	17.5
Total Arsenic	12.1	63.3
D.D.T.	2.15	1.89

D-6 + 25 25' West of D-6	8.0' to 9.5'	11.0' to 12.0'
Total Lead	78.0	12.4
Total Arsenic	15.3	10.5
D.D.T.	7.65	5.26

TABLE 3 (CONT.)

ORIGINAL (RED)

D-7	0' to 2.0'
Total Lead	254.0
Total Arsenic	9.2
D.D.T.	100.0

D-7A - 30' N.W. of D-7	4.5' to 6.0'	8.0' to 9.5'	11.0' to 12.0'
Total Lead	16.7	12.5	13.7
Total Arsenic	8.4	16.5	16.8
D.D.T.	0.95	0.72	3.08

D-8	0' to 2.0'
Total Lead	83.5
Total Arsenic	6.2
D.D.T.	15.5

E-3	0' to 2.0'
Total Lead	42.2
Total Arsenic	7.2
D.D.T.	1.75

E-7-A - 30' N.W. of E-7	5.0' to 7.5'	15.0' to 20.0'	Auger Sample
Total Lead	102.0	31.9	
Total Arsenic	26.1	35.0	
D.D.T.	22	1404.	

E-8	0' to 1.5'	4.5' to 6.0'
Total Lead	39.0	53.0
Total Arsenic	9.0	17.5
D.D.T.	17.5	122.5

F-5	0' to 2.0'	4.5' to 6.0'	8.0' to 9.5'
Total Lead	10.9	28.7	54.0
Total Arsenic	11.0	20.9	4.9
D.D.T.	25.0	0.70	0.82

G-4	0.5' to 2.0'	4.5' to 6.0'	8.0' to 9.5'	11.0' to 12.0'
Total Lead	47.0	11.3	27.2	14.4
Total Arsenic	10.0	19.2	12.7	19.9
D.D.T.	5.32	1.08	7.2	2.75

ORIGINAL (RED)

TABLE 4
GROUNDWATER ANALYSES
5/16/77

Location	Monitoring Well A-5	
	Water Level 18 feet below ground level	
	Total Lead	Less than 0.05 parts per million
	Total Arsenic	Less than 0.02 parts per million
	D.D.T.	0.33 parts per billion
		(0.00033 parts per million)
Location	Abandoned Quarry	
	Total Lead	Less than 0.05 parts per million
	Total Arsenic	Less than 0.02 parts per million
	D.D.T.	0.36 parts per billion
		(0.00036 parts per million)
Location	E-7A, Water Level 10 feet below ground level	
	Total Lead	Less than 0.05 parts per million
	Total Arsenic	1.97 parts per million
	D.D.T.	2.20 parts per billion
		(0.0022 parts per million)

Baker-Wibberly Hydrologic Investigation, 1977

TABLE 5

3/27/87

	SOIL 1
EP TOX ORGANICS	
Lindane	52 ppb
ORGANICS	
Chlordane	424 ppm
Methoxychlor	9800 ppm
4,4-DDE	734 ppm
4,4-DDD	345 ppm
4,4-DDT	3700 ppm
Lindane	15 ppm
ORGANICS	
Chlorobenzene	16 ppm
(2-Butanone)	29 ppm
1,4-Dichlorobenzene	14 ppm
1,2-Dichlorobenzene	45 ppm

Soil samples taken from the dump area.
Analyzed by MD/DHMH.

TABLE 6

10/25-26/88

	BH-1-4	BH-2-7	BH-3-5	BH-4-3	BH-5-7	BH-6-4	BH-6-5	BH-2 AQ	BH-5 AQ	BH-2A/MD	BH-5A/MD
VOLATILES (ppb)											
Methylene chloride									*50.0		
Acetone			110.000						*26.0		
1,1-dichloroethane										2.000	
Chloroform	13.000			2.000				12.000		1.000	
Trichloroethene										3.000	
Tetrachloroethene	*8.0			*7.0							
Benzene	17.000		5.000						36.000	45.000	42.000
Toluene	11.000		31.000	3.000						7.000	12.000
Chlorobenzene	1100.000	4600.000	100.000	41.000	34.000	34.000	720.000		490.000	651.000	526.000
m-xylene	33.000	9200.000	110.000		5.000		450.000				
o&p-xylene	38.000	7500.000	150.000		9.000		110.000				
1,3-dichlorobenzene	66.000	1200.000	17.000	6.000		14.000	790.000	27.000	21.000		
1,2-dichlorobenzene	1100.000	81000.00	79.000	34.000	15.000	58.000	3300.000	270.000	900.000		
1,4-dichlorobenzene	1200.000	1.80E+05	340.000	46.000	45.000	260.000	22000.00	630.000	340.000		
ethylbenzene	*8.0		53.000					46.000	97.000	42.000	87.000

Soil boring samples and water samples. Soil samples analyzed by Weston.
Water samples split and analyzed by Weston and MDE.
* indicates a result below exact quantification

TABLE 7

10/25-26/88

	BH-1-4	BH-2-7	BH-3-5	BH-4-3	BH-5-7	BH-6-4	BH-6-5
SEMI-VOLATILES (ppm)							
1,4-dichlorobenzene	0.820	66.000	0.870	47.000	4.500	*0.160	*4.000
1,2-dichlorobenzene	*1.200				1.400		
Acenaphthene			*0.310				
Fluorene			*0.350				
1,2,4-trichlorobenzene	40.000	210.000	*0.420		2.800	6.100	12.000
Naphthalene		*3.700			0.870		
Pentachlorophenol					*0.830		
Phenanthrene		*8.400	1.700		0.500		
Fluoranthene		*3.000	1.000		*0.200		
Benzo(b)fluoranthene					*0.056		
Benzo(a)pyrene					*0.091		
Pyrene					*0.180		
Chrysene					*0.150		
Anthracene			*0.300		*0.061		
Bis(2-ethylhexyl)phthalate		*5.900					
Di-n-butylphthalate	*11.000	*2.600	*0.220			*0.880	*1.400
* indicates a result below exact quantification							
INORGANICS (PPM)							
Arsenic	9.200	171.000	313.000	191.000	5.800	58.900	137.000
Beryllium			2.300				
Chromium	10.500	46.600	32.200	31.100	10.600	7.700	17.300
Copper	181.000	297.000	23.400	319.000	20.600	126.000	258.000
Nickel			30.000	39.100	10.700	12.200	21.800
Lead	50.800		14.200	14.300	18.200		
Zinc	62.100	392.000	102.000	655.000	52.700	169.000	646.000
* indicates a result below exact quantification							
PESTICIDES (ppm)							
Alpha-BHC	110.000						
Beta-BHC			*790.00				
Delta-BHC	260.000						
4,4'-DDE		390.000	130.000	840.000	*57.000	*140.000	*1200.000
4,4'-DDD	*140.000	2100.000	*12.000	22000.00	*32.000	*120.000	*370.000
4,4'-DDT	6700.000	31000.00	130.000	76000.00	390.000	1900.000	*5400.00
* indicates a result below exact quantification							

Soil boring samples. Analyzed by Weston.

ORIGINAL (RED)

TABLE 8

4/27/89

	SOIL 1	SOIL 2	SOIL 3	SOIL 4	SOIL 5
PESTICIDES (ppm)					
DDT	43.000	150.000	798.000	159.000	0.730
DDD		0.860			
DDE	16.000	8.100	43.000	7.800	1.300
Chlordane	7.300	8.800	15.000	31.000	
Alpha-BHC	0.160	0.220	1.000	2.500	0.021
Beta-BHC	0.330	0.520	2.500	1.000	0.076
Gamma-BHC (Lindane)	0.050	0.100	0.460	0.370	0.013
Delta-BHC	0.040	0.110	0.570	0.200	
Endrin	0.270	0.280	0.270	40.000	
TOTAL PESTICIDES	67.150	168.990	860.800	241.870	2.140

Soil/sediment samples taken on and off site. Analyzed by MD/DHMH.

TABLE 9

	5/17/89 MW-1	5/17/89 MW-6	5/17/89 MW-7	5/18/89 MW-2	5/18/89 MW-3	5/18/89 MW-5
VOLATILES (ppb)						
1,1-dichloroethane			2.000			
Chloroform	2.000	2.000	12.000			
1,1,1-trichloroethane	1.000					
1,2-dichlorobenzene	2.000	2.000				
Chlorobenzene	1.000	1.000		182.000	111.000	109.000
Benzene				19.000		14.000
Ethylbenzene				5.000		
Total xylenes				4.000		
Acetone				168.000		
Isopropyl alcohol				250.000		
INORGANICS (ppm)						
Arsenic	N/A	0.003	N/A	0.010		
Calcium	N/A	610.000	N/A	640.000	275.000	520.000
Copper	N/A	0.060	N/A			
Mercury	N/A		N/A	0.001		
PESTICIDES (ppb)						
Alpha-BHC	0.800	1.000	3.000	0.500	3.000	8.000
Beta-BHC	2.000	2.000	40.000	5.000	7.000	4.000
Gamma-BHC (Lindane)	0.100	0.200	1.000			3.000
Delta-BHC	3.000	0.500	8.000	12.000	10.000	9.000
Dieldrin	6.000	0.400	3.000			
Endrin			3.000			

Groundwater samples, split with Weston. Analyzed by MDE.
N/A - Not Analyzed.

ORIGINAL (RED)

TABLE 10

5/17-18/89

VOLATILES (ppb)	MW-1	MW-2	MW-3	MW-5	MW-5(D)	MW-6	MW-7
Chloroform							8.600
Benzene		16.000	1.100	8.400	8.700		
Toluene		1.300					
Chlorobenzene		150.000	8.800	74.000	80.000		
Total xylene		2.100		1.000	1.100		
1,2-dichlorobenzene	2.200	6.900	1.900	5.800	5.200		
1,4-dichlorobenzene		22.000	6.100	12.000	13.000		
Ethylbenzene		4.600					
TOTAL VOLATILES	2.200	202.900	17.900	101.200	108.000		8.600
INORGANICS (ppb)							
Beryllium						38.300	
Cadmium						5.000	
Copper		33.800		25.500	27.100	55.900	
Mercury	0.480						
Nickel						379.000	
Zinc		23.700	20.800	54.300	57.500	512.000	56.800
TOTAL INORGANICS	0.480	57.500	20.800	79.800	84.600	990.200	56.800
PESTICIDES (ppb)							
Alpha-BHC			3.900	12.000	23.000		
Beta-BHC	2.400		7.800				57.000
Delta-BHC	2.400	9.500	19.000	14.000	16.000		
Dieldrin	5.600						
TOTAL PESTICIDES	10.400	9.500	30.700	26.000	39.000		57.000

Groundwater samples, split with MDE. Analyzed by Weston. (D) - duplicate.

128907

ORIGINAL (RED)

APPENDIX B

SAMPLE RESULTS

TABLE I

Antietam Creek Survey - June 1976

Map Loc. Number	AFO Sample No.	Location	Date Sampled	Time Sampled	As PPM	Cd PPM	Cr PPM	Pb PPM	Hg PPM	DDT PPM	DDE PPM	DDD PPM	PCB 1254 PPM	Chloro-dane PPM	Diel-drin PPB
ANT 0366	76062233	Antietam Cr. at USGS Gage Sta. near Md/Pa. line	6-22-76	1015	2.05	<1.0	27.0	68	0.5	.002	.000	.002	<.010	.015	<1.0
ANT 0291	76062232	Antietam Cr. at Hagerstown, below trib next to Trovinger Rd.	6-22-76	1100	2.12	<1.0	11.0	8	<0.1	.001	.000	.000	<.010	<.010	<1.0
ANT 0277	76062231	Antietam Cr. at Hagerstown, above Marsh Run	6-22-76	1130	1.90	<1.0	22.0	53	0.5	.003	.001	.001	<.010	<.010	<1.0
MRS 0000	76062235	Marsh Run at confluence with Antietam Cr.	6-22-76	1150	1.03	8.0	80.0	5	0.6	.001	.000	.000	<.010	<.010	<1.0
ANT 0251	76062230	Antietam Cr. at Hagerstown, bridge at Power Sta.	6-22-76	1300	5.07	2.0	34.0	54	0.8	.002	.001	.001	<.010	<.010	<1.0
UAK 0001	76062234	Unknown Trib at Hagerstown above Power Plant Effl. pipe	6-22-76	1250	4.89	2.0	35.0	1070	1.5	2.059	.018	.206	<.010	<.010	<1.0
ANT 0241	76062229	Antietam Cr. at Hagerstown, US 40 by pumping sta.	6-22-76	1315	3.96	5.0	50.0	255	0.2	.417	.011	.074	<.010	<.010	<1.0
ANT 0229	76062228	Antietam Cr. at Ridge Rd., Funkstown, Md.	6-22-76	1300	5.07	2.0	29.0	96	0.3	.104	.003	.010	<.010	<.010	<1.0
ANT 0203	76062227	Antietam Cr. at Poffenberger Rd.	6-22-76	1200	3.09	1.0	31.0	47	0.3	.138	.007	.068	<.010	<.010	<1.0
ANT 0134	76062226	Antietam Cr. at Devils Backbone Co. Park	6-22-76	1115	3.39	5.0	41.0	114	0.3	.047	.003	.011	<.010	<.010	<1.0
ANT 0044	76062225	Antietam Cr. at Burnside Bridge	6-22-76	1030	4.09	1.0	30.0	36	0.5	.003	.001	.005	<.010	<.010	<1.0

ORIGINAL (RED)

CEN-024310

AR100531

HERBERT M. SACHS
ADMINISTRATOR

ORIGINAL (RED)

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BUILDING
ANNAPOLIS, MARYLAND 21401

MEMORANDUM

TO: Bob Creter

FROM: Rich Steimle

DATE: December 29, 1976

On October 21, 1976 I met with Bob Boone to discuss a subsurface investigation of the possible contamination of soil by insecticides from the Central Chemical Company, Hagerstown, Maryland. The plant manufactures agricultural fertilizers now, but manufactured pesticides previously. It was determined that a series of borings be conducted to obtain soil samples at various depths and locations for the purpose of further understanding the problem.

On October 28 and 29, 1976 the Groundwater Investigating Group conducted a series of borings and obtained split spoon samples. The soil samples were taken to the W.R.A. laboratory to be analysed for DDT, arsenic and lead. The predominant soils consists of silts and clays with rock fragments. The area is underlain by limestone.

The analysis revealed lead concentrations ranging from 395.0 ppm to 14.75 ppm, arsenic from 300.0 ppm to 2.17 ppm and DDT from 1,646.4 ppm to 0.179 ppm.

The limits established by the U.S.P.H.S. for drinking water standards are 0.05 for both arsenic and lead. In view of the fact that the soils on and near the Central Chemical Company property contains lead and arsenic concentrations far exceeding these limits, I feel a serious ground and surface water contamination problem probably exists due to the leaching of the soil by precipitation.

Geologically speaking, this region lies in a limestone area which is a valuable, productive water-bearing rock. This rock is extremely susceptible to contamination due to the relatively large voids and fractures in the rock of which groundwater moves freely with very little chance of filtration or attenuation. Therefore, contaminated groundwater may be found great distances from the source.

I recommend a thorough hydrogeologic investigation be conducted by a competant, private engineering firm. The investigation should include an extensive soil sampling program to define and ascertain the extent of the contamination. A proposal should also be submitted for the possible solution of the problem, i.e. removal of the soil. All plans should be submitted to W.R.A. for review and approval before implementation. An investigation should also be conducted to determine the possible contamination of nearby wells.

I stress the urgency of expedience due to the toxic nature of the contaminents and the relatively large concentrations, therefore deadlines should be set for each step toward the solution.

ORIGINAL (RED)

If you have any questions feel free to call me at 269-2780.

RS:dlk

cc: J. Lewandowski
A. Schiffman

Samples were taken as follows:

ORIGINAL (RED)

SAMPLE POINT 1 - located in the lowest area in the southeast corner of the property.

Sample #1A - ½'-½'
#1B - 2'-3'
#1C - 8'-9'

SAMPLE POINT 2 - located inside the fence line on the western side of the property near the liquid storage area.

Sample #2A - ½'-½'

SAMPLE POINT 3 - located outside the fence line on the southeast corner of the porperty near the shipping area.

Sample #3A - 0'-1'
#3B - 1'-2'

SAMPLE POINT 4 - located outside the fence on the western side near the grinding and dust packing area.

Sample #4A - 0'-1'

SAMPLE POINT 5 - located at the northern corner at the highest point on the property. This sample was taken as a possible unaffected background sample.

Sample #5A - 0'-1½'
#5B - 2½'-3½'

SAMPLE POINT 6 - located outside the fence at the edge of a private landfill containing rubble from insecticide buildings destroyed in a fire.

Sample #6A - 1'-2'
#6B - 3'-4'
#6C - 8'-9'

SAMPLE POINT 7 - located along edge of Mitchell Avenue, south of the plant, where surface drainage enters public storm drains.

