May 1987 EPA-700 8-87 012

Hazardous Waste Ground-Water Task Force

Evaluation of Peoria Disposal Co. Peoria,IL.

United States Environmental Protection Agency

Illinois Environmental Protection Agency

MAY 1987

UPDATE OF THE HAZARDOUS WASTE GROUND-WATER

TASK FORCE EVALUATION OF PEORIA DISPOSAL COMPANY

The United States Environmental Protection Agency's Hazardous Waste Ground-water Task Force ("Task Force"), in conjunction with the Illinois Environmental Protection Agency (IEPA), conducted an evaluation at the Peoria Disposal Company, (PDC) hazardous waste disposal facility. Peoria Disposal was the 18th of 58 facilities to be evaluated by the Task Force. The Task Force effort is in response to recent concerns as to whether owners and operators of hazardous waste disposal facilities are complying with the Resource Conservation and Recovery Act (RCRA) ground-water monitoring regulations, and whether the ground-water monitoring systems in place at the facilities are capable of detecting contaminant releases from waste management units. The PDC is located near Pottstown, Illinois, which is just west of Peoria, Illinois. The on-site field inspection was conducted over a one-week period from April 21 through April 25, 1986.

This update of the Task Force evaluation summarizes salient actions concerning the facility subsequent to the field inspection.

Since the Task Force site visit, technical review of PDC's Part B permit application has been ongoing. The ground-water monitoring system which was in place during the Task Force evaluation is currently being modified in anticipation of PDC receiving a finalized RCRA permit. When completed, the proposed well system will approximately reduce by one-half the average downgradient well spacing (i.e., to about 350 feet) which existed during the Task Force site visit. Also, shallow perched-water zones are being addressed as possible contaminant transport pathways by requiring additional shallow monitoring wells in such zones.

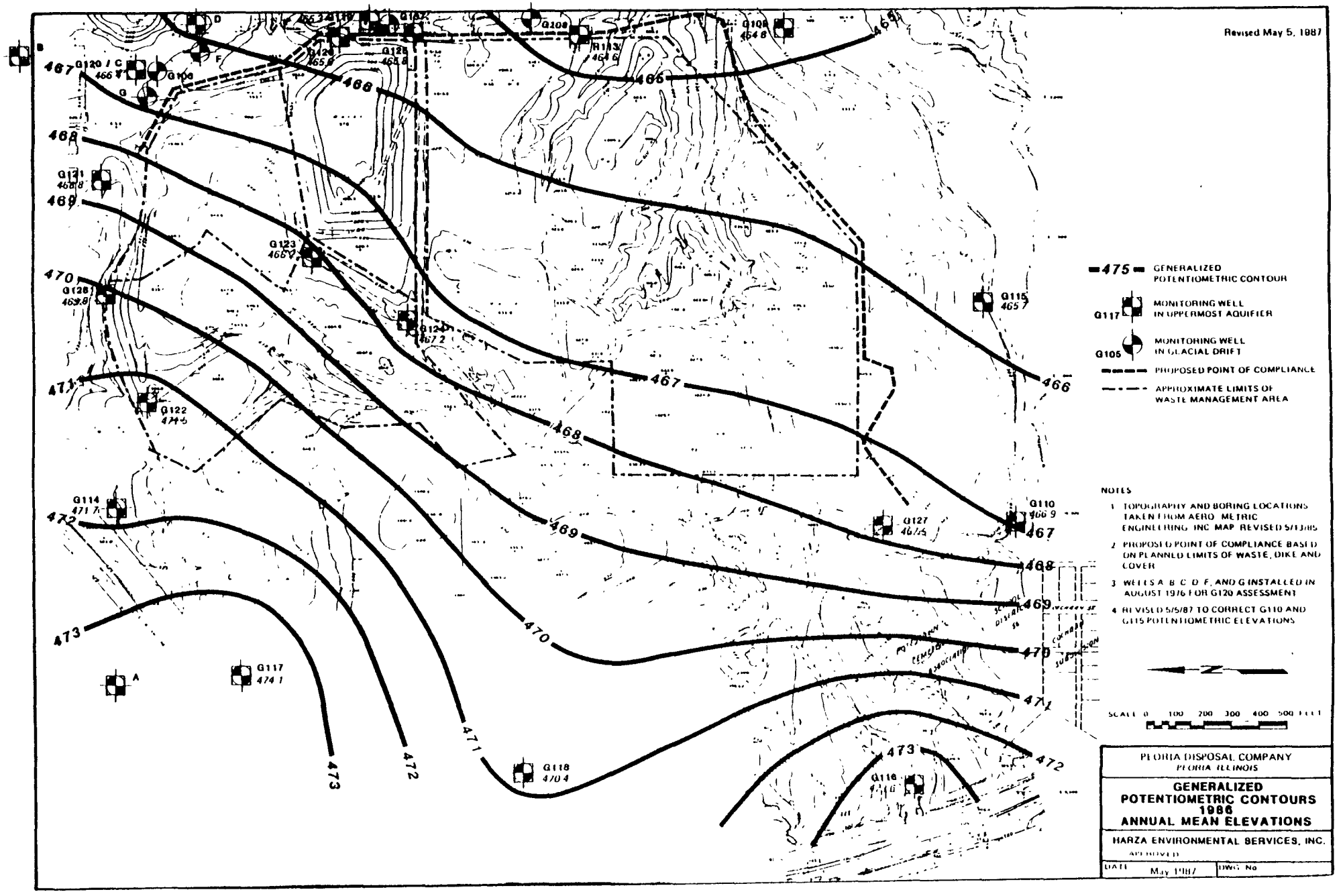
Old upgradient and downgradient monitoring wells, originally constructed using PVC pipe are being replaced. The new wells are to be constructed using inert materials (316 stainless steel) in the saturated zone to conform with the IEPA policy. Six of the old PVC wells have already been replaced (G-109, G-110, G-114, G-115, G-117, and R-118) and at least two more will be replaced before the Part B permit is issued. These new wells will be designated G-129 through G-134. The replacement wells for Wells G-109, G-110, and G-115 were also moved closer to the point of compliance of the proposed permit.

Well G-120, which was the subject of ground-water quality assessment monitoring during the Task Force inspection, has been returned to the indicator evaluation program. Two shallow wells installed near Well G-120 after the Task Force inspection are in assessment. Samples from both these wells, designated G-120 F and G-120 G, indicated the presence of low levels of vinyl chloride and chlorethane.

Wells G-123 and G-124 entered a program for ground-water quality assessment monitoring in July 1986. The initial assessment revealed eight organic compounds in Well G-123 and four of the same organic compounds in Well G-124. Additional shallow and deep wells are being installed as part of the assessment monitoring program for these wells.

The 1986 Ground Water Annual Report that PDC submitted on May 6, 1987, shows revisions to the 1986 potentiometric maps. At the time of the Task Force inspection, the presence of an apparent minor ground-water divide was evident in the southwest corner of the site. This anomaly, evident in Figures 4 and 5 of this report, resulted from the incorrect transposition of numbers from the land survey data to maps. This transposition of numbers resulted in maps yielding a 3.7 foot discrepancy in the ground-water surface at monitoring Well G-115. The following map, revised May 5, 1987, eliminates the anomaly and indicates a less complicated ground-water flow in an east-southeasterly direction.

A closure plan for clean closure of the hazardous waste land treatment unit under interim status was submitted to IEPA on July 13, 1987. The approximate location of that unit is labeled "C-2" on Figure 2 of this report.


Revised May 5, 1987
475 GENERALIZED POTENTIOMETRIC CONTOUR
G117 MONITORING WELL IN UPPERMOST AQUIFER
G105 MONITORING WELL IN GLACIAL DRIFT
PROPOSED POINT OF COMPLIANCE
APPROXIMATE LIMITS OF WASTE MANAGEMENT AREA
NOTES
1 TOPOGRAPHY AND BORING LOCATIONS TAKEN FROM AERO METRIC ENGINEERING INC MAP REVISED 5/13/85
2 PROPOSED POINT OF COMPLIANCE BASED ON PLANNED LIMITS OF WASTE, DIKE AND COVER
3 WELLS A B C D F, AND G INSTALLED IN AUGUST 1976 FOR G120 ASSESSMENT
4 REVISED 5/5/87 TO CORRECT G110 AND G115 POTENTIOMETRIC ELEVATIONS
SCALE 0 100 200 300 400 500 FEET
PEORIA DISPOSAL COMPANY
PEORIA ILLINOIS
GENERALIZED POTENTIOMETRIC CONTOURS 1986 ANNUAL MEAN ELEVATIONS
HARZA ENVIRONMENTAL SERVICES, INC.
APPROVED
DATE May 1987
DWG No

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE GROUND-WATER TASK FORCE

GROUND-WATER MONITORING EVALUATION

PEORIA DISPOSAL COMPANY

POTTSTOWN, ILLINOIS

MAY 1987

JOHN J. McGUIRE

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ENVIRONMENTAL SERVICES DIVISION

CENTRAL DISTRICT OFFICE

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INTRODUCTION

Concerns have recently been raised as to whether the commercial hazardous waste treatment, storage, and disposal facilities are in compliance with the ground-water monitoring requirements promulgated under the Resource Conservation and Recovery Act (RCRA)*. Specifically, the concerns focus on the ability of ground-water monitoring systems to detect contaminant releases from waste management units at these facilities. In response to these concerns, the Administrator of the United States Environmental Protection Agency (U.S. EPA) established a Hazardous Waste Ground-water Task Force (Task Force) to evaluate the level of compliance at these facilities and address the cause(s) of noncompliance. The Task Force comprises personnel from EPA Headquarters, including the Offices of Solid Waste and Emergency Response (OSWER), National Enforcement Investigations Center, U.S. EPA Regional Offices, and State regulatory agency personnel. To determine the status of facility compliance, the Task Force is conducting in-depth facility investigations, including on-site inspections with the following objectives.

- Determine compliance with interim status ground-water monitoring requirements of 40 CFR Part 265 as promulgated under RCRA or the State equivalent (where the State has received RCRA authorization).

- Evaluate the ground-water monitoring program described in the facilities' RCRA Part B permit applications for compliance with 40 CFR Part 270.14 (c) and 264 Subpart F, or the State equivalent (where the State has received RCRA authorization).

- Determine if the ground water at the facility contains hazardous constituents.

* Regulations promulgated under RCRA address hazardous waste management facilities' operations, including ground-water monitoring, to ensure that hazardous waste constituents are not released to the environment.

° Provide information to assist the Agency in determining if the facility meets U.S. EPA ground-water monitoring requirements for waste management facilities receiving waste from response actions conducted under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, Public Law 91-510).*

To address these objectives, each Task Force investigation will determine if:

° The facility has developed and is following an adequate ground-water sampling and analysis plan;

° RCRA (and/or State-required) monitoring wells are properly located and constructed;

° required analyses have been conducted on samples from the designated RCRA monitoring wells; and