Sample #7A - 0'-1'
#7B - 1'-2'
#7C - 2'-3½'

SUBMITTER ______ MARYLAND WATER RESOURCES ADMINISTRATION WQS-10 10.73

WATER QUALITY DATA SHEET

ORIGINAL (RED)

BOTTLE NUMBERS

BACT. ______ DO ______ BOD ______ SURV. ______

PLASTIC ______ GLASS ______

SEQUENCE NUMBER (PUNCH IN 76-79, ALL CARDS)

1 = ONE I = LETTER I 0 = ZERO O = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO. (1–9) | DATE: YEAR (10–11), MONTH (12–13), DAY (14–15) | TIME OF SAMPLE (16–19) | DEPTH FT. (20–22) | SUBMITTER CODE (23–24) | DATA CATEGORY CODE (25–26) | METHOD (27) | COMPOSITE TOTAL HRS. (28–29) | TIDE STATE (30) | WEATHER CODE (31) | SAMPLE TYPE | WATER TYPE (32) | CODE - A (33) | FREQ. INVEST (34) | COUNTY CODE (37–38) | WATER CLASS 1 2 3 4 (39–42) | CARD 1

FLOW NOTES: | GAGE HT. | FLOW: BASIS, VALUE (43–48), EXP., G/L | TEMPERATURE °C: ±, AIR, neg. WATER | FIELD pH | G/L | LAB pH | G/L | DO mg/l | G/L | SPECIFIC CONDUCTANCE micromhos/cm @ 25° C | G/L | 80: 1

CARD 2

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ ICED YES NO

COLIFORMS MPN/100ml | G/L | FECAL COLIFORMS MPN/100ml | G/L | SALINITY 0/00 | G/L | SUSPENDED SOLIDS mg/l | G/L | DISSOLVED SOLIDS mg/l | G/L | CARD 2

TURBIDITY FTU | G/L | NH_3–N mg/l N | G/L | NITRITE–N mg/l N | G/L | NITRATE–N mg/l N | G/L | TOTAL PO_4 mg/l P | G/L | 5 DAY BOD mg/l | G/L | 80: 2

CARD 3

ORGANIC N mg/l | G/L | TOC mg/l C | G/L | CHLOROPHYLL–a micrograms/l | G/L | TOTAL ACIDITY mg/l $CaCO_3$ | G/L | MINERAL ACIDITY mg/l $CaCO_3$ | G/L | TOTAL IRON mg/l Fe | G/L | FERROUS IRON mg/l Fe+2 | G/L

ALUMINUM (TOTAL) mg/l Al | G/L | MANGANESE (TOTAL) mg/l Mn | G/L | SULFATE mg/l SO_4 | G/L | TOTAL ALKALINITY mg/l $CaCO_3$ | G/L | DISSOLVED IRON mg/l | G/L | TOTAL HARDNESS mg/l $CaCO_3$ | G/L | 80: 3 | CARD 3

CARD 4

ZINC (TOTAL) mg/l Zn | G/L | COPPER (TOTAL) mg/l Cu | G/L | HEXAVALENT CHROMIUM mg/l Cr+6 | G/L | TOTAL CHROMIUM mg/l Cr | G/L | CADMIUM (TOTAL) mg/l Cd | G/L | LEAD (TOTAL) mg/l Pb | G/L

CHLORIDES mg/l Cl | G/L | COLOR UNITS | G/L | GREASE & OIL mg/l (hexane soluble) | G/L | OIL & GREASE mg/l (pet. ether soluble) | G/L | RESIDUAL CHLORINE mg/l Cl | G/L | ORTHO PHOSPHATE mg/l P (filterable) | G/L | 80: 4 | CARD 4

CARD 5

DATA ITEM NAME: DDT

DATA ITEM VALUE (25–46): C017640000 [illegible]

FIELD NUMBER: 1 7 2 (See back of sheet)

DATA ITEM VALUE (47–68)

80: 5 | CARD 5

DATA ITEM NAME: ARSENIC

DATA ITEM VALUE (25–46): 20350 [illegible]

FIELD NUMBER: 1 2 8 (See back of sheet)

80: 5 | CARD 5

DATA ITEM NAME

DATA ITEM VALUE (25–46)

FIELD NUMBER (21 22 23) (See back of sheet)

80: 5 | CARD 5

DATA PROCESSING

CEN-024314 AR100[illegible]

WQS-10 10/73

MARYLAND WATER RESOURCES ADMINISTRATION
WATER QUALITY DATA SHEET

SUBMITTER ____________

BOTTLE NUMBERS ____________

BACT. ______ DO ______ BOD ______

PLASTIC ______ GLASS ______

SURVEY ____________

ORIGINAL (RED)

SEQUENCE NUMBER (PUNCH IN 76-79, ALL CARDS)

1 = ONE I = LETTER I 0 = ZERO Ø = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO. (1–9) | DATE: YEAR (10–11), MONTH (12–13), DAY (14–15) | TIME OF SAMPLE (16–19) | DEPTH FT. (20–22) | SUBMITTER CODE (23–24) | DATA CATEGORY CODE (25) | METHOD (26) | COMPOSITE TOTAL HRS. (27–28) | TIDE STATE (29) | WEATHER CODE (30) | SAMPLE TYPE (31) | WATER TYPE (32) | CODE - A (33) | FREQ. INVEST (34) | COUNTY CODE (37–38) | WATER CLASS 1 / 2 / 3 / 4 (39–42) | CARD 1

FLOW NOTES:

GAGE HT. ______

FLOW: BASIS, VALUE (43–48), EXP., G/L | TEMPERATURE °C: ± AIR, neg. WATER (49–57) | FIELD pH (58–60), G/L | LAB pH (61–64), G/L | DO mg/l (65–68), G/L | SPECIFIC CONDUCTANCE micromhos/cm @ 25° C (69–75), G/L | 80: 1

CARD 2

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ | ICED YES NO

COLIFORMS MPN/100ml (1–9), G/L | FECAL COLIFORMS MPN 100ml (10–18), G/L | SALINITY 0/00 (19–24), G/L | SUSPENDED SOLIDS mg/l (25–30), G/L | DISSOLVED SOLIDS mg/l (31–37), G/L | CARD 2

TURBIDITY FTU (38–42), G/L | NH_3—N mg/l N (43–48), G/L | NITRITE—N mg/l N (49–55), G/L | NITRATE—N mg/l N (56–61), G/L | TOTAL PO_4 mg/l P (62–67), G/L | 5 DAY BOD mg/l (68–75), G/L | 80: 2

CARD 3

ORGANIC N mg/l (1–6), G/L | TOC mg/l C (7–12), G/L | CHLOROPHYLL—a micrograms/l (13–18), G/L | TOTAL ACIDITY mg/l $CaCO_3$ (19–24), G/L | MINERAL ACIDITY mg/l $CaCO_3$ (25–30), G/L | TOTAL IRON mg/l Fe (31–36), G/L | FERROUS IRON mg/l Fe+2 (37–42), G/L

ALUMINUM (TOTAL) mg/l Al (43–48), G/L | MANGANESE (TOTAL) mg/l Mn (49–54), G/L | SULFATE mg/l SO_4 (55–60), G/L | TOTAL ALKALINITY mg/l $CaCO_3$ (61–66), G/L | DISSOLVED IRON mg/l (67–71), G/L | TOTAL HARDNESS mg/l $CaCO_3$ (72–75), G/L | 80: 3 | CARD 3

CARD 4

ZINC (TOTAL) mg/l Zn (1–8), G/L | COPPER (TOTAL) mg/l Cu (9–17), G/L | HEXAVALENT CHROMIUM mg/l Cr+6 (18–24), G/L | TOTAL CHROMIUM mg/l Cr (25–31), G/L | CADMIUM (TOTAL) mg/l Cd (32–36), G/L | LEAD (TOTAL) mg/l Pb (37–42), G/L — (Dry basis) [illegible]

CHLORIDES mg/l Cl (43–48), G/L | COLOR UNITS (49–54), G/L | GREASE & OIL mg/l (hexane soluble) (55–59), G/L | OIL & GREASE mg/l (pet. ether soluble) (60–64), G/L | RESIDUAL CHLORINE mg/l Cl (65–69), G/L | ORTHO PHOSPHATE mg/l P (filterable) (70–75), G/L | 80: 4 | CARD 4

CARD 5

DATA ITEM NAME: DDT

DATA ITEM VALUE (25–46): [illegible] DDT Dry Basis

FIELD NUMBER (21–23): 1 7 2 (See back of sheet)

(47–68) | 80: 5 | CARD 5

DATA ITEM NAME: Arsenic

DATA ITEM VALUE (25–46): 11700 [illegible]

FIELD NUMBER (21–23): 1 2 8 (See back of sheet)

80: 5 | CARD 5

DATA ITEM NAME ____________

DATA ITEM VALUE (25–46)

FIELD NUMBER (21–23) (See back of sheet)

80: 5 | CARD 5

DATA PROCESSING

CEN-024315

AR100536

SUBMITTER

MARYLAND WATER RESOURCES ADMINISTRATION

WATER QUALITY DATA SHEET

WQS-10 10/73

BOTTLE NUMBERS

BACT. ____ DO ____ BOD ____ SURVEY ____

PLASTIC ____ GLASS ____

ORIGINAL (RED)

SEQUENCE NUMBER (PUNCH IN 76-79, ALL CARDS)

1 = ONE   I = LETTER I   0 = ZERO   Ø = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO.	DATE: YEAR	MONTH	DAY	TIME OF SAMPLE	DEPTH FT.	SUBMITTER CODE	DATA CATEGORY CODE	METHOD	COMPOSITE TOTAL HRS.	TIDE STATE	WEATHER CODE	SAMPLE TYPE	WATER TYPE	CODE - A	FREQ. INVEST	COUNTY CODE	WATER CLASS 1	2	3	4
1–9	10–11	12–13	14–15	16–19	20–22	23–24	25	26	27–28	29	30	31	32	33	34	37–39	40	41	42	

FLOW NOTES:

GAGE HT.

FLOW: BASIS	VALUE	EXP.	G/L	±	TEMPERATURE °C: AIR	neg. WATER	FIELD pH	G/L	LAB pH	G/L	DO mg/l	G/L	SPECIFIC CONDUCTANCE micromhos/cm @ 25°C	G/L	80
43	44–48	49	50	51	52–54	55–57	58–60	61	62–64	65	66–68	69	70–74	75	1

CARD 2

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ ICED YES NO

COLIFORMS MPN/100ml	G/L	FECAL COLIFORMS MPN/100ml	G/L	SALINITY 0/00	G/L	SUSPENDED SOLIDS mg/l	G/L	DISSOLVED SOLIDS mg/l	G/L
1–8	9	10–17	18	19–23	24	25–30	31	32–36	37

TURBIDITY FTU	G/L	NH_3–N mg/l N	G/L	NITRITE–N mg/l N	G/L	NITRATE–N mg/l N	G/L	TOTAL PO_4 mg/l P	G/L	5 DAY BOD mg/l	G/L	80
38–41	42	43–47	48	49–54	55	56–61	62	63–68	69	70–74	75	2

CARD 3

ORGANIC N mg/l	G/L	TOC mg/l C	G/L	CHLOROPHYLL–a micrograms/l	G/L	TOTAL ACIDITY mg/l $CaCO_3$	G/L	MINERAL ACIDITY mg/l $CaCO_3$	G/L	TOTAL IRON mg/l Fe	G/L	FERROUS IRON mg/l Fe+2	G/L
1–5	6	7–11	12	13–18	19	20–24	25	26–30	31	32–35	36	37–41	42

ALUMINUM (TOTAL) mg/l Al	G/L	MANGANESE (TOTAL) mg/l Mn	G/L	SULFATE mg/l SO_4	G/L	TOTAL ALKALINITY mg/l $CaCO_3$	G/L	DISSOLVED IRON mg/l	G/L	TOTAL HARDNESS mg/l $CaCO_3$	G/L	80
43–47	48	49–53	54	55–59	60	61–65	66	67–69	70	71–74	75	3

CARD 4

ZINC (TOTAL) mg/l Zn	G/L	COPPER (TOTAL) mg/l Cu	G/L	HEXAVALENT CHROMIUM mg/l Cr+6	G/L	TOTAL CHROMIUM mg/l Cr	G/L	CADMIUM (TOTAL) mg/l Cd	G/L	LEAD (TOTAL) mg/l Pb	G/L
1–7	8	9–15	16	17–23	24	25–29	30	31–35	36	37–41	42

CHLORIDES mg/l Cl	G/L	COLOR UNITS	G/L	GREASE & OIL mg/l (hexane soluble)	G/L	OIL & GREASE mg/l (pet. ether soluble)	G/L	RESIDUAL CHLORINE mg/l Cl	G/L	ORTHO PHOSPHATE mg/l P (filterable)	G/L	80
43–47	48	49–53	54	55–58	59	60–64	65	66–68	69	70–74	75	4

CARD 5

DATA ITEM NAME: DDT

DATA ITEM VALUE (25–46): 0 0 47 1 0 0 0 0 [illegible]

FIELD NUMBER (21 22 23): 1 7 2 (See back of sheet)

DATA ITEM VALUE (47–68):

80: 5

CARD 5

DATA ITEM NAME: ARSENIC

DATA ITEM VALUE (25–46): 0 2 1 3 3 [illegible]

FIELD NUMBER (21 22 23): 1 2 5 (See back of sheet)

80: 5

CARD 5

DATA ITEM NAME

DATA ITEM VALUE (25–46)

FIELD NUMBER (21 22 23) (See back of sheet)

80: 5

CEN-024316

AR100537

DATA PROCESSING

SUBMITTER

MARYLAND WATER RESOURCES ADMINISTRATION

WATER QUALITY DATA SHEET

WQS-10 10/73

ORIGINAL (RED)

SEQUENCE NUMBER EACH (IN 76-79, ALL CARDS)

BOTTLE NUMBERS

BACT. ____ DO ____ BOD ____ SURVEY

PLASTIC ____ GLASS ____

1 = ONE   I = LETTER I   0 = ZERO   Ø = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO. (1–9) | DATE: YEAR (10–11), MONTH (12–13), DAY (14–15) | TIME OF SAMPLE (16–19) | DEPTH FT. (20–22) | SUBMITTER CODE | DATA CATEGORY CODE | METHOD | COMPOSITE TOTAL HRS. | TIDE STATE | WEATHER CODE | SAMPLE TYPE | WATER TYPE | CODE - A | FREQ. INVEST | COUNTY CODE | WATER CLASS 1 / 2 / 3 / 4 | CARD 1

FLOW NOTES:

GAGE HT.

FLOW: BASIS, VALUE, EXP., G/L, ± | TEMPERATURE °C: AIR, neg. WATER | FIELD pH, G/L | LAB pH, G/L | DO mg/1, G/L | SPECIFIC CONDUCTANCE micromhos/cm @ 25° C, G/L | 80: 1

CARD 2

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ ICED YES NO

COLIFORMS MPN/100ml, G/L | FECAL COLIFORMS MPN/100ml, G/L | SALINITY 0/00, G/L | SUSPENDED SOLIDS mg/1, G/L | DISSOLVED SOLIDS mg/1, G/L | CARD 2

TURBIDITY FTU, G/L | NH_3–N mg/1 N, G/L | NITRITE–N mg/1 N, G/L | NITRATE–N mg/1 N, G/L | TOTAL PO_4 mg/1 P, G/L | 5 DAY BOD mg/1, G/L | 80: 2

CARD 3

ORGANIC N mg/1, G/L | TOC mg/1 C, G/L | CHLOROPHYLL–a micrograms/1, G/L | TOTAL ACIDITY mg/1 $CaCO_3$, G/L | MINERAL ACIDITY mg/1 $CaCO_3$, G/L | TOTAL IRON mg/1 Fe, G/L | FERROUS IRON mg/1 Fe+2, G/L

ALUMINUM (TOTAL) mg/1 Al, G/L | MANGANESE (TOTAL) mg/1 Mn, G/L | SULFATE mg/1 SO_4, G/L | TOTAL ALKALINITY mg/1 $CaCO_3$, G/L | DISSOLVED IRON mg/1, G/L | TOTAL HARDNESS mg/1 $CaCO_3$, G/L | 80: 3 | CARD 3

CARD 4

ZINC (TOTAL) mg/1 Zn, G/L | COPPER (TOTAL) mg/1 Cu, G/L | HEXAVALENT CHROMIUM mg/1 Cr+6, G/L | TOTAL CHROMIUM mg/1 Cr, G/L | CADMIUM (TOTAL) mg/1 Cd, G/L | LEAD (TOTAL) mg/1 Pb, G/L

CHLORIDES mg/1 Cl, G/L | COLOR UNITS, G/L | GREASE & OIL mg/1 (hexane soluble), G/L | OIL & GREASE mg/1 (pet. ether soluble), G/L | RESIDUAL CHLORINE mg/1 Cl, G/L | ORTHO PHOSPHATE mg/1 P (filterable), G/L | 80: 4 | CARD 4

CARD 5

DATA ITEM NAME: DDT

DATA ITEM VALUE (25–46): [illegible] DDT [illegible]

FIELD NUMBER (21 22 23): 1 7 7 (See back of sheet)

DATA ITEM VALUE (47–68)

80: 5 | CARD 5

DATA ITEM NAME: ARSENIC

DATA ITEM VALUE (25–46): 1 1 2 7 5 [illegible]

FIELD NUMBER (21 22 23): 1 7 8 (See back of sheet)

80: 5 | CARD 5

DATA ITEM NAME

DATA ITEM VALUE (25–46)

FIELD NUMBER (21 22 23) (See back of sheet)

80: 5 | CARD 5

CEN-024317

AR100538

DATA PROCESSING

SUBMITTER

MARYLAND WATER RESOURCES ADMINISTRATION
WATER QUALITY DATA SHEET

WQS-10 10/73

ORIGINAL (RED)

BOTTLE NUMBERS

BACT. ___ DO ___ BOD ___ SURV. ___

PLASTIC ___ GLASS ___

SEQUENCE NUMBER (PUNCH IN 76-79, ALL CARDS)

1 = ONE   I = LETTER I   0 = ZERO   O = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO. (1–9) | DATE: YEAR (10–11), MONTH (12–13), DAY (14–15) | TIME OF SAMPLE (16–19) | DEPTH FT. (20–22) | SUBMITTER CODE (23–24) | DATA CATEGORY CODE (25) | METHOD (26) | COMPOSITE TOTAL HRS. (27–28) | TIDE STATE (29) | WEATHER CODE (30) | SAMPLE TYPE (31) | WATER TYPE (32) | CODE - A (33) | FREQ. INVEST. (34) | COUNTY CODE (37–38) | WATER CLASS 1, 2, 3, 4 (39–42)

FLOW NOTES:
GAGE HT.

FLOW: BASIS (43), VALUE (44–48), EXP. (49), G/L (50) | TEMPERATURE °C: (±) (51), AIR (52–54), neg. WATER (55–57) | FIELD pH (58–60) G/L | LAB pH (61–64) G/L | DO mg/l (65–68) G/L | SPECIFIC CONDUCTANCE micromhos/cm @ 25° C (69–74) G/L (75) | 80: 1

CARD 2

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ ICED YES NO

COLIFORMS MPN/100ml (1–9) G/L | FECAL COLIFORMS MPN/100ml (10–18) G/L | SALINITY 0/00 (19–23) G/L | SUSPENDED SOLIDS mg/l (24–30) G/L | DISSOLVED SOLIDS mg/l (31–37) G/L

TURBIDITY FTU (38–42) G/L | NH_3–N mg/l N (43–48) G/L | NITRITE–N mg/l N (49–55) G/L | NITRATE–N mg/l N (56–61) G/L | TOTAL PO_4 mg/l P (62–67) G/L | 5 DAY BOD mg/l (68–75) G/L | 80: 2

CARD 3

ORGANIC N mg/l (1–6) G/L | TOC mg/l C (7–12) G/L | CHLOROPHYLL–a micrograms/l (13–18) G/L | TOTAL ACIDITY mg/l $CaCO_3$ (19–24) G/L | MINERAL ACIDITY mg/l $CaCO_3$ (25–30) G/L | TOTAL IRON mg/l Fe (31–36) G/L | FERROUS IRON mg/l Fe+2 (37–42) G/L

ALUMINUM (TOTAL) mg/l Al (43–48) G/L | MANGANESE (TOTAL) mg/l Mn (49–54) G/L | SULFATE mg/l SO_4 (55–60) G/L | TOTAL ALKALINITY mg/l $CaCO_3$ (61–66) G/L | DISSOLVED IRON mg/l (67–70) G/L | TOTAL HARDNESS mg/l $CaCO_3$ (71–75) G/L | 80: 3

CARD 4

ZINC (TOTAL) mg/l Zn (1–8) G/L | COPPER (TOTAL) mg/l Cu (9–17) G/L | HEXAVALENT CHROMIUM mg/l Cr+6 (18–24) G/L | TOTAL CHROMIUM mg/l Cr (25–30) G/L | CADMIUM (TOTAL) mg/l Cd (31–36) G/L | LEAD (TOTAL) mg/l Pb (37–42) G/L

CHLORIDES mg/l Cl⁻ (43–48) G/L | COLOR UNITS (49–54) G/L | GREASE & OIL mg/l (hexane soluble) (55–59) G/L | OIL & GREASE mg/l (pet. ether soluble) (60–64) G/L | RESIDUAL CHLORINE mg/l Cl (65–69) G/L | ORTHO PHOSPHATE mg/l P (filterable) (70–75) G/L | 80: 4

CARD 5

DATA ITEM NAME: DO
DATA ITEM VALUE (25–46)
FIELD NUMBER (21 22 23) (See back of sheet)
DATA ITEM VALUE (47–68)
80: 5

CARD 5

DATA ITEM NAME: A-Ocsnic
DATA ITEM VALUE (25–46)
FIELD NUMBER (21 22 23) (See back of sheet)
80: 5

CARD 5

DATA ITEM NAME
DATA ITEM VALUE (25–46)
FIELD NUMBER (21 22 23) (See back of sheet)
80: 5

CEN-024318

AR100539

DATA PROCESSING

SUBMITTER ____ MARYLAND WATER RESOURCES ADMINISTRATION WQS-10 10/73

WATER QUALITY DATA SHEET

ORIGINAL (RED)

BOTTLE NUMBERS

BACT. ____ DO ____ BOD ____ SURVE. ____

PLASTIC ____ GLASS ____

SEQUENCE NUMBER (PUNCH IN 76-79, ALL CARDS)

1 = ONE I = LETTER I 0 = ZERO Ø = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO. (1–9) | DATE: YEAR (10–11), MONTH (12–13), DAY (14–15) | TIME OF SAMPLE (16–19) | DEPTH FT. (20–22) | SUBMITTER CODE (23–24) | DATA CATEGORY CODE (25) | METHOD (26) | COMPOSITE TOTAL HRS. (27–28) | TIDE STATE (29) | WEATHER CODE (30) | SAMPLE TYPE (31) | WATER TYPE (32) | CODE - A (33) | FREQ. INVEST (34) | COUNTY CODE (37–38) | WATER CLASS 1 2 3 4 (39–42)

FLOW NOTES: GAGE HT. ____

FLOW: BASIS, VALUE, EXP, G/L (43–50) | TEMPERATURE °C: ±, AIR, neg. WATER (51–57) | FIELD pH G/L (58–61) | LAB pH G/L (62–65) | DO mg/l G/L (66–69) | SPECIFIC CONDUCTANCE micromhos/cm @ 25°C G/L (70–75) | 80: 1

CARD 2

BACTERIOLOGICAL: (HEALTH DEPT.) OR WRA ICED YES NO

COLIFORMS MPN/100ml G/L (1–10) | FECAL COLIFORMS MPN/100ml G/L (11–19) | SALINITY 0/00 G/L (20–24) | SUSPENDED SOLIDS mg/l G/L (25–30) | DISSOLVED SOLIDS mg/l G/L (31–37)

TURBIDITY FTU G/L (38–42) | NH_3–N mg/l N G/L (43–48) | NITRITE–N mg/l N G/L (49–55) | NITRATE–N mg/l N G/L (56–61) | TOTAL PO_4 mg/l P G/L (62–67) | 5 DAY BOD mg/l G/L (68–75) | 80: 2

CARD 3

ORGANIC N mg/l G/L | TOC mg/l C G/L | CHLOROPHYLL-a micrograms/l G/L | TOTAL ACIDITY mg/l $CaCO_3$ G/L | MINERAL ACIDITY mg/l $CaCO_3$ G/L | TOTAL IRON mg/l Fe G/L | FERROUS IRON mg/l Fe+2 G/L (1–42)

ALUMINUM (TOTAL) mg/l Al G/L | MANGANESE (TOTAL) mg/l Mn G/L | SULFATE mg/l SO_4 G/L | TOTAL ALKALINITY mg/l $CaCO_3$ G/L | DISSOLVED IRON G/L | TOTAL HARDNESS mg/l $CaCO_3$ G/L (43–75) | 80: 3

CARD 4

ZINC (TOTAL) mg/l Zn G/L | COPPER (TOTAL) mg/l Cu G/L | HEXAVALENT CHROMIUM mg/l Cr+6 G/L | TOTAL CHROMIUM mg/l Cr G/L | CADMIUM (TOTAL) mg/l Cd G/L | LEAD (TOTAL) mg/l Pb G/L (1–42)

CHLORIDES mg/l Cl G/L | COLOR UNITS G/L | GREASE & OIL mg/l (hexane soluble) G/L | OIL & GREASE mg/l (pet. ether soluble) G/L | RESIDUAL CHLORINE mg/l Cl G/L | ORTHO PHOSPHATE mg/l P (filterable) G/L (43–75) | 80: 4

CARD 5

DATA ITEM NAME: DDT

DATA ITEM VALUE (25–46): 0050050001 ...

FIELD NUMBER (21 22 23): 1 7 2 (See back of sheet)

DATA ITEM VALUE (47–68) | 80: 5

DATA ITEM NAME: ARSENIC

DATA ITEM VALUE (25–46): 300000 7/4 ...

FIELD NUMBER (21 22 23): 1 2 3 (See back of sheet)

80: 5

DATA ITEM NAME ____ DATA ITEM VALUE (25) ____ | 80: 5 | CARD 5

FIELD NUMBER (21 22 23) ____ (See back of sheet)

CEN-024319

AR100540

DATA PROCESSING

WQS-10 10/73

MARYLAND WATER RESOURCES ADMINISTRATION
WATER QUALITY DATA SHEET

ORIGINAL (RED)

SUBMITTER ______

BOTTLE NUMBERS

BACT. ______ DO ______ BOD ______ SURVE. ______

PLASTIC ______ GLASS ______

SEQUENCE NUMBER (PUNCH IN 76-79, ALL CARDS)

1 = ONE I = LETTER I 0 = ZERO Ø = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO. (1–9) | DATE: YEAR (10–11), MONTH (12–13), DAY (14–15) | TIME OF SAMPLE (16–19) | DEPTH FT. (20–22) | SUBMITTER CODE | DATA CATEGORY CODE | METHOD | COMPOSITE TOTAL HRS. | TIDE STATE | WEATHER CODE | SAMPLE TYPE | WATER TYPE | CODE - A | FREQ. INVEST | COUNTY CODE | WATER CLASS 1 2 3 4 (37–42)

FLOW NOTES: GAGE HT. ______

FLOW: BASIS, VALUE, EXP., G/L (43–48) | TEMPERATURE °C: ±, AIR, neg. WATER (49–57) | FIELD pH G/L | LAB pH G/L | DO mg/l G/L | SPECIFIC CONDUCTANCE micromhos/cm @ 25°C G/L (69–75) | 80: 1

CARD 2

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ ICED YES NO

COLIFORMS MPN/100ml G/L | FECAL COLIFORMS MPN/100ml G/L | SALINITY 0/00 G/L | SUSPENDED SOLIDS mg/l G/L | DISSOLVED SOLIDS mg/l G/L (1–37)

TURBIDITY FTU G/L | NH_3–N mg/l N G/L | NITRITE–N mg/l N G/L | NITRATE–N mg/l N G/L | TOTAL PO_4 mg/l P G/L | 5 DAY BOD mg/l G/L (38–75) | 80: 2

CARD 3

ORGANIC N mg/l G/L | TOC mg/l C G/L | CHLOROPHYLL–a micrograms/l G/L | TOTAL ACIDITY mg/l $CaCO_3$ G/L | MINERAL ACIDITY mg/l $CaCO_3$ G/L | TOTAL IRON mg/l Fe G/L | FERROUS IRON mg/l Fe+2 G/L (1–42)

ALUMINUM (TOTAL) mg/l Al G/L | MANGANESE (TOTAL) mg/l Mn G/L | SULFATE mg/l SO_4 G/L | TOTAL ALKALINITY mg/l $CaCO_3$ G/L | DISSOLVED IRON mg/l G/L | TOTAL HARDNESS mg/l $CaCO_3$ G/L (43–75) | 80: 3

CARD 4

ZINC (TOTAL) mg/l Zn G/L | COPPER (TOTAL) mg/l Cu G/L | HEXAVALENT CHROMIUM mg/l Cr+6 G/L | TOTAL CHROMIUM mg/l Cr G/L | CADMIUM (TOTAL) mg/l Cd G/L | LEAD (TOTAL) mg/l Pb G/L (1–42)

CHLORIDES mg/l Cl⁻ G/L | COLOR UNITS G/L | GREASE & OIL mg/l (hexane soluble) G/L | OIL & GREASE mg/l (pet. ether soluble) G/L | RESIDUAL CHLORINE mg/l Cl G/L | ORTHO PHOSPHATE mg/l P (filterable) G/L (43–75) | 80: 4

CARD 5

DATA ITEM NAME: DDT

DATA ITEM VALUE (25–46): 00095+0500 [illegible]

FIELD NUMBER (21 22 23): 1 7 2 (See back of sheet) | 47–68 | 80: 5

CARD 5

DATA ITEM NAME: ARSENIC

DATA ITEM VALUE (25–46): 2800 [illegible]

FIELD NUMBER (21 22 23): 1 2 8 (See back of sheet) | 80: 5

CARD 5

DATA ITEM NAME ______

DATA ITEM VALUE (25–46) ______

FIELD NUMBER (21 22 23) ______ (See back of sheet) | 80: 5

CEN-024320

AR100541

DATA PROCESSING

SUBMITTER ______

MARYLAND WATER RESOURCES ADMINISTRATION

WATER QUALITY DATA SHEET

WQS-10 10/73

ORIGINAL (RED)

BOTTLE NUMBERS

ACT. ______ DO ______ BOD ______ SURV. ______

PLASTIC ______ GLASS ______

SEQUENCE NUMBER (PUNCH IN 76-79, ALL CARDS)

1 = ONE I = LETTER I 0 = ZERO Ø = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO.	DATE: YEAR	MONTH	DAY	TIME OF SAMPLE	DEPTH FT.	SUBMITTER CODE	DATA CATEGORY CODE	METHOD	COMPOSITE TOTAL HRS.	TIDE STATE	WEATHER CODE	SAMPLE TYPE	WATER TYPE	CODE - A	FREQ. INVEST	COUNTY CODE	WATER CLASS 1 / 2 / 3 / 4
1–9	10–11	12–13	14–15	16–19	20–21	22–23	24–25	26	27–28	29	30	31	32	33	34	37–38	39–42

FLOW NOTES:

GAGE HT. ______

FLOW: BASIS	VALUE	EXP	G/L	±	TEMPERATURE °C: AIR	neg. WATER	FIELD pH	G/L	LAB pH	G/L	DO mg/l	G/L	SPECIFIC CONDUCTANCE micromhos/cm @ 25°C	G/L	80
43	44–48	49	50	51	52–54	55–57	58–60	61	62–64	65	66–67	68	69–74	75	1

CARD 2

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ ICED YES NO

COLIFORMS MPN/100ml	G/L	FECAL COLIFORMS MPN/100ml	G/L	SALINITY 0/00	G/L	SUSPENDED SOLIDS mg/l	G/L	DISSOLVED SOLIDS mg/l	G/L
1–9	10	11–18	19	20–23	24	25–30	31	32–36	37

TURBIDITY FTU	G/L	NH_3—N mg/l N	G/L	NITRITE—N mg/l N	G/L	NITRATE—N mg/l N	G/L	TOTAL PO_4 mg/l P	G/L	5 DAY BOD mg/l	G/L	80
38–41	42	43–47	48	49–54	55	56–60	61	62–66	67	68–74	75	2

CARD 3

ORGANIC N mg/l	G/L	TOC mg/l C	G/L	CHLOROPHYLL-a micrograms/l	G/L	TOTAL ACIDITY mg/l $CaCO_3$	G/L	MINERAL ACIDITY mg/l $CaCO_3$	G/L	TOTAL IRON mg/l Fe	G/L	FERROUS IRON mg/l $Fe+2$	G/L
1–5	6	7–11	12	13–17	18	19–23	24	25–29	30	31–35	36	37–41	42

ALUMINUM (TOTAL) mg/l Al	G/L	MANGANESE (TOTAL) mg/l Mn	G/L	SULFATE mg/l SO_4	G/L	TOTAL ALKALINITY mg/l $CaCO_3$	G/L	DISSOLVED IRON mg/l	G/L	TOTAL HARDNESS mg/l $CaCO_3$	G/L	80
43–47	48	49–53	54	55–59	60	61–65	66	67–69	70	71–74	75	3

CARD 4

ZINC (TOTAL) mg/l Zn	G/L	COPPER (TOTAL) mg/l Cu	G/L	HEXAVALENT CHROMIUM mg/l $Cr+6$	G/L	TOTAL CHROMIUM mg/l Cr	G/L	CADMIUM (TOTAL) mg/l Cd	G/L	LEAD (TOTAL) mg/l Pb	G/L
1–7	8	9–16	17	18–23	24	25–30	31	32–35	36	37–41	42

CHLORIDES mg/l Cl^-	G/L	COLOR UNITS	G/L	GREASE & OIL mg/l (hexane soluble)	G/L	OIL & GREASE mg/l (pet. ether soluble)	G/L	RESIDUAL CHLORINE mg/l Cl	G/L	ORTHO PHOSPHATE mg/l P (filterable)	G/L	80
43–47	48	49–53	54	55–58	59	60–63	64	65–68	69	70–74	75	4

CARD 5

DATA ITEM NAME: DDT

DATA/ITEM VALUE (25–46): [illegible]

(47–68): ______

FIELD NUMBER (21 22 23): 1 7 2 (See back of sheet)

5 (80)

CARD 5

DATA ITEM NAME: Arsenic

DATA ITEM VALUE (25–46): [illegible]

FIELD NUMBER (21 22 23): 1 2 [illegible] (See back of sheet)

5 (80)

CARD 5

DATA ITEM NAME: ______

DATA ITEM VALUE (25–46): ______

FIELD NUMBER (21 22 23): ______ (See back of sheet)

5 (80)

DATA PROCESSING

CEN-024321

AR100542

SUBMITTER _____ MARYLAND WATER RESOURCES ADMINISTRATION — WATER QUALITY DATA SHEET — WQS-1 5 10-73

BOTTLE NUMBERS

BACT. _____ DO _____ BOD _____ SURV _____

PLASTIC _____ GLASS _____

ORIGINAL (RED)

SEQUENCE NUMBER
PUNCH IN 76-79, ALL CARDS

1 = ONE I = LETTER I 0 = ZERO Ø = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO.	DATE: YEAR	MONTH	DAY	TIME OF SAMPLE	DEPTH FT.	SUBMITTER CODE	DATA CATEGORY CODE	METHOD	COMPOSITE TOTAL HRS.	TIDE STATE	WEATHER CODE	SAMPLE TYPE	WATER TYPE	CODE - A	FREQ. INVEST	COUNTY CODE	WATER CLASS 1	2	3	4
1-9	10-11	12-13	14-15	16-19	20-21	22-23	24	25-26	27-28	29	30	31	32	33-34		37-38	39	40	41	42

CARD 2

FLOW NOTES:

GAGE HT. _____

BASIS	FLOW VALUE	EXP.	G/L	TEMPERATURE °C ± AIR	neg. WATER	FIELD pH	G/L	LAB pH	G/L	DO mg/l	G/L	SPECIFIC CONDUCTANCE micromhos/cm @ 25° C	G/L
43	44-48	49-50	51	52-53	54-55	56-57	58	59-60	61	62-63	64	65-68	69	70-75

CARD 3

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ ICED YES NO

COLIFORMS MPN/100ml	G/L	FECAL COLIFORMS MPN/100ml	G/L	SALINITY o/oo	G/L	SUSPENDED SOLIDS mg/l	G/L	DISSOLVED SOLIDS mg/l	G/L
1-4	5	6-9	10	11-12	13	14-17	18	19-22	23

CARD 4

TURBIDITY FTU	G/L	NH_3–N mg/l N	G/L	NITRITE–N mg/l N	G/L	NITRATE–N mg/l N	G/L	TOTAL PO_4 mg/l P	G/L	5 DAY BOD mg/l	G/L
38-39	40	41-42	43	44-45	46	47-48	49	50-51	52	53-54	55

CARD 5

ORGANIC N mg/l	G/L	TOC mg/l C	G/L	CHLOROPHYLL–a micrograms/l	G/L	TOTAL ACIDITY mg/l $CaCO_3$	G/L	MINERAL ACIDITY mg/l $CaCO_3$	G/L	TOTAL IRON mg/l Fe	G/L	FERROUS IRON mg/l Fe+2	G/L
1-2	3	4-5	6	7-8	9	10-11	12	13-14	15	16-17	18	19-20	21

CARD 6

ALUMINUM (TOTAL) mg/l Al	G/L	MANGANESE (TOTAL) mg/l Mn	G/L	SULFATE mg/l SO_4	G/L	TOTAL ALKALINITY mg/l $CaCO_3$	G/L	DISSOLVED IRON mg/l	G/L	TOTAL HARDNESS mg/l $CaCO_3$	G/L
43-44	45	46-47	48	49-50	51	52-53	54	55-56	57	58-59	60

CARD 7

ZINC (TOTAL) mg/l Zn	G/L	COPPER (TOTAL) mg/l Cu	G/L	HEXAVALENT CHROMIUM mg/l Cr+6	G/L	TOTAL CHROMIUM mg/l Cr	G/L	CADMIUM (TOTAL) mg/l Cd	G/L	LEAD (TOTAL) mg/l Pb	G/L
1-2	3	4-5	6	7-8	9	10-11	12	13-14	15	16-17	18

CARD 8

CHLORIDES mg/l Cl^-	G/L	COLOR UNITS	G/L	GREASE & OIL mg/l (hexane soluble)	G/L	OIL & GREASE mg/l (pet. ether soluble)	G/L	RESIDUAL CHLORINE mg/l Cl	G/L	ORTHO PHOSPHATE mg/l P (filterable)	G/L
43-44	45	46-47	48	49-50	51	52-53	54	55-56	57	58-59	60

CARD 9

DATA ITEM NAME: DDT — DATA ITEM VALUE (25-46): [illegible] — CARD 5

FIELD NUMBER: 172 (See back of sheet) (21-23) — DATA ITEM VALUE (47-68): [illegible] — 5 (80) — CARD 5

DATA ITEM NAME: ARSENIC — DATA ITEM VALUE (25-46): 0570 [illegible] — 5 (80) — CARD 5

FIELD NUMBER: 170 (See back of sheet) (21-23)

DATA ITEM NAME: _____ — DATA ITEM VALUE (25-46): _____ — 5 (80) — CARD 5

FIELD NUMBER: _____ (See back of sheet) (21-23)

CEN-024322

AR100543

DATA PROCESSING

SUBMITTER _____ MARYLAND WATER RESOURCES ADMINISTRATION WQS-13 10/73

BOTTLE NUMBERS _____ WATER QUALITY DATA SHEET ORIGINAL (RED)