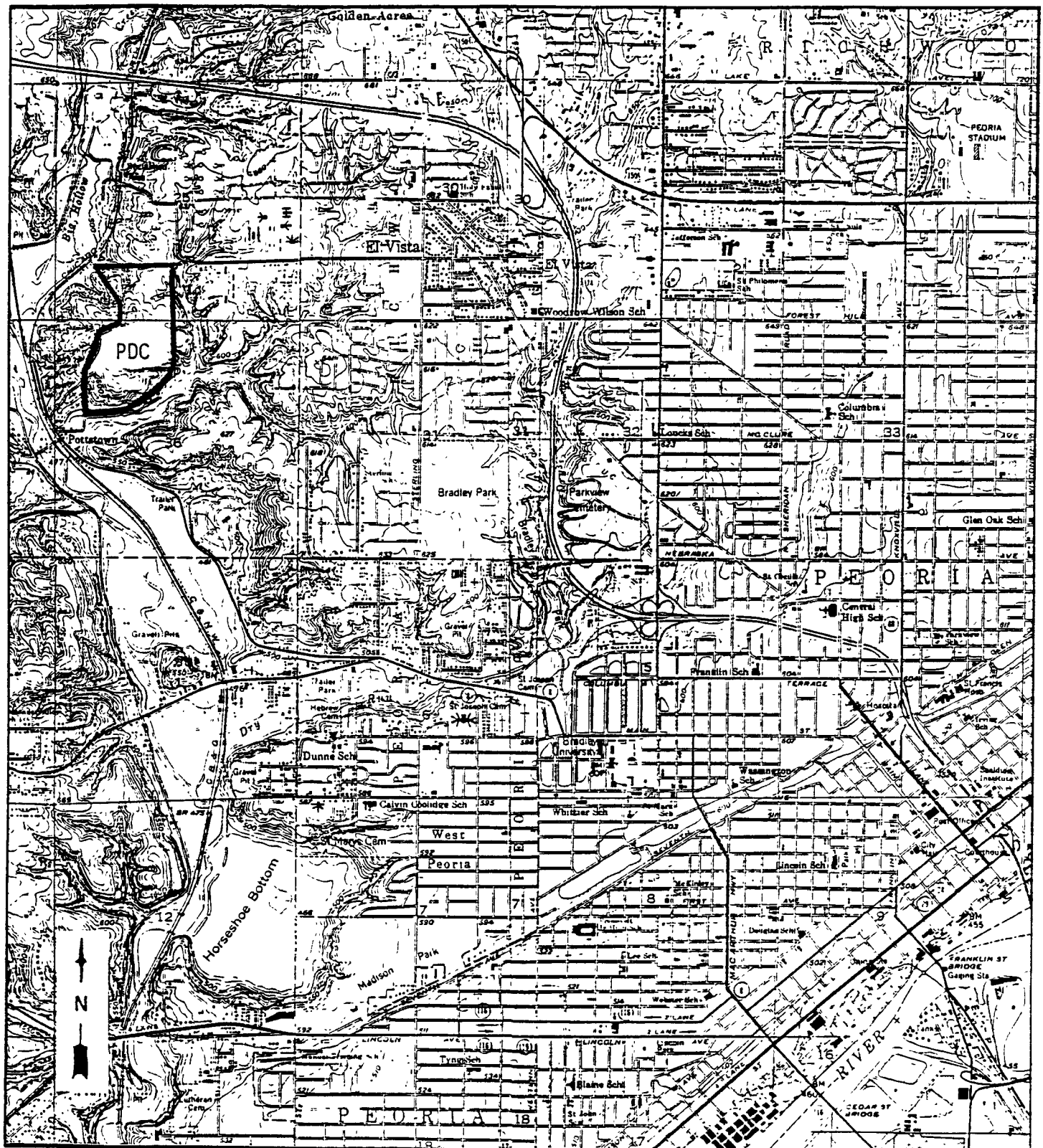
° the ground-water quality assessment program outline (or plan, as appropriate) is adequate.

The eighteenth facility investigated by the Task Force was the Peoria Disposal Company (PDC) facility, located near Pottstown and west of Peoria, Illinois (FIGURE 1). The PDC facility is a multi-service, family-owned waste management company that operates a liquid waste treatment service on-site in addition to three active landfills. The on-site inspection was conducted from April 21 through April 25, 1986, and was coordinated by personnel from the U.S. EPA, Region V, Central District Office. The investigation, in general, involved review of State, Federal and facility records, facility inspection, laboratory evaluation, and ground-water sampling and analysis.

* "Procedures for Planning and Implementing Off-Site Response Action"; Federal Register, Vol. 50, No. 214, Page 459-463, November 5, 1985.

FIGURE 1

SITE LOCATION MAP



The PDC facility is located on a 152 acre site in a rural part of Peoria County. The landfill is situated on a hill 150 to 200 feet above the surrounding area and extends into Section 25, T.9N, R.7E and Section 36, T.9N, R.7E. Arcing around the southwest base of the hill is a valley which contains Kickapoo Creek, Route 8, and the Chicago and North Western Railroad. To the northwest of the PDC is Big Hollow Creek and a residential condominium development. Another valley, containing an intermittent unnamed tributary of Kickapoo Creek, curves from the northeast to the southeast of the site. The only area zoned for industrial use in the vicinity is the site itself.

SUMMARY OF FINDINGS AND CONCLUSIONS

The interim status program at Peoria Disposal Company began in November 1981, when the applicable provisions of the RCRA regulations became effective. The findings and conclusions presented below reflect conditions existing at the facility during the period of the inspection conducted April 21 through April 25, 1986.

COMPLIANCE WITH INTERIM STATUS GROUND-WATER MONITORING - 35 ILLINOIS ADMINISTRATIVE CODE PART 725 SUBPART F (40 CFR PART 265 SUBPART F)

§ 725.191 (§ 265.91) - GROUND-WATER MONITORING SYSTEM

At the time of the Task Force inspection, PDC had a RCRA monitoring well system that was comprised of 18 monitoring wells, including 3 upgradient wells. In November 1985, PDC certified that it was in compliance with RCRA interim status ground-water monitoring requirements. In February 1986, PDC submitted a report on a numerical ground-water model of its facility. After reviewing this model and its report, the Task Force concluded that PDC's monitoring wells were widely spaced

along the southern edge of Section B landfill (1100 ft), and along the northeastern edge of Section A landfill (750 feet between G-126 and G-120, and 450 feet between G-120 and G-121).

Some of the existing downgradient monitoring wells (G-109, G-110, R-113, and G-115) are located along the southern and southeastern portion of the facility. With regard to compliance with the minimum requirements of an interim status ground-water monitoring system, the Task Force considers these wells to be extraneous. The wells are located too far from the limit of the active waste management units to be capable of immediate detection of any contaminant releases. These wells would be required for future expansion into Area C.

In addition to the RCRA ground-water monitoring system, PDC maintains a shallow ground-water monitoring system under its Illinois solid waste disposal program permit. This system monitors shallow, discontinuous, perched-water zones contained within the Illinoian Drift. The Task Force concluded that this shallow monitoring system is important because these perched-water zones may be the first pathway for the release of contaminants from localized parts of the facility. Furthermore, the Task Force recommends this shallow monitoring system be maintained and expanded under Illinois Environmental Protection Agency (IEPA) supervision. This shallow monitoring system should be incorporated into the requirements for a RCRA permit at PDC.