BACT. _____ DO _____ BOD _____ SURVE. _____ SEQUENCE NUMBER (PUNCH IN 76-79, ALL CARDS)

PLASTIC _____ GLASS _____

1 = ONE I = LETTER I O = ZERO Ø = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO. | DATE: YEAR, MONTH, DAY | TIME OF SAMPLE | DEPTH FT. | SUBMITTER CODE | DATA CATEGORY CODE | METHOD | COMPOSITE TOTAL HRS. | TIDE STATE | WEATHER CODE | SAMPLE TYPE | WATER TYPE | CODE - A | FREQ. INVEST | COUNTY CODE | WATER CLASS: 1 2 3 4

CARD 1

FLOW NOTES. GAGE HT. _____

FLOW: BASIS | VALUE | EXP. | G/L | TEMPERATURE °C: ± | AIR | neg. WATER | FIELD pH | G/L | LAB pH | G/L | DO mg/l | G/L | SPECIFIC CONDUCTANCE micromhos/cm @ 25°C | G/L

CARD 1

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ ICED YES NO

COLIFORMS MPN/100ml | FECAL COLIFORMS MPN/100ml | G/L | SALINITY 0/00 | G/L | SUSPENDED SOLIDS mg/l | G/L | DISSOLVED SOLIDS mg/l | G/L

CARD 2

TURBIDITY FTU | NH_3–N mg/l N | G/L | NITRITE–N mg/l N | G/L | NITRATE–N mg/l N | G/L | TOTAL PO_4 mg/l P | G/L | 5 DAY BOD mg/l | G/L

CARD 2

ORGANIC N mg/l | G/L | TOC mg/l C | G/L | CHLOROPHYLL–a micrograms/l | G/L | TOTAL ACIDITY mg/l $CaCO_3$ | G/L | MINERAL ACIDITY mg/l $CaCO_3$ | G/L | TOTAL IRON mg/l Fe | G/L | FERROUS IRON mg/l Fe+2 | G/L

ALUMINUM (TOTAL) mg/l Al | G/L | MANGANESE (TOTAL) mg/l Mn | G/L | SULFATE mg/l SO_4 | G/L | TOTAL ALKALINITY $CaCO_3$ mg/l | G/L | DISSOLVED IRON mg/l | G/L | TOTAL HARDNESS $CaCO_3$ mg/l | G/L

CARD 3

ZINC (TOTAL) mg/l Zn | G/L | COPPER (TOTAL) mg/l Cu | G/L | HEXAVALENT CHROMIUM mg/l Cr+6 | G/L | TOTAL CHROMIUM mg/l Cr | G/L | CADMIUM (TOTAL) mg/l Cd | G/L | LEAD (TOTAL) mg/l Pb | G/L

CHLORIDES mg/l Cl | G/L | COLOR UNITS | G/L | GREASE & OIL mg/l (hexane soluble) | G/L | OIL & GREASE mg/l (pet. ether soluble) | G/L | RESIDUAL CHLORINE mg/l Cl | G/L | ORTHO PHOSPHATE mg/l P (filterable) | G/L

CARD 4

DATA ITEM NAME: DDT

DATA ITEM VALUE (25–46): [illegible]

FIELD NUMBER (21 22 23): 1 7 7 (See back of sheet)

DATA ITEM VALUE (47–68): [illegible]

CARD 5

DATA ITEM NAME: ARSENIC

DATA ITEM VALUE (25–46): 3 9 2 5

FIELD NUMBER (21 22 23): 1 2 5 (See back of sheet)

CARD 5

DATA ITEM NAME: _____

DATA ITEM VALUE (25–46): _____

FIELD NUMBER (21 22 23): _____ (See back of sheet)

CARD 5

CEN-024323

AR100544

DATA PROCESSING

SUBMITTER _____ MARYLAND WATER RESOURCES ADMINISTRATION WQS-10 10/73

WATER QUALITY DATA SHEET

BOTTLE NUMBERS

BACT. _____ DO _____ BOD _____ SURVE. _____ ORIGINAL (RED)

PLASTIC _____ GLASS _____

SEQUENCE NUMBER (PUNCH IN 76-79, ALL CARDS)

1 = ONE I = LETTER I 0 = ZERO Ø = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO. | DATE: YEAR, MONTH, DAY | TIME OF SAMPLE | DEPTH FT. | SUBMITTER CODE | DATA CATEGORY CODE | METHOD | COMPOSITE TOTAL HRS. | TIDE STATE | WEATHER CODE | SAMPLE TYPE | WATER TYPE | CODE - A FREQ. INVEST | COUNTY CODE | WATER CLASS 1 2 3 4

CARD 1

FLOW NOTES: GAGE HT. _____

FLOW: BASIS | VALUE | EXP. | G/L

TEMPERATURE °C: ± | AIR | neg. WATER

FIELD pH | G/L

LAB pH | G/L

DO mg/l | G/L

SPECIFIC CONDUCTANCE micromhos/cm @ 25° C | G/L

CARD 1

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ ICED YES NO

COLIFORMS MPN/100ml | G/L

FECAL COLIFORMS MPN 100ml | G/L

SALINITY o/oo | G/L

SUSPENDED SOLIDS mg/l | G/L

DISSOLVED SOLIDS mg/l | G/L

CARD 2

TURBIDITY FTU | G/L

NH_3–N mg/l N | G/L

NITRITE–N mg/l N | G/L

NITRATE–N mg/l N | G/L

TOTAL PO_4 mg/l P | G/L

5 DAY BOD mg/l | G/L

CARD 2

ORGANIC N mg/l | G/L

TOC mg/l C | G/L

CHLOROPHYLL–a micrograms/l | G/L

TOTAL ACIDITY mg/l $CaCO_3$ | G/L

MINERAL ACIDITY mg/l $CaCO_3$ | G/L

TOTAL IRON mg/l Fe | G/L

FERROUS IRON mg/l Fe^{+2} | G/L

CARD 3

ALUMINUM (TOTAL) mg/l Al | G/L

MANGANESE (TOTAL) mg/l Mn | G/L

SULFATE mg/l SO_4 | G/L

TOTAL ALKALINITY mg/l $CaCO_3$ | G/L

DISSOLVED IRON mg/l | G/L

TOTAL HARDNESS mg/l $CaCO_3$ | G/L

CARD 3

ZINC (TOTAL) mg/l Zn | G/L

COPPER (TOTAL) mg/l Cu | G/L

HEXAVALENT CHROMIUM mg/l Cr^{+6} | G/L

TOTAL CHROMIUM mg/l Cr | G/L

CADMIUM (TOTAL) mg/l Cd | G/L

LEAD (TOTAL) mg/l Pb | G/L

CARD 4

CHLORIDES mg/l Cl^- | G/L

COLOR UNITS | G/L

GREASE & OIL mg/l (hexane soluble) | G/L

OIL & GREASE mg/l (pet. ether soluble) | G/L

RESIDUAL CHLORINE mg/l Cl | G/L

ORTHO PHOSPHATE mg/l P (filterable) | G/L

CARD 4

DATA ITEM NAME: DO?

DATA ITEM VALUE (25–46): [illegible]

FIELD NUMBER: 172 (See back of sheet) (21 22 23)

DATA ITEM VALUE (47–68): [illegible]

CARD 5

DATA ITEM NAME: Arsenic

DATA ITEM VALUE (25–46): [illegible]

FIELD NUMBER: 128 (See back of sheet) (21 22 23)

CARD 5

DATA ITEM NAME: _____

DATA ITEM VALUE (25–46): _____

FIELD NUMBER: _____ (See back of sheet) (21 22 23)

CARD 5

CEN-024324

AR100545

DATA PROCESSING

SUBMITTER ______ MARYLAND WATER RESOURCES ADMINISTRATION WQS-13 10/73

BOTTLE NUMBERS ______ WATER QUALITY DATA SHEET

BACT. ______ DO ______ BOD ______ SURV. ______

PLASTIC ______ GLASS ______

ORIGINAL (RED)

SEQUENCE NUMBER (PUNCH IN 76-79, ALL CARDS)

1 = ONE I = LETTER I 0 = ZERO Ø = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO. (1–9) | DATE: YEAR, MONTH, DAY (10–15) | TIME OF SAMPLE (16–19) | DEPTH FT. (20–21) | SUBMITTER CODE | DATA CATEGORY CODE | METHOD | COMPOSITE TOTAL HRS. | TIDE STATE | WEATHER CODE | SAMPLE TYPE | WATER TYPE | CODE - A | FREQ. INVEST | COUNTY CODE | WATER CLASS 1 2 3 4 (39–42)

FLOW NOTES:

GAGE HT. ______

FLOW: BASIS, VALUE, EXP., G/L (43–49) | TEMPERATURE °C: ±, AIR, neg. WATER (50–57) | FIELD pH G/L | LAB pH G/L | DO mg/l G/L | SPECIFIC CONDUCTANCE micromhos/cm @ 25°C G/L | 80: 1

CARD 2

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ ICED YES NO

COLIFORMS MPN/100ml G/L | FECAL COLIFORMS MPN/100ml G/L | SALINITY 0/00 G/L | SUSPENDED SOLIDS mg/l G/L | DISSOLVED SOLIDS mg/l G/L

TURBIDITY FTU G/L | NH_3–N mg/l N G/L | NITRITE–N mg/l N G/L | NITRATE–N mg/l N G/L | TOTAL PO_4 mg/l P G/L | 5 DAY BOD mg/l G/L | 80: 2

CARD 3

ORGANIC N mg/l G/L | TOC mg/1C G/L | CHLOROPHYLL–a micrograms/l G/L | TOTAL ACIDITY mg/l $CaCO_3$ G/L | MINERAL ACIDITY mg/l $CaCO_3$ G/L | TOTAL IRON mg/l Fe G/L | FERROUS IRON mg/l Fe+2 G/L

ALUMINUM (TOTAL) mg/l Al G/L | MANGANESE (TOTAL) mg/l Mn G/L | SULFATE mg/l SO_4 G/L | TOTAL ALKALINITY mg/l $CaCO_3$ G/L | DISSOLVED IRON mg/l G/L | TOTAL HARDNESS mg/l $CaCO_3$ G/L | 80: 3

CARD 4

ZINC (TOTAL) mg/l Zn G/L | COPPER (TOTAL) mg/l Cu G/L | HEXAVALENT CHROMIUM mg/l Cr+6 G/L | TOTAL CHROMIUM mg/l Cr G/L | CADMIUM (TOTAL) mg/l Cd G/L | LEAD (TOTAL) mg/l Pb G/L

CHLORIDES mg/l Cl⁻ G/L | COLOR UNITS G/L | GREASE & OIL mg/l (hexane soluble) G/L | OIL & GREASE mg/l (pet. ether soluble) G/L | RESIDUAL CHLORINE mg/l Cl G/L | ORTHO PHOSPHATE mg/l P (filterable) G/L | 80: 4

CARD 5

DATA ITEM NAME: DDT

DATA ITEM VALUE (25–46, 47–68): [illegible]

FIELD NUMBER (21 22 23): 1 7 2 (See back of sheet) | 80: 5

CARD 5

DATA ITEM NAME: Arsenic

DATA ITEM VALUE (25–46): [illegible]

FIELD NUMBER (21 22 23): 1 2 5 (See back of sheet) | 80: 5

CARD 5

DATA ITEM NAME ______

DATA ITEM VALUE (25) ______

FIELD NUMBER (21 22 23) (See back of sheet) | 80: 5

CEN-024325

AR100646

DATA PROCESSING

SUBMITTER _____ MARYLAND WATER RESOURCES ADMINISTRATION WQS-10 10.75

WATER QUALITY DATA SHEET

ORIGINAL (RED)

BOTTLE NUMBERS

ACT. _____ DO _____ BOD _____ SUR _____

SEQUENCE NUMBER (PUNCH IN 76-79, ALL CARDS)

PLASTIC _____ GLASS _____

1 = ONE I = LETTER I O = ZERO Ø = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO. | DATE: YEAR, MONTH, DAY | TIME OF SAMPLE | DEPTH FT. | SUBMITTER CODE | DATA CATEGORY CODE | METHOD | COMPOSITE TOTAL HRS. | TIDE STATE | WEATHER CODE | SAMPLE TYPE | WATER TYPE | CODE - A | FREQ. INVEST | COUNTY CODE | WATER CLASS 1 2 3 4

FLOW NOTES:

GAGE HT. _____

CARD 1 (continued)

FLOW: BASIS, VALUE, EXP., G/L | TEMPERATURE °C: ±, AIR, neg. WATER | FIELD pH, G/L | LAB pH, G/L | DO mg/l, G/L | SPECIFIC CONDUCTANCE micromhos/cm @ 25° C, G/L

CARD 2

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ ICED YES NO

COLIFORMS MPN/100ml, G/L | FECAL COLIFORMS MPN/100ml, G/L | SALINITY 0/00 | SUSPENDED SOLIDS mg/l, G/L | DISSOLVED SOLIDS mg/l, G/L

CARD 2 (continued)

TURBIDITY FTU | NH_3–N mg/l N, G/L | NITRITE–N mg/l N, G/L | NITRATE–N mg/l N, G/L | TOTAL PO_4 mg/l P, G/L | 5 DAY BOD mg/l, G/L

CARD 3

ORGANIC N mg/l, G/L | TOC mg/l C, G/L | CHLOROPHYLL–a micrograms/l, G/L | TOTAL ACIDITY mg/l $CaCO_3$, G/L | MINERAL ACIDITY mg/l $CaCO_3$, G/L | TOTAL IRON mg/l Fe, G/L | FERROUS IRON mg/l Fe+2, G/L

CARD 3 (continued)

ALUMINUM (TOTAL) mg/l Al, G/L | MANGANESE (TOTAL) mg/l Mn, G/L | SULFATE mg/l SO_4, G/L | TOTAL ALKALINITY mg/l $CaCO_3$, G/L | DISSOLVED IRON mg/l, G/L | TOTAL HARDNESS mg/l $CaCO_3$, G/L

CARD 4

ZINC (TOTAL) mg/l Zn, G/L | COPPER (TOTAL) mg/l Cu, G/L | HEXAVALENT CHROMIUM mg/l Cr+6, G/L | TOTAL CHROMIUM mg/l Cr, G/L | CADMIUM (TOTAL) mg/l Cd, G/L | LEAD (TOTAL) mg/l Pb, G/L

CARD 4 (continued)

CHLORIDES mg/l Cl^-, G/L | COLOR UNITS, G/L | GREASE & OIL mg/l (hexane soluble), G/L | OIL & GREASE mg/l (pet. ether soluble), G/L | RESIDUAL CHLORINE mg/l Cl, G/L | ORTHO PHOSPHATE mg/l P (filterable), G/L

CARD 5

DATA ITEM NAME: DDT

DATA ITEM VALUE: [illegible]

FIELD NUMBER: 1 7 2 (See back of sheet)

CARD 5

DATA ITEM NAME: ASCMC

DATA ITEM VALUE: [illegible]

FIELD NUMBER: 1 2 3 (See back of sheet)

CARD 5

DATA ITEM NAME:

DATA ITEM VALUE:

FIELD NUMBER: (See back of sheet)

DATA PROCESSING

CEN-024326

AR100547

SUBMITTER _____ MARYLAND WATER RESOURCES ADMINISTRATION WQS-10 10/78

WATER QUALITY DATA SHEET

BOTTLE NUMBERS

BACT. _____ DO _____ BOD _____ SURV. _____

PLASTIC _____ GLASS _____

ORIGINAL (RED)

SEQUENCE NUMBER (PUNCH IN 76-79, ALL CARDS)

1 = ONE I = LETTER I 0 = ZERO Ø = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO. | DATE: YEAR, MONTH, DAY | TIME OF SAMPLE | DEPTH FT. | SUBMITTER CODE | DATA CATEGORY CODE | METHOD | COMPOSITE TOTAL HRS. | TIDE STATE | WEATHER CODE | SAMPLE TYPE | WATER TYPE | CODE - A | FREQ. INVEST | COUNTY CODE | WATER CLASS 1 2 3 4

CARD 1

FLOW NOTES: GAGE HT. _____

FLOW: BASIS | VALUE | EXP | G/L | + | TEMPERATURE °C: AIR | neg. WATER | FIELD pH | G/L | LAB pH | G/L | DO mg/l | G/L | SPECIFIC CONDUCTANCE micromhos/cm @ 25° C | G/L

CARD 1

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ ICED YES NO

COLIFORMS MPN/100ml | G/L | FECAL COLIFORMS MPN/100ml | G/L | SALINITY 0/00 | G/L | SUSPENDED SOLIDS mg/l | G/L | DISSOLVED SOLIDS mg/l | G/L

CARD 2

TURBIDITY FTU | NH_3–N mg/l N | G/L | NITRITE–N mg/l N | G/L | NITRATE–N mg/l N | G/L | TOTAL PO_4 mg/l P | G/L | 5 DAY BOD mg/l | G/L

CARD 2

ORGANIC N mg/l | G/L | TOC mg/l C | G/L | CHLOROPHYLL–a micrograms/l | G/L | TOTAL ACIDITY mg/l $CaCO_3$ | G/L | MINERAL ACIDITY mg/l $CaCO_3$ | G/L | TOTAL IRON mg/l Fe | G/L | FERROUS IRON mg/l Fe+2 | G/L

ALUMINUM (TOTAL) mg/l Al | G/L | MANGANESE (TOTAL) mg/l Mn | G/L | SULFATE mg/l SO_4 | G/L | TOTAL ALKALINITY mg/l $CaCO_3$ | G/L | DISSOLVED IRON mg/l | G/L | TOTAL HARDNESS mg/l $CaCO_3$ | G/L

CARD 3

ZINC (TOTAL) mg/l Zn | G/L | COPPER (TOTAL) mg/l Cu | G/L | HEXAVALENT CHROMIUM mg/l Cr+6 | G/L | TOTAL CHROMIUM mg/l Cr | G/L | CADMIUM (TOTAL) mg/l Cd | G/L | LEAD (TOTAL) mg/l Pb | G/L

CHLORIDES mg/l Cl^- | G/L | COLOR UNITS | G/L | GREASE & OIL mg/l (hexane soluble) | G/L | OIL & GREASE mg/l (pet. ether soluble) | G/L | RESIDUAL CHLORINE mg/l Cl | G/L | ORTHO PHOSPHATE mg/l P (filterable) | G/L

CARD 4

DATA ITEM NAME: DDT — DATA ITEM VALUE

FIELD NUMBER: 172 (See back of sheet)

CARD 5

DATA ITEM NAME: ARSENIC — DATA ITEM VALUE

FIELD NUMBER: 129 (See back of sheet)

CARD 5

DATA ITEM NAME: _____ DATA ITEM VALUE

FIELD NUMBER: _____ (See back of sheet)

CARD 5

CEN-024327

AR100518

DATA PROCESSING

WQS-13 10.73

MARYLAND WATER RESOURCES ADMINISTRATION

WATER QUALITY DATA SHEET

ORIGINAL (RED)