§ 725.192 (§ 265.92) Sampling and Analysis

The Sampling and Analysis Plan (SAP), onsite at the time of the inspection, was dated February 1986, and contained the general procedures for collection and analysis of samples from its ground-water monitoring system. In addition to a

review of the SAP, the Task Force observed PDC's sampling crew while they sampled Wells G-106 and R-113. Generally, PDC followed its SAP in sampling the wells. Listed below are the good points and deficiencies found in the Task Force evaluation of PDC's plan.

The Task Force evaluation found that PDC not only meets the EPA-recommended purging requirements, but has added additional criteria. The plan requires that five well volumes be removed from good-yielding wells, three to five well volumes from poor-yielding wells, and that the pH and specific conductance measurements meet specified stability requirements.

The SAP describes the methods used by PDC for taking water level measurements but needs to include more specific information. The names of the two devices used and a reference to the manufacturers' manual should be included. PDC also needs to add the decontamination procedures used to clean the portable equipment between wells and to add a procedure to recalibrate the static water level equipment permanently installed in some wells.

A number of additional deficiencies were found and discussed with the facility during the inspection. The deficiencies found include: (1) discrepancies within the plan regarding chemicals used to preserve samples for analysis of total organic halogens (TOX), total organic carbon (TOC), and nitrate-nitrite (N); (2) no clear listing of the order in which sample bottles are filled; (3) a discrepancy as to what temperature samples are stored at; and (4) the lack of cleaning procedures for filtering equipment, nondedicated bailers, and Teflon® discharge tubing used on pumps. PDC sent an addendum to the SAP to the Field Team Leader correcting these problems the week after the inspection.

Five laboratories used by PDC were evaluated by Region V's Quality Assurance Office. All five laboratories were found to be technically competent, but a

number of problems were noted. The laboratory that performs the radiation analysis and another laboratory which analyzes the TOX and TOC samples do not maintain chain-of-custody on the samples received from PDC. The radiation laboratory and the laboratory that analyzes pesticide samples had some difficulty with performance evalution samples. The on-site laboratory at PDC analyzes all the metals samples. This laboratory needs to prepare a Quality Assurance Plan, to be included in the SAP, to justify why they have modified six of the U.S. EPA methods for metals, and to improve daily instrument calibration procedures.

§ 725.193 (§ 265.93) PREPARATION, EVALUATION, AND RESPONSE

Well G-120 at PDC had indicated the presence of methylene chloride in the ground water during the Spring of 1986. During the Task Force inspection, PDC was beginning an IEPA-approved ground-water quality assessment program. Well G-120 was sampled in duplicate by the Task Force and the sample did not contain methylene chloride or any other contamination.

GROUND-WATER MONITORING PROPOSED FOR RCRA PERMIT

The present wide spacing between monitoring wells along the southern portion of Section B landfill and the northeastern portion of Section A landfill should be reduced through RCRA permit conditions based on the requirements of 35 Ill. Adm. Code Part 724 (40 CFR Part 264). Secondly, the Task Force recommends that the shallow ground-water monitoring system currently operated under the Illinois solid waste disposal program be expanded and included in any future RCRA monitoring program. Finally, the monitoring wells along the southern boundary of the facility (G-109, G-110, G-115, G-127) are too far from the waste management areas currently in use, or planned for use in the near future, to immediately detect hazardous constituents escaping from a regulated unit.

§ 703.185 (40 CFR §270.14(c)) HYDROGEOLOGIC CHARACTERIZATION

PDC has conducted a geologic boring program that consists of over 170 borings of depths of up to 200 feet. The information gleaned from this program is adequate to describe the Shelbyville Outwash below the PDC site. However, PDC's description of the overlying Illinoian Drift is very general and has overlooked the presence of some significant, although discontinuous, thicknesses of sand. The sand zones may provide pathways for the release of contaminants from localized parts of the facility and, therefore, affect the number, depths, and locations of required monitoring wells.

TASK FORCE SAMPLING AND MONITORING DATA ANALYSIS

During the inspection, the Task Force personnel collected samples from 19 of PDC's ground-water monitoring wells. The analytical results for these samples are tabulated in Appendix A. The Task Force samples indicate that three wells may contain hazardous waste constituents: Well G-123 contained 1,1-dichloroethane at 16 ug/l; Well G-128 contained 32 ug/l of methylene chloride; and Well G-124 contained lead at a concentration above the level specified in 40 CFR Part 265 Appendix III.

Three other wells (G-114, G-124, and G-125) showed concentrations of methylene chloride that were above the method detection limits, but were within two standard deviations of the detection limit. Therefore, these data may be considered unreliable.

CONFORMANCE WITH SUPERFUND OFF-SITE POLICY

At the time of the Task Force evaluation, PDC was not required to meet the minimum landfill technology standards of RCRA Section 3015(b) because the trench in

use had received waste prior to May 8, 1985. However, the current U.S. EPA Superfund off-site policy requires wastes from EPA-financed Superfund cleanups must be disposed of in units built with double liners, leak detection, and leachate collection systems. Therefore, while the PDC landfill is not required to have these new minimum technologies yet, U.S. EPA policy precludes EPA from disposing of Superfund cleanup waste at PDC.

INVESTIGATION METHODS

The Task Force investigation of the PDC facility consisted of:

- Reviewing and evaluating records and documents from U.S. EPA, the Illinois EPA, and PDC;
- conducting an on-site facility inspection April 21 through April 25, 1986;
- evaluating off-site analytical laboratories used by PDC; and
- sampling and subsequent analysis and data evaluation for selected ground-water monitoring wells.

RECORDS/DOCUMENTS REVIEW

Records and documents from U.S. EPA Region V and the IEPA offices, compiled by a U.S. EPA contractor, were reviewed prior to and during the on-site inspection. On-site facility records were reviewed to verify and augment information currently in government files. These records were reviewed to obtain information on facility operations, construction details of waste management units, and the ground-water monitoring program. The facility was requested to supply the U.S. EPA with a copy of selected documents for in-depth evaluation.

Specific documents and records that were reviewed included the ground-water sampling and analysis plan; outline of the facility ground-water quality assessment program; analytical results from past ground-water sampling; monitoring well construction data and logs; site geologic report; site operations plans; IEPA permits; waste management unit design and operation reports; and operating records showing the general types, quantities, and locations of wastes disposed of at the facility.

FACILITY INSPECTION

The facility inspection conducted in April 1986, included identifying past and present waste management units, identification and assessment of waste management operations and pollution control practices, and the verification of the locations of all ground-water monitoring wells and leachate monitoring systems.

PDC representatives were interviewed to identify records and documents of interest, discuss the contents of the documents, and explain (1) past and present facility operations; (2) site hydrogeology; (3) the ground-water monitoring system; (4) ground-water sampling and analysis plan; and (5) all laboratory procedures for obtaining data on ground-water quality. Because PDC had ground-water samples analyzed by offsite laboratories, personnel from these laboratories were also interviewed regarding sample handling and analytical methods.

LABORATORY EVALUATION

The offsite laboratory facilities that analyze PDC's samples were evaluated regarding their respective responsibilities under the PDC ground-water sampling and analysis plan. Analytical equipment and methods and quality assurance procedures and records were examined for adequacy. Laboratory records were inspected for completeness, accuracy, and compliance with State and Federal requirements. The ability of each laboratory to produce quality data for the required analyses was also evaluated. Later in this report, a detailed discussion of this evaluation is presented under "Sample Analysis and Data Quality Evaluation."

GROUND-WATER SAMPLING AND ANALYSIS

During the inspection, the Task Force contractor collected samples from 19 ground-water monitoring wells at the facility. Wells were selected for sampling principally for their location relative to the waste management areas. Data from sample analyses were reviewed to further evaluate PDC's ground-water monitoring program and to identify ground-water contaminants. Analytical results of the samples collected by the Task Force are presented in Appendix A of this report.

WASTE MANAGEMENT UNITS AND FACILITY DESIGN

The present operation of PDC consists primarily of (1) the landfilling of both hazardous and nonhazardous wastes, both in bulk and drum, and (2) the storage and treatment of aqueous nonhazardous waste. A summary of the types of waste accepted by PDC is given in Table 1. These wastes originated from a great number of generators, but primarily from earth-moving equipment manufacturers, agricultural chemical industries, steel industries, and breweries.

OPERATION

RCRA-regulated activities at PDC included two hazardous waste landfills (Sections A and B), a trench for the landfilling of barrels, a series of storage and treatment tanks for treating liquid nonhazardous wastes, and a large tract of land for future expansion (Area C). Types of hazardous waste currently accepted by PDC are shown in Table 1. Pre-RCRA operations that may impact the ground water of the site include a commercial co-disposal landfill, two surface impoundments (B-1 and B-2), and two land farm operations (C-1 and C-2). The locations of past operations are shown in Figure 2. The locations of units in operation during the inspection are shown in Figure 3. The design and overall operation of these various components of the facility are discussed in the following section.

HAZARDOUS WASTE LANDFILL CELLS

Section A

Section A (Figure 3) is located in the northeast portion of the site and was in use between 1979 and 1984. This landfill is about 7 acres in size and is approx-

TABLE 1

HAZARDOUS WASTE STREAMS ACCEPTED BY PDC

WASTE	EPA HAZARDOUS WASTE NUMBER
Ignitable	D001
Corrosive	D002
Reactive	D003
EP Toxic (Metals)	D004 - D011
EP Toxic(2,4-D)	D016
Spent halogenated and non-halogenated solvents (Still bottoms)	F001, F005
Spent cyanide plating bath solutions from electroplating operations	F007
Wastewater treatment sludges from chemical conversion coating of aluminum	F019
Bottom sediment sludge from the treatment of wastewater from wood preserving processes using creosote and/or pentachlorophenol	K001
Oven residue from the production of chrome oxide green pigments	K008
Distillation side cuts from the production of acetaldehyde from ethylene	K010
Wastewater treatment sludges from the production of disulfoton	K037
Wastewater treatment sludges from the manufacturing and processing of explosives	K044

TABLE 1 (cont'd)

HAZARDOUS WASTE STREAMS ACCEPTED BY PDC

WASTE	EPA HAZARDOUS WASTE NUMBER
Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds	K046
API separator sludge from petroleum refining industry	K051
Tank bottoms (leaded) from petroleum refining industry	K052
Ammonia still lime sludge from coking operations	K060
Emission control dust/sludge from the primary production of steel in electric furnaces.	K061
Emission control dust/sludge from secondary lead smelting	K069
Brine purification muds from mercury cell process in chlorine production, where separately prepurified brine is not used	K071
Decanter tank tar sludge from coking operations	K087
Discarded commercial chemical products, off-specification species, container residues, and spill residues	P021, P030, P039, P059, P092, P120, U007, U013, U019, U036, U051, U052, U061, U070, U080, U122, U128, U159, U188, U189, U220, U239, U242