SUBMITTER ______

BOTTLE NUMBERS

BACT. ______ DO ______ BOD ______ SURV ______

PLASTIC ______ GLASS ______

SEQUENCE NUMBER (PUNCH IN 76-79, ALL CARDS)

1 = ONE I = LETTER I 0 = ZERO Ø = LETTER O

CARD 1

FACILITY ID NO. & DISCHARGE NO. OR SAMPLING STATION NO. (1–9) | DATE: YEAR (10–11), MONTH (12–13), DAY (14–15) | TIME OF SAMPLE (16–19) | DEPTH FT. (20–21) | SUBMITTER CODE (22–23) | DATA CATEGORY CODE (24) | METHOD (25) | COMPOSITE TOTAL HRS. (26–27) | TIDE STATE (28) | WEATHER CODE (29–30) | SAMPLE TYPE (31) | WATER TYPE (32) | CODE - A FREQ. INVEST (33–34) | COUNTY CODE (37–39) | WATER CLASS 1 2 3 4 (40–42)

FLOW NOTES:

GAGE HT. ______

FLOW: BASIS (43), VALUE (44–48), EXP. G/L (49–50) | TEMPERATURE °C: ± AIR (51–54), neg. WATER (55–57) | FIELD pH G/L (58–61) | LAB pH G/L (62–65) | DO mg/l G/L (66–69) | SPECIFIC CONDUCTANCE micromhos/cm @ 25°C G/L (70–75) | 80: 1

CARD 2

BACTERIOLOGICAL: (HEALTH DEPT.) ☐ OR WRA ☐ ICED YES NO

COLIFORMS MPN/100ml G/L (1–9) | FECAL COLIFORMS MPN/100ml G/L (10–18) | SALINITY 0/00 G/L (19–23) | SUSPENDED SOLIDS mg/l G/L (24–30) | DISSOLVED SOLIDS mg/l G/L (31–37)

TURBIDITY FTU G/L (38–42) | NH_3–N mg/l N G/L (43–48) | NITRITE–N mg/l N G/L (49–55) | NITRATE–N mg/l N G/L (56–61) | TOTAL PO_4 mg/l P G/L (62–68) | 5 DAY BOD mg/l G/L (69–75) | 80: 2

CARD 3

ORGANIC N mg/l G/L (1–6) | TOC mg/l C G/L (7–11) | CHLOROPHYLL–a micrograms/l G/L (12–18) | TOTAL ACIDITY mg/l $CaCO_3$ G/L (19–24) | MINERAL ACIDITY mg/l $CaCO_3$ G/L (25–30) | TOTAL IRON mg/l Fe G/L (31–36) | FERROUS IRON mg/l Fe+2 G/L (37–42)

ALUMINUM (TOTAL) mg/l Al G/L (43–48) | MANGANESE (TOTAL) mg/l Mn G/L (49–54) | SULFATE mg/l SO_4 G/L (55–60) | TOTAL ALKALINITY mg/l $CaCO_3$ G/L (61–66) | DISSOLVED IRON mg/l G/L (67–70) | TOTAL HARDNESS mg/l $CaCO_3$ G/L (71–75) | 80: 3

CARD 4

ZINC (TOTAL) mg/l Zn G/L (1–8) | COPPER (TOTAL) mg/l Cu G/L (9–16) | HEXAVALENT CHROMIUM mg/l Cr+6 G/L (17–23) | TOTAL CHROMIUM mg/l Cr G/L (24–30) | CADMIUM (TOTAL) mg/l Cd G/L (31–35) | LEAD (TOTAL) mg/l Pb G/L (36–42)

CHLORIDES mg/l Cl⁻ G/L (43–48) | COLOR UNITS G/L (49–54) | GREASE & OIL mg/l (hexane soluble) G/L (55–60) | OIL & GREASE mg/l (pet. ether soluble) G/L (61–65) | RESIDUAL CHLORINE mg/l Cl G/L (66–69) | ORTHO PHOSPHATE mg/l P (filterable) G/L (70–75) | 80: 4

CARD 5

DATA ITEM NAME: DDT

DATA ITEM VALUE (25–46, 47–68)

FIELD NUMBER: 1 2 2 (21 22 23) (See back of sheet) | 80: 5

CARD 5

DATA ITEM NAME: ARSENIC

DATA ITEM VALUE (25–46)

FIELD NUMBER: 1 2 3 (21 22 23) (See back of sheet) | 80: 5

CARD 5

DATA ITEM NAME ______

DATA ITEM VALUE (25–46)

FIELD NUMBER ______ (21 22 23) (See back of sheet) | 80: 5

CEN-024328

AR100549

DATA PROCESSING

HERBERT M. SACHS
DIRECTOR

ORIGINAL (RED)

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BUILDING
ANNAPOLIS, MARYLAND 21401

CERTIFIED MAIL

March 7, 1977

Central Chemical Corporation (Maryland Corp.)
c/o Mr. Franklin M. Thomas, Jr., Resident Agent
523 Gordon Circle
Hagerstown, MD 21740

C-77-432

Gentlemen:

Pursuant to the provisions of Sections 8-1401-1417, inclusive, of the Natural Resources Article, Annotated Code of Maryland (1974 Vol. & 1975 Supp.), the Water Resources Administration has determined that a pollution violation has occurred.

Specifically, the determination is based upon the findings of Mr. Robert A. Boone, Regional Inspector, Enforcement Division, and the Groundwater Investigation group of the Hazardous Wastes Section, Water Resources Administration.

On August 3, 1976, Mr. Boone found soil contaminated with toxic metal and chemical concentrations at your facility located on Mitchell Avenue, Hagerstown, Maryland. Mr. Boone also found evidence of the same toxic chemicals concentrated in the soil of unvegetated drainage ditches located on the West and South side drainage areas from your plant building and in receiving storm drain inlet on Mitchell Avenue, waters of the State. This storm drain system flows to the unnamed tributary to Marsh Run and outfalls from concrete box culvert at Walnut Lane. Analyses on a dry weight basis of the soil samples taken from these chemical discharges revealed the following violations:

1. Location - Chemical plant drainage ditch located at west side edge of pesticide chemical loading dock -- Total Lead, 188 mg/Kgm; Total Arsenic, 53.750 mg/Kgm; DDT, 1.8672 mg/Kgm

2. Location - Chemical plant upper drainage ditch west of paper storage shed before entering Penn Central Railroad drainage ditch -- Total Lead, 100.50 mg/Kgm; Total Arsenic, 16.17 mg/Kgm; DDT, 6,535.0 mg/Kgm

ORIGINAL (RED)

C-77-432

3. Location - Penn Central Railroad drain inlet pipe receiving west side drainage of Chemical plant building and property -- Total Lead 124 mg/Kgm; Total Arsenic, 34.00 mg/Kgm; and DDT, 6931.98 mg/Kgm

4. Location - Mitchell Avenue storm drain inlet below drainage from Chemical plant (northeast of railroad overpass) -- Total Lead, 138.50 mg/Kgm; Total Arsenic, 16.50 mg/Kgm; DDT, 46.68 mg/Kgm

On October 28 and 29, 1976, the Groundwater Investigation group of the Industrial and Hazardous Waste Section of this Administration conducted a series of soil borings and obtained split spoon samples from your facility and found that the following toxic chemicals sampled from your facility are causing a serious groundwater contamination problem in this area. The analyses on a dry weight basis of these samples revealed the following violations:

1. Location - lowest sarea in the southeast corner of Central Chemical Corp. property. Sample #1A, Soil Depth ½' to ½', Total Lead, 395.00 mg/Kgm; Total DDT, 176.0000 mg/Kgm; Total Arsenic 20.850 mg/Kgm. Sample #1B, Soil Depth 2' to 3', Total Lead, 201.00 mg/Kgm; Total DDT, 25.1100 mg/Kgm; Total Arsenic, 11.700 mg/Kgm. Sample #1C, Soil Depth 8' to 9', Total Lead, 32.20 mg/Kgm; Total DDT, 471.0000 mg/Kgm; Total Arsenic, 8.138 mg/Kgm

2. Location - inside the fence line on the western side of Central Chemical Corp. property near the liquid storage area. Sample #2A, Soil Depth ½' to ½', Total Lead, 93.50 mg/Kgm; Total DDT, 119.4800 mg/Kgm; Total Arsenic, 16.275 mg/Kgm

3. Location - outside Central Chemical Corp. fence line on the southeast corner of the property near the shipping area. Sample #3A, Soil Depth 0' to 1', Total Lead, 97.25 mg/Kgm; Total DDT, 653.6000 mg/Kgm; Total Arsenic, 180.000 mg/Kgm. Sample #3B, Soil Depth 1' to 2', Total Lead, 197.000 mg/Kgm; Total DDT, 300.3000 mg/Kgm; Total Arsenic, 300.000 mg/Kgm

4. Location - outside the Central Chemical Corp. fence on the western side near the grinding and dust packing area. Sample #4A, Soil Depth 0' to 1', Total Lead, 31.00 mg/Kgm; Total DDT, 85.0500 mg/Kgm; Total Arsenic, 38.000 mg/Kgm

5. Location - at the northern corner at the highest point of Central Chemical Corp. property. Sample #5A, Soil Depth 0' to 1½', Total Lead, 114.50 mg/Kgm; Total DDT, 70.6800 mg/Kgm; Total Arsenic, 17.68 mg/Kgm. Sample #5B, Soil Depth 2½' to 3½', Total Lead, 14.75 mg/Kgm; Total DDT, 0.2675 mg/Kgm; Total Arsenic, 5.700 mg/Kgm

6. Location - outside Central Chemical Corp. fence at the edge of abandoned Central Chemical Corp. landfill containing rubble from insecti-

ORIGINAL (RED)

cide building destroyed in fire. Sample #6A, Soil Depth 1' to 2', Total Lead, 90.75 mg/Kgm; Total DDT, 1,646.4000 mg/Kgm; Total Arsenic, 39.25 mg/Kgm. Sample #6B, Soil Depth 3' to 4', Total Lead, 15.00 mg/Kgm; Total DDT, 34.6560 mg/Kgm; Total Arsenic, 3.715 mg/Kgm. Sample #6C, Soil Depth 8' to 9', Total Lead, 18.65 mg/Kgm; 1.5200 mg/Kgm; Total Arsenic, 3.775 mg/Kgm

7. Location - along edge of Mitchell Avenue, south of Central Chemical Corp. plant building, where surface drainage enters public storm drains. Sample #7A, Soil Depth 0' to 1', Total Lead, 89.10 mg/Kgm; Total DDT, 27.3000 mg/Kgm. Sample #7B, Soil Depth 1' to 2', Total Lead, 79.25 mg/Kgm; Total DDT, 16.875 mg/Kgm. Sample #7C, Soil Depth 2' to 3½', Total Lead, 15.75 mg/Kgm; Total Arsenic, 2.17 mg/Kgm

Said facility is in violation of Maryland Water Resources Regulations 08.05.04.02 A (4) and 08.05.04.05 A (2).

Accordingly, the Administration has issued the enclosed Order.

Direct any questions or correspondence regarding this matter to Mr. Robert V. Creter, Regional Chief, Enforcement Division, Water Resources Administration, Box 613-B, Highland Estates, Naves Crossroads, Cumberland, Maryland 21502; telephone number (301) 724-8530.

Sincerely,

Herbert M. Sachs, Director

By: Joseph P. Lewandowski
Joseph P. Lewandowski, Chief
Enforcement Division

HMS:JPL:km

cc: Warren K. Rich, Esq., Asst. Attorney General
Mr. Robert V. Creter
Mr. William E. Chicca, WRA
Washington County Health Dept.
Mr. David Woronecki, Fisheries Admin.

Central Chemical Corporation (Maryland Corp.)
c/o Mr. Franklin M. Thomas, Jr.
523 Gordon Circle
Hagerstown, MD 21740

VIOLATOR

WATER RESOURCES ADMINISTRATION

C-O-77-432

ORIGINAL (RED)

O R D E R

Pursuant to the provisions of Sections 8-1401-1417, inclusive, of the Natural Resources Article, Annotated Code of Maryland (1974 Vol. & 1975 Supp.), it is, this 7th day of February, 1977, by the Water Resources Administration, ORDERED:

That Central Chemical Corporation (Maryland Corp.) shall:

1. By April 30, 1977, submit to the Cumberland Regional Office of this Administration results from hydrologic investigation by a competant engineering firm to include but not limited to extensive soil sampling to determine levels of Total Lead, Total Arsenic and DDT.
2. By May 30, 1977, submit to the Cumberland Regional Office for review and approval, a detailed plan and time schedule for eliminating all contaminated soil and for restoration of all disturbed ground areas.
3. By May 30, 1977, submit for review and approval a plan for preventing reoccurrence of untreated chemical discharges and/or soil contamination to the area surrounding plant from your plant.

Herbert M. Sachs, Director
Water Resources Administration
Tawes State Office Building
Annapolis, Maryland 21401

By: Joseph P. Lewandowski
Joseph P. Lewandowski, Chief
Enforcement Division

ORIGINAL (RED)

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston Street
J. Mahsen Joseph, Ph.D., Director

TRACE ORGANICS LABORATORY
VOLATILE ORGANICS ANALYSIS

BOTTLE NUMBER GS 032787-01 Washington (Name of County)

SOURCE OF SAMPLE historic Pesticide dump/landfill COLLECTOR Sanberg

SAMPLE TYPE: _____ DISTRIBUTION _____ SOURCE _____ OTHER (specify) _____

Community _____ noncommunity _____ private _____

Landfill observation well _____ stream _____ tidal waters _____

Industrial effluent _____ STP sampling station _____ STP effluent _____

Chlorinated _____ preserved with thiosulfate _____

Reason for submitting sample: Trihalomethane Survey _____

Suspected Industrial Chemical Contamination X

Suspected Petroleum (gasoline, etc.) Contamination _____

Other (specify) _____

REMARKS: pesticides suspected (DDT formerly found here from Gregg E. Sanberg 1132 3/31/87 To Villella 1132 3-31-87

1	2 3	4 5 6 7	8 9 10 11	12 13 14 15 16 17	18 19
TRANS TYPE	COUNTY	PLANT NO.	SAMPLING STATION	DATE COLLECTED 032787	CARD NO.

FIELD pH (20 21 22) FIELD RESID. CHLORINE: FREE (23 24) TOTAL (25 26) 0429G405A

Purgeable Halocarbons (EPA 624)				Purgeable Aromatics EPA 624	
Chloromethane	<5. ppm	trans-1,3-Dichloropropene	<5. ppm	Benzene	<5. ppm
Bromomethane		Trichloroethene		Toluene	
Dichlorodifluoromethane		Dibromochloromethane		Ethylbenzene	
Vinyl chloride		1,1,2-Trichloroethane		Total Xylenes	<10. ppm
Chloroethane		cis-1,3-Dichloropropene		Total Purgeable Hydrocarbons	
Methylene chloride		2-Chloroethylvinylether		Tetrahydrofuran	N.D.
Trichlorofluoromethane		Bromoform		(2-Butanone) (MEK)	29. ppm
1,1-Dichloroethene		1,1,2,2-Tetrachloroethane		Methylisobutylketone (MIBK)	N.D.
1,1-Dichloroethane		Tetrachloroethene		Acrolein	
trans-1,2-Dichloroethene		Chlorobenzene	16. ppm	Acrylonitrile	
Chloroform		Total Trihalomethanes			
1,2-Dichloroethane		**Other Purgeable Organics:**			
1,1,1-Trichloroethane		1,4-DICHLOROBENZENE 14. ppm			
Carbon Tetrachloride		1,2-DICHLOROBENZENE 45. ppm			
Bromodichloromethane					
1,2-Dichloropropane					

CEN-024333

Results reported in micrograms per ~~liter~~ gram (parts per million)

DATE RECEIVED MAR 31 1987 DATE REPORTED 5-1-87 MAY 1987 CHEMIST _____ LAB. NO. 874054

AR109554

DWMH 749.2/85 2M

Program:
RCRA X
NPDES ______
SPECIFY ______

MARYLAND STATE DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
Howard and Biddle Streets
P.O. ... Baltimore, Maryland 2...
Hazardous Waste Laboratory
Organic Analysis Report Form

SECURITY

ORIGINAL (RED)

Lab. No. 870308

Priority ASAP

Collector Sonberg 1900-2000 3/27/87 (Name/time/date)
Sample Source Central Chemical Co.

Sample ID No. GS 032787-01
Preservative Used none

Sample Alert samples from historic pesticide landfill
historic samples have shown DDT - Dioxin?

Chain of Custody sample possession

From [signature] 1120 hrs 3/31/87 (Name/time/date) to Alice Lew 1120 3/31/87 (Name/time/date)

From ______ (Name/time/date) to ______ (Name/time/date)

From ______ (Name/time/date) to ______ (Name/time/date)

EP Toxicity Organics

	PPb
endrin	None detected DL = 2 ppb
lindane	52 ppb
methoxychlor	None detected DL = 4 ppb
toxaphene	None detected DL = 90 ppb
2, 4-D	None detected DL = 8 ppb
2, 4, 5-TP(silvex)	None detected DL = 5 ppb

Organics Analysis

- [X] *Purgeable halocarbons
- [X] *Purgeable aromatics
- [X] *Acrolein & Acrylonitrile
- [X] *Phenols
- [X] *Phthalate esters
- [X] *Organochlorine Pesticides
- [X] *Nitroaromatics & Isophorone
- [X] *Polynuclear aromatic hydrocarbons
- [X] *Haloethers
- [X] *Chlorinated hydrocarbons

*see other side for specific compounds

GC analysis indicated the following:
[illegible] ppm chlordane
7600 ppm methoxychlor
734 ppm 4 4' DDE
345 ppm 4'4' DDD
5700 ppm 4'4' DDT
15 ppm lindane

GC/MS analysis indicated the following:
18 ppm naphthalene 21 ppm 1,4-dichlorobenzene

Organic identification and comparison ______

oil and grease ______ PPM

Authorized By:

Section Chief: SW Date: 4-29-87 Verified By: SW

AR100555

CEN-024334

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston Street
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (RED)

DEC 14 '88

TRACE ORGANICS LABORATORY
VOLATILE ORGANICS ANALYSIS

BOTTLE NUMBER BB102685O/A+B COLLECTOR Barbara Brown - Washington County

SOURCE OF SAMPLE Central Chemical Corp.