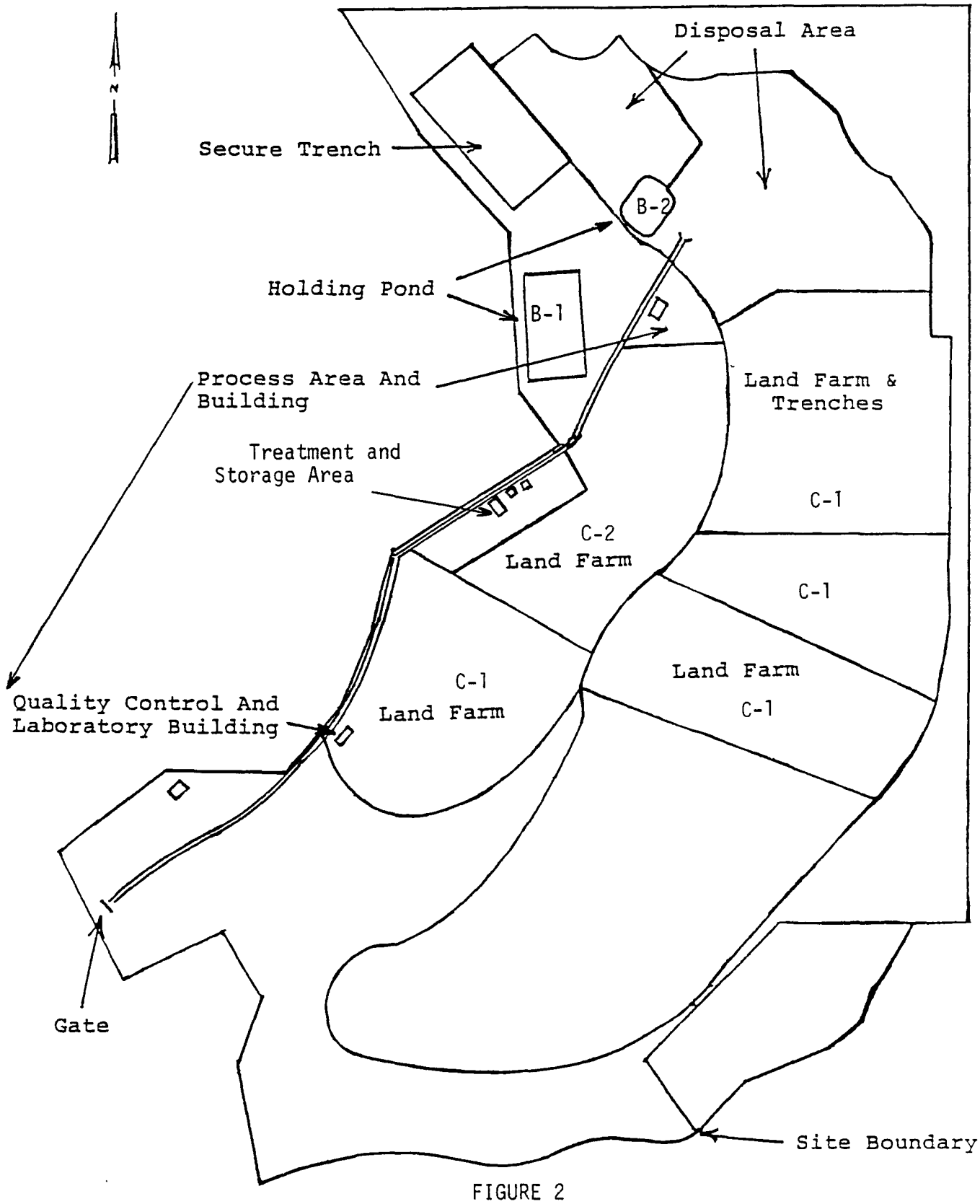


FIGURE 2
LOCATION MAP SHOWING PAST OPERATIONS AT PDC

Scale: 1"=400'

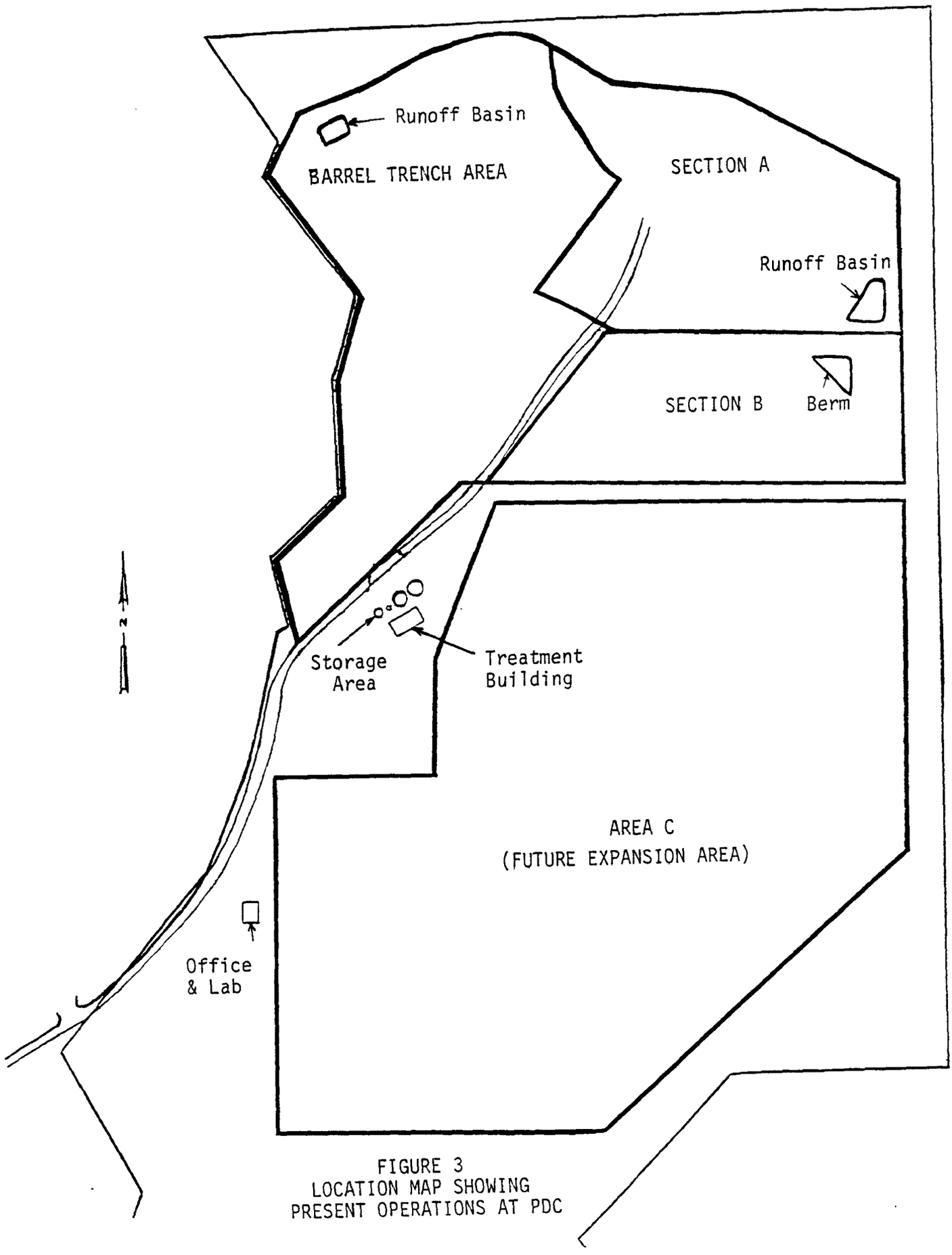


FIGURE 3
LOCATION MAP SHOWING
PRESENT OPERATIONS AT PDC

imately 50 feet deep. This landfill contains about 15% RCRA hazardous waste and about 85% municipal waste or nonhazardous industrial wastes. The landfill was operated using the area-fill method. At the time of the inspection, this area was nearing completion and a final cap was being laid down.

Section B

Section B is located along the eastern boundary, just south of Section A, and was in use at the time of the Task Force inspection. This landfill is about 50 feet deep and has a 100 ft. X 400 ft. floor (almost 7 acres at ground surface). This disposal unit has a compacted clay liner, a synthetic liner, and a leachate collection system. This landfill cell contains only RCRA hazardous wastes and nonhazardous "special wastes" in solid bulk form or in drums.

Barrel Trench Area

The Barrel Trench Area is located along the northern boundary of the facility, just west of Sections A and B. This unit was used for disposal from the late-1970s to 1985 and is about 13 acres in size. This disposal trench is about 70 feet deep. Barrels were stacked up to 15 high in glacial till sediments. A runoff containment basin (Figure 3) and a leachate collection sump were installed during 1984/1985 at the request of the IEPA. The leachate sump has been collecting fluids, but it should be noted that the sump does not have a lined bottom.

Area C

Area C encompasses the entire southern portion of the PDC facility. This area is bigger than the three aforementioned sections combined (over 60 acres). This area is bigger than the future expansion and a number of disposal trenches are planned. During the Task Force inspection, cover materials were being excavated from this area and rainwater and nonhazardous precipitation run-on from Section B were ponded there. At one time, portions of Area C were used as land treatment units for RCRA hazardous wastes and nonhazardous wastes. Beginning in the mid-1970s and until November 1981, three or four areas covering 20 acres were used to stabilize nonhazardous liquid wastes, including wastewater treatment liquids, cutting oils, and coolants. The soils and wastes from these land treatment units were removed and landfilled in 1982. One area, covering 2 acres and designated C-2 on Figure 2, was used to stabilize neutralized stripper solutions (a RCRA hazardous waste). This land treatment unit was addressed in 1982 by a Consent Decree between PDC, the IEPA, and the Illinois Attorney General. The unit was decommissioned and hazardous waste removal was observed by IEPA staff. Soil samples were taken and analytical data indicated most hazardous waste and hazardous waste constituents were removed.

WASTE TREATMENT AND STORAGE

The liquid waste treatment plant, using a proprietary process, treats nonhazardous bulk liquids, such as cutting oils and coolants. Bulk wastes are stored in two 150,000-gallon receiving tanks for later treatment in batches of 100,000 to 120,000 gallons. Free oils are separated and the remaining liquid is treated and sent to holding tanks, tested, and then discharged to the Peoria Sanitary District. In addition, commercial waste, other nonhazardous waste, and rainwater run-off from the barrel trench area are also treated.

PRE-RCRA UNITS

Landfill

The area west of the PDC facility is a 40-acre landfill that was operated by PDC prior to 1980. This landfill accepted municipal and industrial wastes and was operated using the area-fill method. This unit was closed prior to 1980 and never received interim status. PDC has legally separated this parcel of land from its present disposal facility, but it remains under the physical and economic control of PDC.

Surface Impoundments

PDC operated two surface impoundments (labeled B-1 on Figure 2) near the center of the facility. During the mid-1970s these ponds accepted aqueous oily liquid wastes and industrial liquid wastewaters. These impoundments covered approximately three acres and were unlined. The units were eliminated in the 1970s.

PDC operated another unlined surface impoundment from the late-1970s until November 1981. This unit was 250 feet by 250 feet in area and approximately 18 feet deep and could hold over 8 million gallons. This pond was used for disposal of oily liquid wastes, industrial liquid wastes, and "special wastes", but no RCRA hazardous wastes are recorded as being disposed of there. This pond was located in the Barrel Trench Area and is labeled B-2 on Figure 2. This unit was eliminated in 1982/1983.

Above-Ground Storage Tanks

During the mid-1970s to the early-1980s, nine 20,000-gallon above-ground storage tanks were located near the center of the PDC facility. It is unknown exactly what types of liquid wastes were stored in these tanks.

Container Storage Area

A temporary barrel storage area was used during construction of the barrel trench in the late-1970s. This area was located in the north central portion of the site. The storage was discontinued upon the opening of the barrel trench prior to November 19, 1980.

HYDROGEOLOGY

GEOMORPHOLOGY

The region surrounding Peoria, Illinois has been affected by four periods of Pleistocene glaciation. The PDC facility is located on top of a small hill that is part of a northeasterly-trending glacial moraine system. This hill rises approximately 150 feet above the nearby confluence of Kickapoo Creek and Big Hollow Creek. This topographic high has been enhanced vertically and expanded laterally by landfilling. The Section A landfill is the new topographic high and Area C, which is unaffected by landfilling but partially excavated, is the topographic low.

There are three streams that flow near the PDC property: Kickapoo Creek to the west, Big Hollow Creek to the north, and a small unnamed stream to the south. The latter two flow into Kickapoo Creek, which in turn flows into the Illinois River near Peoria.

Surface runoff on the PDC facility drains from the elevated, landfilled portions of the property and is trapped in one of two drainage control basins. One basin is in the Barrel Trench Area and the other is in Section A (Figure 3). The water collected is tested and pumped to the low-lying Area C, where it can evaporate or percolate into the ground.