(Include Address) Mitchell Ave, Hagerstown MD

SAMPLE TYPE: Community ____ Noncommunity ____ Domestic ____ STP Station ____

Observation Well ____ Stream ____ Tidal Waters ____ Industrial Effluent ____

Other (Specify) Boring BH-2

Preservative Used ____

IMPORTANT: First time sampled X Last known sampling date ____

Reason for submitting sample: Survey X Suspected Petroleum Contamination ____

Suspected Industrial Chemical Contamination X Other (Specify) ____

CHAIN OF CUSTODY: From: B. Brown 10/28/88 To: ____

From: ____ To: ____

REMARKS: ____

1	2 3	4 5 6 7	8 9 10 11	12 13 14 15 16 17	18 19
TRANS TYPE	COUNTY	PLANT NO.	SAMPLING STATION	DATE COLLECTED	CARD NO.
				102688	

20 21 22	23 24	25 26
FIELD pH	FIELD RESID. CHLORINE: FREE	TOTAL

Purgeable Halocarbons (EPA 601)				Other Purgeables	
Chloromethane	<5	trans-1,3-Dichloropropene	<1	Benzene	45
Bromomethane	<1	Trichloroethene	3	Toluene	7
Dichlorodifluoromethane		Dibromochloromethane	<1	Ethylbenzene	42
Vinyl choride		1,1,2-Trichloroethane		Total Xylenes	51
Chloroethane		cis-1,3-Dichloropropene	↓	Total Purgeable Hydrocarbons	
Methylene chloride		2-Chloroethylvinylether	<10	Tetrahydrofuran	N.D.
Trichlorofluoromethane		Bromoform	<1	(2-Butanone MEK)	
-Dichloroethene	↓	1,1,2,2-Tetrachloroethene		Methylisobutylketone (MIBK)	
1,1-Dichloroethane	2	Tetrachloroethene	↓	Acrolein	
trans-1,2-Dichloroethene	1	Chlorobenzene	651	Acrylonitrile	
Chloroform	1	Total Trihalomethanes		Carbon Disulfide	
1,2-Dichloroethane	<1	Other Purgeable Organics:		Vinyl Acetate	
1,1,1-Trichloroethane				Acetone	
Carbon Tetrachloride				2-Hexanone	
Bromodichloromethane				Styrene	↓
1,2-Dichloropropane	↓				

1,2-Dichlorobenzene (estimated) = 180
1,4-Dichlorobenzene (estimated) = 780

CEN-024335

Results reported in micrograms per (parts per million/billion)

DATE RECEIVED ____ DATE REPORTED 12/5/88 CHEMIST J. Comer LAB NO 891875

AR100556

Laboratories Administration
201 W. Preston Street
J. Mahsen Joseph, Ph.D., Director

ORIGINAL (RED)

TRACE ORGANICS LABORATORY
VOLATILE ORGANICS ANALYSIS

BOTTLE NUMBER AA102588801 A+B COLLECTOR Barbara Brown Washington County

SOURCE OF SAMPLE Central Chemical

(Include Address) Mitchell Ave

SAMPLE TYPE: Community ____ Noncommunity ____ Domestic ____ STP Station ____

Observation Well ____ Stream ____ Tidal Waters ____ Industrial Effluent ____

Other (Specify) Boring pH-5

Preservative Used ice

IMPORTANT: First time sampled X Last known sampling date ____

Reason for submitting sample: Survey ~~X~~ Suspected Petroleum Contamination X

Suspected Industrial Chemical Contamination X Other (Specify) ____

CHAIN OF CUSTODY: From: B. Brown 10/28/88 To: ____

From: ____ To: ____

REMARKS: ____

1	2 3	4 5 6 7	8 9 10 11	12 13 14 15 16 17	18 19
TRANS TYPE	COUNTY	PLANT NO.	SAMPLING STATION	DATE COLLECTED	CARD NO.
				10 25 88	

20 21 22	23 24	25 26
FIELD pH	FIELD RESID. CHLORINE: FREE	TOTAL

Purgeable Halocarbons (EPA 601)				Other Purgeables	
Chloromethane	<50	trans-1,3-Dichloropropene	<10	Benzene	42
Bromomethane	<10	Trichloroethene		Toluene	12
Dichlorodifluoromethane		Dibromochloromethane		Ethylbenzene	97
Vinyl chloride		1,1,2-Trichloroethane		Total Xylenes	58
Chloroethane		cis-1,3-Dichloropropene		Total Purgeable Hydrocarbons	
Methylene chloride		2-Chloroethylvinylether	<100	Tetrahydrofuran	N.D
Trichlorofluoromethane		Bromoform	<10	(2-Butanone MEK)	
1,1-Dichloroethene		1,1,2,2-Tetrachloroethene		Methylisobutylketone (MIBK)	
1,1-Dichloroethane		Tetrachloroethene		Acrolein	
trans-1,2-Dichloroethene		Chlorobenzene	526	Acrylonitrile	
Chloroform		Total Trihalomethanes		Carbon Disulfide	
1,2-Dichloroethane		Other Purgeable Organics:		Vinyl Acetate	
1,1,1-Trichloroethane				Acetone	
Carbon Tetrachloride				2-Hexanone	
Bromodichloromethane				Styrene	
1,2-Dichloropropane					

1,4-Dichlorobenzene (estimated) = 340

1,2-Dichlorobenzene (estimated) = 820

CEN-024336

DATE RECEIVED 10/28/88 (Results reported in micrograms per (parts per million/billion)) DATE REPORTED DEC 01 1988 CHEMIST JCormier LAB NO 891880

AR-100567

CENTRAL CHEMICAL SOIL BORING RESULTS OCT 1988

	BH-1-4	BH-2-7	BH-3-5	BH-4-3	BH-5-7	BH-6-4	BH-6-5	BH-2(water)	BH-5(water)
SAMPLE DEPTH (ft)	6-8	12-14	8-10	4-6	14-16	10-12	12-14	36	32.5
HEAD SPACE (ppm)	6.2-20	150->1000	12-35	0	6-400	78-95	40-85	NA	NA
VOLATILES (ppm)									
chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND
acrilonitril	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	*0.05
acetone	ND	ND	0.11	ND	ND	ND	ND	ND	*0.026
1,1-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
chloroform	0.013	ND	ND	0.002	ND	ND	ND	0.012	ND
1,2-dichlororthane	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
bromodichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND
trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
dibromochloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
tetrachloroethene	*0.008	ND	ND	0.007	ND	ND	ND	ND	ND
benzene	0.017	ND	0.005	ND	ND	ND	ND	ND	0.036
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND
bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone (MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND
toluene	0.011	ND	0.031	0.003	ND	ND	ND	ND	ND
chlorobenzene	1.1	4.6	0.1	0.041	0.034	0.034	0.72	0.74	0.49
m-xylene	0.033	9.2	0.11	ND	0.005	ND	0.45	0.019	ND
o&p-xylene	0.038	7.5	0.15	ND	0.009	ND	0.11	ND	ND
1,3-dichlorobenzene	0.066	12	0.017	0.006	ND	0.014	0.79	0.027	0.021
1,2-dichlorobenzene	1.1	81	0.079	0.034	0.015	0.058	3.3	0.27	0.9
1,4-dichlorobenzene	1.2	180	0.34	0.046	0.045	0.26	22	0.63	0.34
ethylbenzene	*0.008	ND	0.053	ND	ND	ND	ND	0.046	0.097

* indicates a result below exact quantification

ORIGINAL (RED)

CEN-024337

AR100558

CENTRAL CHEMICAL SOIL BORING RESULTS OCT 1988

SAMPLE DEPTH (ft)	BH-1-4 6-8	BH-2-7 12-14	BH-3-5 8-10	BH-4-3 4-6	BH-5-7 14-16	BH-6-4 10-12	BH-6-5 12-14
SEMI-VOLATILES (ppm)							
phenol	ND	ND	ND	ND	ND	ND	ND
bis(2-chloroethyl)ether	ND	ND	ND	ND	ND	ND	ND
2-chlorophenol	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	*0.82	66	0.87	47	4.5	*0.16	*4
1,2-dichlorobenzene	*1.2	ND	ND	ND	1.4	ND	ND
bis(2-chloroisopropyl)ether	ND	ND	ND	ND	ND	ND	ND
4-methylphenol	ND	ND	ND	ND	ND	ND	ND
N-nitroso-Di-n-propylamine	ND	ND	ND	ND	ND	ND	ND
hexachloroethane	ND	ND	ND	ND	ND	ND	ND
nitrobenzene	ND	ND	ND	ND	ND	ND	ND
isophorone	ND	ND	ND	ND	ND	ND	ND
2-nitrophenol	ND	ND	ND	ND	ND	ND	ND
2,4-dimethylphenol	ND	ND	ND	ND	ND	ND	ND
bis(2-chloroethoxy)methane	ND	ND	ND	ND	ND	ND	ND
2,4-dichlorophenol	ND	ND	ND	ND	ND	ND	ND
acenaphthene	ND	ND	*0.31	ND	ND	ND	ND
fluorene	ND	ND	*0.35	ND	ND	ND	ND
1,2,4-trichlorobenzene	40	210	*0.42	ND	2.8	6.1	12
naphthalene	ND	*3.7	ND	ND	0.87	ND	ND
hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND
4-chloro-3-methylphenol	ND	ND	ND	ND	ND	ND	ND
hexachlorocyclopentadiene	ND	ND	ND	ND	ND	ND	ND
2,4,6-trichlorophenol	ND	ND	ND	ND	ND	ND	ND
2-chloronapthalene	ND	ND	ND	ND	ND	ND	ND
dimethylphthalate	ND	ND	ND	ND	ND	ND	ND
acenaphthalene	ND	ND	ND	ND	ND	ND	ND
2,4-dinitrophenol	ND	ND	ND	ND	ND	ND	ND
4-nitrophenol	ND	ND	ND	ND	ND	ND	ND
2,4-dinotrotoluene	ND	ND	ND	ND	ND	ND	ND
diethylphthalate	ND	ND	ND	ND	ND	ND	ND
4-chlorophenyl-phenylether	ND	ND	ND	ND	ND	ND	ND
4,6-dinitro-2-methylphenol	ND	ND	ND	ND	ND	ND	ND
n-nitrosodiphenylamine	ND	ND	ND	ND	ND	ND	ND
4-bromophenyl-phenylether	ND	ND	ND	ND	ND	ND	ND
hexachlorobenzene	ND	ND	ND	ND	ND	ND	ND
2,6-dinitrotoluene	ND	ND	ND	ND	ND	ND	ND
pentachlorophenol	ND	ND	ND	ND	*0.83	ND	ND
phenanthrene	ND	*8.4	1.7	ND	0.5	ND	*1.2
fluoranthene	ND	*3	1	ND	*0.2	ND	ND
benzo(b)fluoranthene	ND	ND	ND	ND	*0.056	ND	ND
benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND
benzo(a)pyrene	ND	ND	ND	ND	*0.091	ND	ND
pyrene	ND	ND	ND	ND	*0.18	ND	ND
butylbenzylphthalate	ND	ND	ND	ND	ND	ND	ND
3,3'-dichlorobenzidine	ND	ND	ND	ND	ND	ND	ND
benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND
chrysene	ND	ND	ND	ND	*0.15	ND	ND
anthracene	ND	ND	*0.3	ND	*0.061	ND	ND
bis(2-ethylhexyl)phthalate	ND	*5.9	ND	ND	ND	*0.75	*1.4
di-n-octyl phthalate	ND	ND	ND	ND	ND	ND	ND
di-n-butylphthalate	*11	*2.6	*0.22	ND	ND	*0.88	*1.4
indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	*0.067	ND	ND
dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND
benzo(g,h,i)perylene	ND	ND	ND	ND	ND	ND	ND
n-nitrosodimethylamine	ND	ND	ND	ND	ND	ND	ND
benzidene	ND	ND	ND	ND	ND	ND	ND

* indicates a result below exact quantification

ORIGINAL (RED)

CEN-024338

AR100559

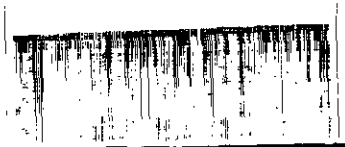
CENTRAL CHEMICAL SOIL BORING RESULTS OCT 1988

SAMPLE DEPTH (ft)	BH-1-4 6-8	BH-2-7 12-14	BH-3-5 8-10	BH-4-3 4-6	BH-5-7 14-16	BH-6-4 10-12	BH-6-5 12-14
PESTICIDES (PP) (ppm)							
Alpha-BHC	110	ND	ND	ND	ND	ND	ND
Beta-BHC	ND	ND	*790	ND	ND	ND	ND
Delta-BHC	260	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ND	ND	ND	ND	ND	ND	ND
Aldrin	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ND	390	130	840	*57	*140	*1200
Endrin	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	*140	2100	*12	22000	*32	*120	*370
Endosulfan sulfate	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	6700	31000	130	76000	390	1900	*5400
Methoxychlor	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ND	ND	ND	ND	ND	ND	ND
Arochlor-1016	ND	ND	ND	ND	ND	ND	ND
Arochlor-1221	ND	ND	ND	ND	ND	ND	ND
Arochlor-1232	ND	ND	ND	ND	ND	ND	ND
Arochlor-1242	ND	ND	ND	ND	ND	ND	ND
Arochlor-1248	ND	ND	ND	ND	ND	ND	ND
Arochlor-1254	ND	ND	ND	ND	ND	ND	ND
Arochlor-1260	ND	ND	ND	ND	ND	ND	ND
HERBICIDES (EP TOX) (ppb)							
2,4-D	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP	ND	ND	ND	ND	ND	ND	ND
2,4,5-T	ND	ND	ND	ND	ND	ND	ND
PESTICIDES (EP TOX) (ppm)							
gamma-BHC	ND	ND	ND	ND	ND	ND	ND
Endrin	ND	ND	ND	ND	ND	ND	ND
Methoxyclor	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ND	ND	ND	ND	ND	ND	ND

* indicates a result below exact quantification

CEN-024339

ORIGINAL (RED)



AR100560

CENTRAL CHEMICAL SOIL BORING RESULTS

SAMPLE DEPTH (ft)	BH-1-4 6-8	BH-2-7 12-14	BH-3-5 8-10	BH-4-3 4-6	BH-5-7 14-16	BH-6-4 10-12	BH-6-5 12-14
INORGANICS (PP) (ppm)							
silver	ND	ND	ND	ND	ND	ND	ND
antimony	ND	ND	ND	2.0	ND	ND	ND
arsenic	9.2	171.0	313.0	191.0	5.8	58.9	137.0
beryllium	ND	ND	2.3	ND	ND	ND	ND
cadmium	ND	ND	ND	1.1	ND	ND	ND
chromium	10.5	46.6	32.2	31.1	10.6	7.7	17.3
copper	181.0	297.0	23.4	319.0	20.6	126.0	258.0
mercury	ND	ND	ND	ND	ND	ND	ND
nickel	ND	ND	30.0	39.1	10.7	12.2	21.8
lead	50.8	ND	14.2	14.3	18.2	ND	ND
selenium	ND	ND	ND	ND	ND	ND	ND
thallium	ND	ND	ND	ND	ND	ND	ND
zinc	62.1	392.0	102.0	655.0	52.7	169.0	646.0
INORGANICS (EP TOX) (ppm)							
silver	ND	ND	ND	ND	ND	ND	ND
arsenic	ND	ND	ND	ND	ND	ND	ND
barium	ND	ND	ND	ND	ND	ND	ND
cadmium	ND	ND	ND	ND	ND	ND	ND
chromium	ND	ND	ND	ND	ND	ND	ND
mercury	ND	ND	ND	ND	ND	ND	ND
lead	ND	ND	ND	ND	ND	ND	ND
selenium	ND	ND	ND	ND	ND	ND	0.209

ORIGINAL (RED)

CEN-024340

Mar 23 '89 10:08 P.03

STATE OF MARYLAND

DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Laboratories Administration

201 W. Preston St.

P.O. Box 2355, Baltimore, Maryland 21203

J. Mehsen Joseph, Ph.D., Director

SECURITY

LAB. NO. 790086 ORIGINAL (RED)

Program:

RCRA ✓

HAZARDOUS WASTE LABORATORY

MULTI SAMPLE SUBMISSION FORM

NPDES

SPECIFY

Priority

Collector Robert Boone / 1455 / 4-27-89 (Name/time/date) Sample Source Central Chemical Co.

Sample ID No. See Attached Preservative Used Ice - 8 oz Glass Jars (5)

Sample Alert Pesticide Landfill [illegible]

Chain of Custody sample possession

Robert Boone / 0830 / 4-28-89 (Name/time/date) to [illegible] 4-28-89 (Name/time/date)

From [illegible] (Name/time/date) to [illegible] 411 5-3-89 (Name/time/date)

From (Name/time/date) to (Name/time/date)

☒ ORGANIC ☐ INORGANIC ☐ METAL

1 4-27-89-RAB-1

2 4-27-89-RAB-2

3 4-27-89-RAB-3

4 4-27-89-RAB-4

5 4-27-89-RAB-5

6

7

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12

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HSWMA ENFORCEMENT PROGRAM

CEN-024341

AR100502

DC 7-17-89

ORIGINAL (RED)

STATE OF MARYLAND

DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Laboratories Administration

201 W. Preston St.

P.O. Box 2355, Baltimore, Maryland 21203

J. Mehsen Joseph, Ph.D., Director

SECURITY

LAB. NO. 790898

HAZARDOUS WASTE LABORATORY

Organic Analysis Report Form

Priority ______

Collector R Boone / 1455 / 4-27-89 (Name/Time/Date)

Sample Source [illegible] Chemical Corp Soil Sample – Mitchell Ave. Storm drain

Sample ID No. 4-27-89-FAB-1

Preservative Used [illegible]

Sample Alert Pesticides [illegible]

Specify Program: Historic Pesticide Landfill

RCRA: ✓ NPDES: ______ OTHER: ______

Chain of Custody Sample Possession

From: R Boone / / (Name/Time/Date) To: ______ (Name/Time/Date)

From: ______ (Name/Time/Date) To: ______ (Name/Time/Date)

From: ______ (Name/Time/Date) To: ______ (Name/Time/Date)

Circle Parameters Requested:

EP Toxicity; Priority Pollutant Scan; PCB/Pesticides; Identify/Compare

GC/MS analysis indicates the presence of the following:

GC Analysis indicates the presence of the following PCB/Pesticides:

	PPM
DDT	43
DDD	present but not separable
DDE	16
Chlordane	7.3
α-BHC	0.16
β-BHC	0.33
γ-BHC (Lindane)	0.05
Δ-BHC	0.04
Endrin	0.27

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HSWMA ENFORCEMENT PROGRAM

Section Chief: DS Date: 7-17-89 Verified By: RER Authorized By: ______

AR100563

CEN-024342

ORIGINAL (RED)

STATE OF MARYLAND

DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Laboratories Administration

201 W. Preston St.

P.O. Box 2355, Baltimore, Maryland 21203

J. Mehsen Joseph, Ph.D., Director

SECURITY

LAB. NO. 79[illegible]

HAZARDOUS WASTE LABORATORY

Priority ______ Organic Analysis Report Form

Collector F. Ba[illegible] / 1500 / [illegible] 89 (Name/Time/Date) Sample Source [illegible] → upslope from storm drain

Sample ID No. 4-27-89-RAB-2 Preservative Used 8 oz Jar, Teflon lid

Sample Alert [illegible]

Specify Program: [illegible]

RCRA: ✓ NPDES: ______ OTHER: ______

Chain of Custody Sample Possession

From: ______ (Name/Time/Date) To: ______ (Name/Time/Date)

From: ______ (Name/Time/Date) To: ______ (Name/Time/Date)

From: ______ (Name/Time/Date) To: ______ (Name/Time/Date)

Circle Parameters Requested:

EP Toxicity; Priority Pollutant Scan; PCB/Pesticides; Identify/Compare

GC/MS analysis indicates the presence of the following:

GC Analysis indicates the presence of the following PCB/Pesticides:

	PPM
DDT	150
DDD	0.86
DDE	8.1
Chlordane	8.8
α-BHC	0.22
β-BHC	0.52
γ-BHC (Lindane)	0.10
Δ-BHC	0.11
Endrin	0.28

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AUG 7 [illegible]

HSWMA ENFORCEMENT PROGRAM

Section Chief: DS Date: 7-7-89 Verified By: RFR Authorized By: ______

CEN 024343

HEALTH DEPARTMENT

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Metcalf Joseph, Ph.D., Director

SECURITY

ORIGINAL (RED)

LAB. NO. 790885

HAZARDOUS WASTE LABORATORY

Priority _____ Organic Analysis Report Form

Collector R. Boone / 1510 / 4-27-89 Sample Source Central Chemical Co. (Balto.) Name/Time/Date
West S. end of bldg @ discharge drains

Sample ID No. 4-27-89-RAB-3 Preservative Used None

Sample Alert Pesticides; EP Tox for Lindane if high

Specify Program:

RCRA: ✓ NPDES: _____ OTHER: _____

Chain of Custody Sample Possession

From: _____ To: _____
Name/Time/Date Name/Time/Date

From: _____ To: _____
Name/Time/Date Name/Time/Date

From: _____ To: _____
Name/Time/Date Name/Time/Date

Circle Parameters Requested:

(EP Toxicity); Priority Pollutant Scan; (PCB/Pesticides); Identify/Compare

GC/MS analysis indicates the presence of the following:

GC Analysis indicates the presence of the following PCB/Pesticides:

	PPM
DDT	798
DDD	present but not separable
DDE	43
Chlordane	15
α-BHC	1.0
β-BHC	2.5
γ-BHC (Lindane)	0.46
Δ-BHC	0.57
Endrin	0.27

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HSWMA
ENFORCEMENT PROGRAM

Section Chief: DS Date: 7-17-89 Verified By: RFR Authorized By: _____

DHMH 4320-C 10/87 HEALTH DEPARTMENT

CEN-024344 AR100565

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (RED)

LAB. NO. 79088

HAZARDOUS WASTE LABORATORY

Priority _____ Organic Analysis Report Form

Collector P. Bocaso / 1520 / 4.27.89 Sample Source Enthal Chemical Corp (Soil) Samples
Name/Time/Date
FAL NW side of Pesticide storage bldg.

Sample ID No. 4.27.89 - RAB-4 Preservative Used Ice

Sample Alert Pesticides, PCB & Lindane

Specify Program:

RCRA: ✓ NPDES: _____ OTHER: _____

Chain of Custody Sample Possession

From: _____ To: _____
Name/Time/Date Name/Time/Date

From: _____ To: _____
Name/Time/Date Name/Time/Date

From: _____ To: _____
Name/Time/Date Name/Time/Date

Circle Parameters Requested:

(EP Toxicity;) Priority Pollutant Scan; PCB/(Pesticides;) Identify/Compare

GC/MS analysis indicates the presence of the following:

GC Analysis indicates the presence of the following PCB/Pesticides:

	PPM
DDT	159
DDD	present but not separable
DDE	7.8
Chlordane	31
α-BHC	2.5
β-BHC	1.0
γ-BHC (Lindane)	0.37
Δ-BHC	0.20
Endrin	40

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HSWMA
ENFORCEMENT PROGRAM

Section Chief: DS Date: 7-17-89 Verified By: RER Authorized By: _____

CEN-024345
AR100566

SECURITY

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

LAB. NO. 790

ORIGINAL (RED)

HAZARDOUS WASTE LABORATORY

Priority ______ ✓ Organic Analysis Report Form

Collector [illegible] / 1530 / 4-27-89
Name/Time/Date

Sample Source Central Chemical Corp. (Soil Samples) [illegible]

Sample ID No. 4-27-89-CAB-5

Preservative Used [illegible]

Sample Alert [illegible]

Specify Program:

RCRA: ✓ NPDES: ______ OTHER: ______

Chain of Custody Sample Possession

From: ______ To: ______
Name/Time/Date Name/Time/Date

From: ______ To: ______
Name/Time/Date Name/Time/Date

From: ______ To: ______
Name/Time/Date Name/Time/Date

Circle Parameters Requested:

EP Toxicity; Priority Pollutant Scan; PCB/Pesticides; Identify/Compare

GC/MS analysis indicates the presence of the following:

GC Analysis indicates the presence of the following PCB/Pesticides:

	PPM
DDT	0.73
DDD	present but not separable
DDE	1.3
α-BHC	0.021
β-BHC	0.076
γ-BHC (Lindane)	0.013

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HSWMA ENFORCEMENT PROGRAM

Section Chief: DS Date: 7-17-89 Verified By: RER Authorized By: ______

CEN-024346
AR100567

DHMH 4320-C 10/87 HEALTH DEPARTMENT 5M

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (RED)

LAB. NO. [illegible]

HAZARDOUS WASTE LABORATORY

Priority _____ Organic Analysis Report Form

Collector J.C. Pollock 05-17-89 Sample Source Central Chemical MW-01
Name/Time/Date Hydration.

Sample ID No. JCP 05-17 89-03 Preservative Used None

Sample Alert _____

Specify Program:

RCRA: X NPDES: _____ OTHER: _____

Chain of Custody Sample Possession

From: _____ To: _____
Name/Time/Date Name/Time/Date

From: _____ To: _____
Name/Time/Date Name/Time/Date

From: _____ To: _____
Name/Time/Date Name/Time/Date

Circle Parameters Requested:

EP Toxicity; Priority Pollutant Scan; ~~PCB~~/Pesticides; Identify/Compare

GC/MS analysis indicates the presence of the following:

GC Analysis indicates the presence of the following ~~PCB~~/Pesticides:

α-BHC	0.8 ppb
β-BHC	2 ppb
γ-BHC (Lindane)	0.1 ppb
Δ-BHC	3 ppb
Dieldrin	6 ppb

Section Chief: DS Date: 7-17-89 Verified By: RFR Authorized By: _____

CEN-024347

AR100568

DHMH 4320-C 10/87 HEALTH DEPARTMENT 5M

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston Street
J. Mehsen Joseph, Ph.D., Director

790963 ORIGINAL (RED)

TRACE ORGANICS LABORATORY
VOLATILE ORGANICS ANALYSIS

BOTTLE NUMBER JCP 051789-03 COLLECTOR J.C. Polikoff MDE/HSWMA WASH County

SOURCE OF SAMPLE Central Chemical MW-1

(Include Address)

SAMPLE TYPE: Community ____ Noncommunity ____ Domestic ____ STP Station ____
Observation Well Y Stream ____ Tidal Waters ____ Industrial Effluent ____
Other (Specify) ____
Preservative Used 1+1 HCl

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JUL 6 1989
GROUNDWATER AND SPECIAL INVESTIGATION DIVISION

IMPORTANT: First time sampled ✓ Last known sampling date ____
Reason for submitting sample: Survey ____ Suspected Petroleum Contamination ____
Suspected Industrial Chemical Contamination ✓ Other (Specify) ____

CHAIN OF CUSTODY: From: ____ To: ____
From: ____ To: ____

REMARKS: ____

1	2 3	4 5 6 7	8 9 10 11	12 13 14 15 16 17	18 19
TRANS TYPE	COUNTY	PLANT NO.	SAMPLING STATION	DATE COLLECTED	CARD NO.
			MW01	051789	

FIELD pH (20 21 22) FIELD RESID. CHLORINE: FREE (23 24) TOTAL (25 26) Time 1600

Purgeable Halocarbons (EPA 601)				Other Purgeables	
Chloromethane	<5	trans-1,3-Dichloropropene	<1	Benzene	<1
Bromomethane	<1	Trichloroethene	1	Toluene	1
Dichlorodifluoromethane	1	Dibromochloromethane	1	Ethylbenzene	1
Vinyl choride	1	1,1,2-Trichloroethane	1	Total Xylenes	<2
Chloroethane	1	cis-1,3-Dichloropropene	1	Total Purgeable Hydrocarbons	
Methylene chloride	1	2-Chloroethylvinylether	<10	Tetrahydrofuran	N.P.
Trichlorofluoromethane	1	Bromoform	<1	(2-Butanone MEK)	
Dichloroethene	1	1,1,2,2,-Tetrachloroethane	1	Methylisobutylketone (MIBK)	
1,1-Dichloroethane	1	Tetrachloroethene	1	Acrolein	
trans-1,2-Dichloroethene	1	Chlorobenzene	1	Acrylonitrile	
Chloroform	2	Total Trihalomethanes		Carbon Disulfide	
1,2-Dichloroethane	<1	**Other Purgeable Organics:**		Vinyl Acetate	
1,1,1-Trichloroethane	1			Acetone	
Carbon Tetrachloride	<1			2-Hexanone	
Bromodichloromethane	1			Styrene	
1,2-Dichloropropane	1				
1,2-Dichlorobenzene	2				

DATE ANALYZED: 6-21-89

CEN-024348

Results reported in micrograms per liter (parts per ~~million~~/billion)

DATE RECEIVED 5-8-89 DATE REPORTED 6-29-89 CHEMIST JCrocco LAB. NO. AR100569

DHMH 749 6/88 4M

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (RED)

LAB. NO. [illegible]

HAZARDOUS WASTE LABORATORY

Priority _____ Organic Analysis Report Form

Collector J.C. Poliketti 05-17-89 Sample Source Ciba-Geigy Chemical MW-06
Name/Time/Date Hawesville

Sample ID No. JCP 051789-01 Preservative Used None

Sample Alert _____

Specify Program:

RCRA: X NPDES: _____ OTHER: _____

Chain of Custody Sample Possession

From: _____ To: _____
Name/Time/Date Name/Time/Date

From: _____ To: _____
Name/Time/Date Name/Time/Date

From: _____ To: _____
Name/Time/Date Name/Time/Date

Circle Parameters Requested:

EP Toxicity; Priority Pollutant Scan; ~~PCB~~/Pesticides; Identify/Compare

GC/MS analysis indicates the presence of the following:

GC Analysis indicates the presence of the following ~~PCB~~/Pesticides:

α-BHC	1 ppb
β-BHC	2 ppb
γ-BHC (Lindane)	0.2 ppb
Δ-BHC	0.5 ppb
Dieldrin	0.4 ppb

Section Chief: DS Date: 7-12-89 Verified By: RER Authorized By: _____

DHMH 4320-C 10/87 HEALTH DEPARTMENT CEN-024349 AR100572 5M

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston Street
J. Mahsen Joseph, Ph.D., Director

(ORIGINAL (RED))

TRACE ORGANICS LABORATORY
VOLATILE ORGANICS ANALYSIS

BOTTLE NUMBER JCP 051889-02 COLLECTOR J.C. Polikoff MDE/HSWMA WASH. County

SOURCE OF SAMPLE Central Chemical - Hagerstown

(Include Address)

SAMPLE TYPE: Community ____ Noncommunity ____ Domestic ____ STP Station ____
Observation Well ✓ Stream ____ Tidal Waters ____ Industrial Effluent ____
Other (Specify) ____
Preservative Used 1+1 HCl

IMPORTANT: First time sampled ✓ Last known sampling date ____
Reason for submitting sample: Survey ____ Suspected Petroleum Contamination ____
Suspected Industrial Chemical Contamination ✓ Other (Specify) MONITORING SECTION

CHAIN OF CUSTODY: From: ____ To: GROUND WATER
From: ____ To: ____

REMARKS: NOV 15 1989

1	2 3	4 5 6 7	8 9 10 11	12 13 14 15 16 17 18 19
TRANS TYPE	COUNTY	PLANT NO.	SAMPLING STATION	DATE COLLECTED / CARD NO.
			MW05	051889

FIELD pH (20 21 22) FIELD RESID. CHLORINE: FREE (23 24) TOTAL (25 26) Time 1400

Purgeable Halocarbons (EPA 601)				Other Purgeables	
Chloromethane	<5	trans-1,3-Dichloropropene	<1	Benzene	14
Bromomethane	<1	Trichloroethene		Toluene	<1
Dichlorodifluoromethane		Dibromochloromethane		Ethylbenzene	<1
Vinyl choride		1,1,2-Trichloroethane		Total Xylenes	<2
Chloroethane		cis-1,3-Dichloropropene	↓	Total Purgeable Hydrocarbons	
Methylene chloride		2-Chloroethylvinylether	<10	Tetrahydrofuran	N.D.
Trichlorofluoromethane		Bromoform	<1	(2-Butanone MEK)	
1,1-Dichloroethene		1,1,2,2-Tetrachloroethane		Methylisobutylketone (MIBK)	
1,1-Dichloroethane		Tetrachloroethene	↓	Acrolein	
trans-1,2-Dichloroethene		Chlorobenzene	109	Acrylonitrile	
Chloroform		Total Trihalomethanes		Carbon Disulfide	
1,2-Dichloroethane		**Other Purgeable Organics:**		Vinyl Acetate	
1,1,1-Trichloroethane				Acetone	
Carbon Tetrachloride				2-Hexanone	
Bromodichloromethane				Styrene	↓
1,2-Dichloropropane	↓				

Observed: Dichlorobenzene

CEN-024350

Results reported in micrograms per L (parts per ~~million~~/billion)

DATE RECEIVED 5/19/89 DATE REPORTED 11-14-89 CHEMIST [signature] LAB. NO. AR100571

DHMH 749 6/88 DATE ANALYZED: 6-13-89 4M

ORIGINAL (RED)

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

LAB NO. 790569

HAZARDOUS WASTE LABORATORY
Metals Analysis Report Form

PRIORITY _____

Collector J.C. Polikoff 05-18-89 (Name/Time/Date) Sample Source Central Chemical MW-05

Sample ID No. JCP 051889-02 Preservative Used HNO_3

Sample Alert _____

Specify Program:
RCRA: X NPDES: _____ OTHER: _____

Chain of Custody Sample Possession:

From: _____ (Name/Time/Date) To: _____ (Name/Time/Date) RECEIVED

From: _____ (Name/Time/Date) To: _____ (Name/Time/Date)

GROUND WATER MONITORING

Circle Type of Analysis:

1. EP Toxicity 2. Priority Pollutant (3. Total Metals) 4. Dissolved Metals

Indicate Type of Sample:

Liquid _____ Solid _____ Percent Solids _____%

Metals in ppm

	Element	EP	Total
	Antimony		
✓	Arsenic		<0.002
✓	Barium		<0.5
	Beryllium		
✓	Cadmium		<0.05
✓	Chromium		<0.5
✓	Copper		<0.05
	Iron		
✓	Lead		<0.5
✓	Mercury		<0.001
✓	Nickel		<0.5
	Selenium		
	Silver		
	Thallium		
	Zinc		
✓	Chromium Cr+6	* Analysis cannot be performed on fixed sample	

	Element	EP	Total
	Aluminum		
✓	Calcium		~~250~~ 320
	Cobalt		
	Magnesium		
	Manganese		
	Potassium		
	Sodium		
	Vanadium		

CEN-024351

SELECT OTHER ELEMENTS FROM REVERSE SIDE OF THIS FORM

Section Chief: DS Date: 7-12-89 Verified By: mg Authorized By: _____

AR100572

DHMH - 4320 10/87 SUBMITTER'S COPY

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (RED)

LAB. NO. 790969

HAZARDOUS WASTE LABORATORY

Priority _____ Organic Analysis Report Form

Collector J.C. Paliko-ff 5-15-89 Sample Source Control Chemical MW-05 Hagerstown
Name/Time/Date

Sample ID No. JCP 051889-07 Preservative Used _____

Sample Alert _____

Specify Program:

RCRA: X NPDES: _____ OTHER: _____

Chain of Custody Sample Possession

From: _____ To: _____
Name/Time/Date Name/Time/Date

From: _____ To: _____
Name/Time/Date Name/Time/Date

From: _____ To: _____
Name/Time/Date Name/Time/Date

Circle Parameters Requested:

EP Toxicity; Priority Pollutant Scan; ~~PCB~~/Pesticides; Identify/Compare

GC/MS analysis indicates the presence of the following:

GC Analysis indicates the presence of the following PCB/Pesticides:

α-BHC	8 ppb
β-BHC	4 ppb
γ-BHC (Lindane)	3 ppb
Δ-BHC	9 ppb

Section Chief: DS Date: 7-12-89 Verified By: RER Authorized By: _____

CEN-024352

AR100573

DHMH 4320-C 10/87 HEALTH DEPARTMENT 5M

ORIGINAL (RED)

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

LAB NO. 790969

HAZARDOUS WASTE LABORATORY
Metals Analysis Report Form

PRIORITY _____

Collector J.C. Polikoff 05-18-89 (Name/Time/Date) Sample Source Central Chemical MW-03

Sample ID No. JCP051889-01 Preservative Used HNO3

Sample Alert _____

Specify Program: RCRA: X NPDES: _____ OTHER: _____

Chain of Custody Sample Possession:

From: _____ (Name/Time/Date) To: _____ (Name/Time/Date)

From: _____ (Name/Time/Date) To: _____ (Name/Time/Date)

RECEIVED
OCT 5 1989
GROUND WATER PROTECTION

Circle Type of Analysis:

1. EP Toxicity 2. Priority Pollutant (3. Total Metals) 4. Dissolved Metals

Indicate Type of Sample:

Liquid _____ Solid _____ Percent Solids _____ %

Metals in ppm

	Element	EP	Total		Element	EP	Total
	Antimony				Aluminum		
✓	Arsenic		<0.002	✓	Calcium		275
✓	Barium		<0.5		Cobalt		
	Beryllium				Magnesium		
✓	Cadmium		<0.05		Manganese		
✓	Chromium		<0.5		Potassium		
✓	Copper		<0.05		Sodium		
	Iron				Vanadium		
✓	Lead		<0.5				
✓	Mercury		<0.001				
✓	Nickel		<0.5				
	Selenium						
	Silver						
	Thallium						
	Zinc						
✓	Chromium Cr+6	* Sample fixed					

CEN-024353

SELECT OTHER ELEMENTS FROM REVERSE SIDE OF THIS FORM

Section Chief: DS Date: 11-12-89 Verified By: mg Authorized By: _____

AR100574

DHMH - 4320 10/87 SUBMITTER'S COPY

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston Street
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (RED)

TRACE ORGANICS LABORATORY
VOLATILE ORGANICS ANALYSIS

BOTTLE NUMBER JCP 051889-01 COLLECTOR JC Polikoff MDE/HSWMA WASH County

SOURCE OF SAMPLE Central Chemical - Hagerstown

(Include Address)

SAMPLE TYPE: Community ____ Noncommunity ____ Domestic ____ STP Station ____
Observation Well ✓ Stream ____ Tidal Waters ____ Industrial Effluent ____
Other (Specify) ____
Preservative Used 1+1 HCl

IMPORTANT: First time sampled ✓ Last known sampling date ____
Reason for submitting sample: Survey ____ Suspected Petroleum Contamination ____
Suspected Industrial Chemical Contamination ✓ Other (Specify) ____

CHAIN OF CUSTODY: From: ____ To: RECEIVED
From: ____ To: ____

REMARKS: GOST GI AON

GROUND WATER SECTION

1	2 3	4 5 6 7	8 9 10 11	12 13 14 15	16 17 18 19
TRANS TYPE	COUNTY	PLANT NO.	SAMPLING STATION	DATE COLLECTED	CARD NO.
			MW03	051889	

FIELD pH (20 21 22) FIELD RESID. CHLORINE: FREE (23 24) TOTAL (25 26) Time 0948

Purgeable Halocarbons (EPA 601)				Other Purgeables	
Chloromethane	<5	trans-1,3-Dichloropropene	<1	Benzene	<1
Bromomethane	<1	Trichloroethene		Toluene	
Dichlorodifluoromethane		Dibromochloromethane		Ethylbenzene	
Vinyl chloride		1,1,2-Trichloroethane		Total Xylenes	<2
Chloroethane		cis-1,3-Dichloropropene		Total Purgeable Hydrocarbons	
Methylene chloride		2-Chloroethylvinylether	<10	Tetrahydrofuran	N D
Trichlorofluoromethane		Bromoform	<1	(2-Butanone MEK)	
1,1-Dichloroethene		1,1,2,2-Tetrachloroethane		Methylisobutylketone (MIBK)	
1,1-Dichloroethane		Tetrachloroethene		Acrolein	
trans-1,2-Dichloroethene		Chlorobenzene	11	Acrylonitrile	
Chloroform		Total Trihalomethanes		Carbon Disulfide	
1,2-Dichloroethane		**Other Purgeable Organics:**		Vinyl Acetate	
1,1,1-Trichloroethane				Acetone	
Carbon Tetrachloride				2-Hexanone	
Bromodichloromethane				Styrene	
1,2-Dichloropropane					

observed: Dichlorobenzene

CEN-024354

Results reported in micrograms per (parts per ~~million~~/billion)

DATE RECEIVED 5/19/89 DATE REPORTED 11-14-89 CHEMIST J Corman LAB. NO. AR100575

DHMH 749 6/88 DATE ANALYZED: 6-13-89 4M

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (RED)

LAB. NO. 79[illegible]

HAZARDOUS WASTE LABORATORY

Priority _____ Organic Analysis Report Form

Collector J.C. Polikoff 5-18-89 (Name/Time/Date) Sample Source Central Chemical Hagerstown MW-03

Sample ID No. J.C. Ps 051889-01 Preservative Used _____

Sample Alert _____

Specify Program:

RCRA: _____ NPDES: _____ OTHER: _____

Chain of Custody Sample Possession

From: _____ (Name/Time/Date) To: _____ (Name/Time/Date)

From: _____ (Name/Time/Date) To: _____ (Name/Time/Date)

From: _____ (Name/Time/Date) To: _____ (Name/Time/Date)

Circle Parameters Requested:

EP Toxicity; Priority Pollutant Scan; PCB/Pesticides; Identify/Compare

GC/MS analysis indicates the presence of the following:

GC Analysis indicates the presence of the following PCB/Pesticides:

α-BHC	3 ppb
β-BHC	7 ppb
Δ-BHC	10 ppb

Section Chief: DS Date: 7-12-89 Verified By: RFR Authorized By: _____

CEN-024355 AR1[illegible]576

DHMH 4320-C 10/87 HEALTH DEPARTMENT 5M

ORIGINAL (RED)

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

LAB NO. 790566

HAZARDOUS WASTE LABORATORY
Metals Analysis Report Form

PRIORITY _____

Collector J.C. Polikoff 05-18-89 (Name/Time/Date) Sample Source Central Chemical MW-02

Sample ID No. JCP051889-03 Preservative Used HNO_3

Sample Alert _____

Specify Program: RCRA: ✓ NPDES: _____ OTHER: _____

RECEIVED
JUL 14 1989
GROUNDWATER AND SPECIAL ... DIVISION

Chain of Custody Sample Possession:

From: _____ (Name/Time/Date) To: _____ (Name/Time/Date)

From: _____ (Name/Time/Date) To: _____ (Name/Time/Date)

Circle Type of Analysis:

1. EP Toxicity 2. Priority Pollutant (3. Total Metals) 4. Dissolved Metals

Indicate Type of Sample:

Liquid _____ Solid _____ Percent Solids _____%

Metals in ppm

	Element	EP	Total		Element	EP	Total
	Antimony				Aluminum		
✓	Arsenic		0.01	✓	Calcium		640
✓	Barium		<0.5		Cobalt		
	Beryllium				Magnesium		
✓	Cadmium		<0.05		Manganese		
✓	Chromium		<0.5		Potassium		
✓	Copper		<0.05		Sodium		
	Iron				Vanadium		
✓	Lead		<0.5				
✓	Mercury		0.001				
✓	Nickel		<0.5				
	Selenium						
	Silver						
	Thallium						
	Zinc						
✓	Chromium Cr+6	* cannot analyze using fixed sample.					

CEN-024356

SELECT OTHER ELEMENTS FROM REVERSE SIDE OF THIS FORM

Section Chief: DS Date: 7-12-89 Verified By: mg Authorized By: _____

AR100577

DHMH - 4320 10/87 HEALTH DEPARTMENT

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston Street
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (RED)

TRACE ORGANICS LABORATORY
VOLATILE ORGANICS ANALYSIS

BOTTLE NUMBER JCP 051889-03 COLLECTOR J.C. Polikoff MDE/HSWMA WASH County

SOURCE OF SAMPLE Central Chemical - Hagerstown

(Include Address)

SAMPLE TYPE: Community ____ Noncommunity ____ Domestic ____ STP Station ____
Observation Well ✓ Stream ____ Tidal Waters ____ Industrial Effluent ____
Other (Specify) ____
Preservative Used 1+1 HCl

IMPORTANT: First time sampled ✓ Last known sampling date ____
Reason for submitting sample: Survey ____ Suspected Petroleum Contamination ____
Suspected Industrial Chemical Contamination ✓ Other (Specify) ____

RECEIVED
GROUND WATER MONITORING SECTION

CHAIN OF CUSTODY: From: ____ To: ____ CBST ST AGN
From: ____ To: ____

REMARKS: ____

1	2 3	4 5 6 7	8 9 10 11	12 13 14 15 16 17	18 19
TRANS TYPE	COUNTY	PLANT NO.	SAMPLING STATION	DATE COLLECTED	CARD NO.
			MW02	051889	

FIELD pH (20 21 22) ____ FIELD RESID. CHLORINE: FREE (23 24) ____ TOTAL (25 26) ____ Time 1630

Purgeable Halocarbons (EPA 601)				Other Purgeables	
Chloromethane	<5	trans-1,3-Dichloropropene	<1	Benzene	19
Bromomethane	<1	Trichloroethene		Toluene	<1
Dichlorodifluoromethane		Dibromochloromethane		Ethylbenzene	5
Vinyl choride		1,1,2-Trichloroethane		Total Xylenes	4
Chloroethane		cis-1,3-Dichloropropene	↓	Total Purgeable Hydrocarbons	
Methylene chloride		2-Chloroethylvinylether	<10	Tetrahydrofuran	
Trichlorofluoromethane		Bromoform	<1	(2-Butanone MEK)	
1,1-Dichloroethene		1,1,2,2-Tetrachloroethane		Methylisobutylketone (MIBK)	
1,1-Dichloroethane		Tetrachloroethene	↓	Acrolein	
trans-1,2-Dichloroethene		Chlorobenzene	182	Acrylonitrile	
Chloroform		Total Trihalomethanes		Carbon Disulfide	
1,2-Dichloroethane		**Other Purgeable Organics:**		Vinyl Acetate	
1,1,1-Trichloroethane				Acetone	168
Carbon Tetrachloride				2-Hexanone	
Bromodichloromethane				Styrene	
1,2-Dichloropropane					
				Isopropyl alcohol	250

observed: Dichlorobenzene

CEN-024357

Results reported in micrograms per ℓ (parts per ~~million~~/billion)

DATE RECEIVED 5/19/89 DATE REPORTED 11-14-89 CHEMIST J Cronin LAB. NO. AB100578
DHMH 749 6/88 DATE ANALYZED: 5-13-89 4M

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (RED)

LAB. NO. 736503

HAZARDOUS WASTE LABORATORY

Priority _____ Organic Analysis Report Form

Collector J.C. Pelikoff 5-18-89 Sample Source Control Chemical MW-02 Hagerstown
Name/Time/Date

Sample ID No. JCP 0518 #3 Preservative Used _____

Sample Alert _____

Specify Program:

RCRA: ✓ NPDES: _____ OTHER: _____

Chain of Custody Sample Possession

From: _____ To: _____
Name/Time/Date Name/Time/Date

From: _____ To: _____
Name/Time/Date Name/Time/Date

From: _____ To: _____
Name/Time/Date Name/Time/Date

Circle Parameters Requested:

EP Toxicity; Priority Pollutant Scan; ~~PCB~~/Pesticides; Identify/Compare

GC/MS analysis indicates the presence of the following:

GC Analysis indicates the presence of the following PCB/Pesticides:

α-BHC	0.5 ppb
β-BHC	5 ppb
Δ-BHC	12 ppb

Section Chief: DS Date: 7-18-89 Verified By: RFR Authorized By: _____

CEN-024358

AR100579

DHMH 4320-C 10/87 HEALTH DEPARTMENT SM

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston Street
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (RED)

TRACE ORGANICS LABORATORY
VOLATILE ORGANICS ANALYSIS

BOTTLE NUMBER Polikoff JCP051789-02 COLLECTOR J.C. Polikoff MDE/HSWMA WASH County

SOURCE OF SAMPLE Central Chemical Hagerstown MW-07

(Include Address)

SAMPLE TYPE: Community ____ Noncommunity ____ Domestic ____ STP Station ____
Observation Well X Stream ____ Tidal Waters ____ Industrial Effluent ____
Other (Specify) ____
Preservative Used 1+1 HCl ✓

RECEIVED
JUL 6 1989
GROUNDWATER AND SPECIAL INVESTIGATION DIVISION

IMPORTANT: First time sampled ____ Last known sampling date ____
Reason for submitting sample: Survey ____ Suspected Petroleum Contamination ____
Suspected Industrial Chemical Contamination ✓ Other (Specify) ____

CHAIN OF CUSTODY: From: ____ To: ____
From: ____ To: ____

REMARKS: ____

1	2 3	4 5 6 7	8 9 10 11	12 13 14 15 16 17	18 19
TRANS TYPE	COUNTY	PLANT NO.	SAMPLING STATION	DATE COLLECTED	CARD NO.
			MW07	050489	

FIELD pH (20 21 22) ____ FIELD RESID. CHLORINE: FREE (23 24) ____ TOTAL (25 26) ____ Time 1508

Purgeable Halocarbons (EPA 601)				Other Purgeables	
Chloromethane	<5	trans-1,3-Dichloropropene	<1	Benzene	<1
Bromomethane	<1	Trichloroethene	↓	Toluene	↓
Dichlorodifluoromethane	↓	Dibromochloromethane	↓	Ethylbenzene	↓
Vinyl choride	↓	1,1,2-Trichloroethane	↓	Total Xylenes	<2
Chloroethane	↓	cis-1,3-Dichloropropene	↓	Total Purgeable Hydrocarbons	↓
Methylene chloride	↓	2-Chloroethylvinylether	<10	Tetrahydrofuran	N.P.
Trichlorofluoromethane	↓	Bromoform	<1	(2-Butanone MEK)	↓
1,1-Dichloroethene	↓	1,1,2,2,-Tetrachloroethane	↓	Methylisobutylketone (MIBK)	↓
1,1-Dichloroethane	2	Tetrachloroethene	↓	Acrolein	↓
trans-1,2-Dichloroethene	<1	Chlorobenzene	↓	Acrylonitrile	↓
Chloroform	12	Total Trihalomethanes	↓	Carbon Disulfide	↓
1,2-Dichloroethane	<1	**Other Purgeable Organics:**		Vinyl Acetate	↓
1,1,1-Trichloroethane	↓			Acetone	↓
Carbon Tetrachloride	↓			2-Hexanone	↓
Bromodichloromethane	↓			Styrene	↓
1,2-Dichloropropane	↓				

DATE ANALYZED: 6-21-89

CEN-024359

Results reported in micrograms per liter (parts per ~~million~~/billion)

DATE RECEIVED 5-18-89 DATE REPORTED 6-29-89 CHEMIST J Cromwell LAB. NO. AR100580

DHMH 749 6/88 4M

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (RED)

LAB. NO. -7

HAZARDOUS WASTE LABORATORY

Priority _____ Organic Analysis Report Form

Collector J.C. Pelikoff 05-17-89 (Name/Time/Date) Sample Source Central Chemical MW-07 Hamilton

Sample ID No. ICP051789-02 Preservative Used None

Sample Alert _____

Specify Program:

RCRA: V NPDES: _____ OTHER: _____

Chain of Custody Sample Possession

From: _____ (Name/Time/Date) To: _____ (Name/Time/Date)

From: _____ (Name/Time/Date) To: _____ (Name/Time/Date)

From: _____ (Name/Time/Date) To: _____ (Name/Time/Date)

Circle Parameters Requested:

EP Toxicity; Priority Pollutant Scan; ~~PCB~~/Pesticides; Identify/Compare

GC/MS analysis indicates the presence of the following:

GC Analysis indicates the presence of the following ~~PCB~~/Pesticides:

α-BHC	3 ppb
β-BHC	40 ppb
γ-BHC (Lindane)	1 ppb
Δ-BHC	8 ppb
Dieldrin	3 ppb
Endrin	3 ppb

Section Chief: DS Date: 7-12-89 Verified By: RFR Authorized By: _____

CEN-024360

AR10[illegible]

DHMH 4320-C 10/87 HEALTH DEPARTMENT 5M

ORIGINAL (RED)

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston St.
P.O. Box 2355, Baltimore, Maryland 21203
J. Mehsen Joseph, Ph.D., Director

LAB NO. [illegible]

HAZARDOUS WASTE LABORATORY
Metals Analysis Report Form

PRIORITY _____

Collector W. Pohloff 05-17-89 (Name/Time/Date) Sample Source Envtl Chemical MW-6 Hagerstown

Sample ID No. HCP 051789-01 Preservative Used HNO3

Sample Alert _____

Specify Program: RCRA: X NPDES: _____ OTHER: _____

Chain of Custody Sample Possession:

From: _____ (Name/Time/Date) To: _____ (Name/Time/Date)

From: _____ (Name/Time/Date) To: INVESTIGATION DIVISION (Name/Time/Date)

Circle Type of Analysis:

1. EP Toxicity 2. Priority Pollutant (3. Total Metals) 4. Dissolved Metals

Indicate Type of Sample:

Liquid X Solid _____ Percent Solids _____%

Metals in ppm

	Element	EP	Total		Element	EP	Total
	Antimony				Aluminum		
✓	Arsenic		0.003	✓	Calcium		610
✓	Barium		<0.5		Cobalt		
	Beryllium				Magnesium		
✓	Cadmium		<0.05		Manganese		
✓	Chromium		<0.5		Potassium		
✓	Copper		0.06		Sodium		
	Iron				Vanadium		
✓	Lead		<0.5				
✓	Mercury		<0.001				
✓	Nickel		<0.5				
	Selenium						
	Silver						
	Thallium						
	Zinc						
✓	Chromium Cr+6	* analysis cannot be performed on fixed sample.					

SELECT OTHER ELEMENTS FROM REVERSE SIDE OF THIS FORM CEN-024361

Section Chief: DS Date: 7-12-89 Verified By: mg Authorized By: _____

AR100582

DHMH - 4320 10/87 HEALTH DEPARTMENT

STATE OF MARYLAND
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Laboratories Administration
201 W. Preston Street
J. Mehsen Joseph, Ph.D., Director

ORIGINAL (RED)

TRACE ORGANICS LABORATORY
VOLATILE ORGANICS ANALYSIS

BOTTLE NUMBER JCP 051789-01 COLLECTOR JC Polikoff MDE/HSWMA WASH. County

SOURCE OF SAMPLE Central Chemical MW-6

(Include Address)

SAMPLE TYPE: Community ____ Noncommunity ____ Domestic ____ STP Station ____
Observation Well X Stream ____ Tidal Waters ____ Industrial Effluent ____
Other (Specify) ____
Preservative Used HCl 1+1 ✓

RECEIVED
JUL 6 1989
GROUNDWATER AND SPECIAL INVESTIGATION DIVISION

IMPORTANT: First time sampled ____ Last known sampling date ____
Reason for submitting sample: Survey ____ Suspected Petroleum Contamination ____
Suspected Industrial Chemical Contamination ✓ Other (Specify) ____

CHAIN OF CUSTODY: From: ____ To: ____
From: ____ To: ____

REMARKS: ____

1	2 3	4 5 6 7	8 9 10 11	12 13 14 15 16 17	18 19
TRANS TYPE	COUNTY	PLANT NO.	SAMPLING STATION	DATE COLLECTED	CARD NO.
			MW06	051789	

FIELD pH (20 21 22): ____ FIELD RESID. CHLORINE: FREE (23 24): ____ TOTAL (25 26): ____ Time: 1400

Purgeable Halocarbons (EPA 601)

Chloromethane	<5	trans-1,3-Dichloropropene	<1	Benzene	<1
Bromomethane	<1	Trichloroethene		Toluene	
Dichlorodifluoromethane		Dibromochloromethane		Ethylbenzene	
Vinyl choride		1,1,2-Trichloroethane		Total Xylenes	<2
Chloroethane		cis-1,3-Dichloropropene		Total Purgeable Hydrocarbons	
Methylene chloride		2-Chloroethylvinylether	<10	Tetrahydrofuran	N.D.
Trichlorofluoromethane		Bromoform	<1	(2-Butanone MEK)	
1,1-Dichloroethene		1,1,2,2,-Tetrachloroethane		Methylisobutylketone (MIBK)	
1,1-Dichloroethane		Tetrachloroethene		Acrolein	
trans-1,2-Dichloroethene		Chlorobenzene	1	Acrylonitrile	
Chloroform	2	Total Trihalomethanes		Carbon Disulfide	
1,2-Dichloroethane	<1	**Other Purgeable Organics:**		Vinyl Acetate	
1,1,1-Trichloroethane				Acetone	
Carbon Tetrachlonde				2-Hexanone	
Bromodichloromethane				Styrene	
1,2-Dichloropropane					
1,2-Dichlorobenzene	2				

DATE ANALYZED: 6-21-89

CEN-024362

Results reported in micrograms per ℓ (parts per ~~million~~/billion)

DATE RECEIVED 5-18-89 DATE REPORTED 6-29-89 CHEMIST J Carmines LAB. NO. AR100583

DHMH 749 6/88

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