HYDROGEOLOGIC UNITS

The Task Force studied the stratigraphy and hydrogeology of the PDC facility by reviewing more than 170 boring logs, a geologic map of the area, and reports by consultants to PDC. Task Force geologists also made a number of geologic interpretations and cross-sections using PDC boring logs.

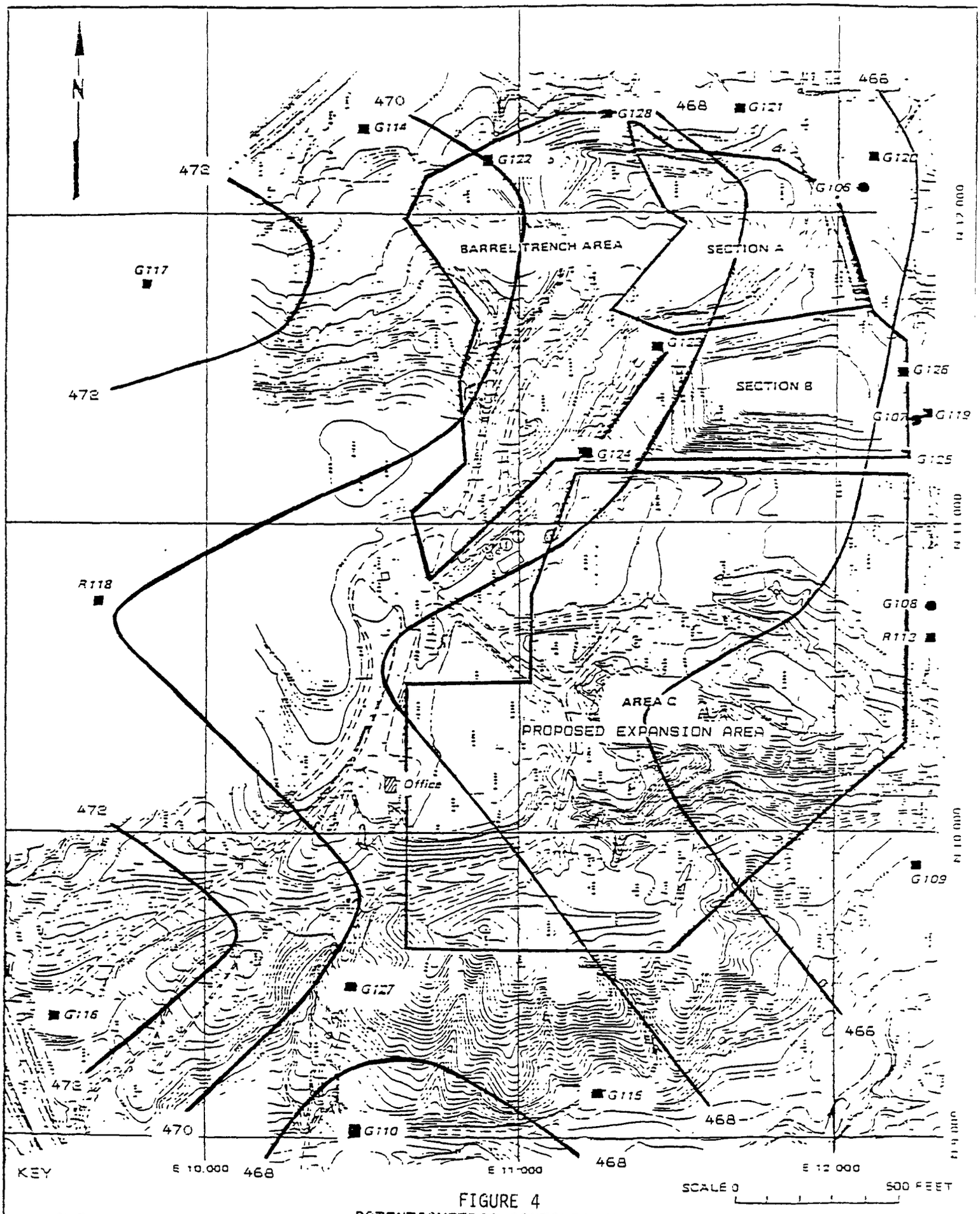
There are two unconsolidated glacial units beneath the PDC facility: the Illinoian Drift and the Shelbyville Outwash. The first bedrock unit encountered is the Pennsylvanian Age Carbondale Formation at a depth of less than 200 feet.

The deepest unit penetrated by boring at PDC is the Pennsylvanian Carbondale Formation. It is a soft, grey shale with interbedded coal, sandstones, and limestones. The shale is at an elevation of 430 feet above sea level near the center of the PDC site and dips generally towards the southeast. This formation yields some ground water, but its usage is minimal because shallower water sources are often available or the bedrock waters are poor quality and the bedrock is low-yielding.

Above the bedrock under the PDC facility is the Shelbyville Outwash. The Shelbyville Outwash is an unconsolidated unit consisting of dense, poorly-graded brown sand with some gravel and silt. The top of the unit is 90 to 105 feet below the ground surface at the site. The Shelbyville is a maximum of 95 feet thick and has a saturated thickness of between 25 and 40 feet. It is an unconfined aquifer and is present beneath the entire site. The Shelbyville is believed to be in lateral hydraulic communication with Kickapoo Creek and with the regional Sankoty Sand aquifer system, which is heavily used as a municipal water source in central Illinois.

PDC and its consultants state that ground-water flow within the Shelbyville Outwash is from west to east based upon static water levels measured in RCRA monitoring wells on site (See Figure 4). Evident in the southwest corner of the facility is a minor ground-water divide.

Water levels measured during the Task Force evaluation are shown as a potentiometric map on Figure 5. The two maps are based upon water levels from different seasons and years, yet they are very similar. Because of this similarity, the Task Force agrees with PDC that ground-water flow in the Shelbyville Outwash is west to east.



■ SHELBYVILLE MONITORING WELL
● SHALLOW MONITORING WELL

FIGURE 4
POTENTIOMETRIC CONTOURS IN THE SHELBYVILLE OUTWASH - NOVEMBER 1, 1984 BY PDC

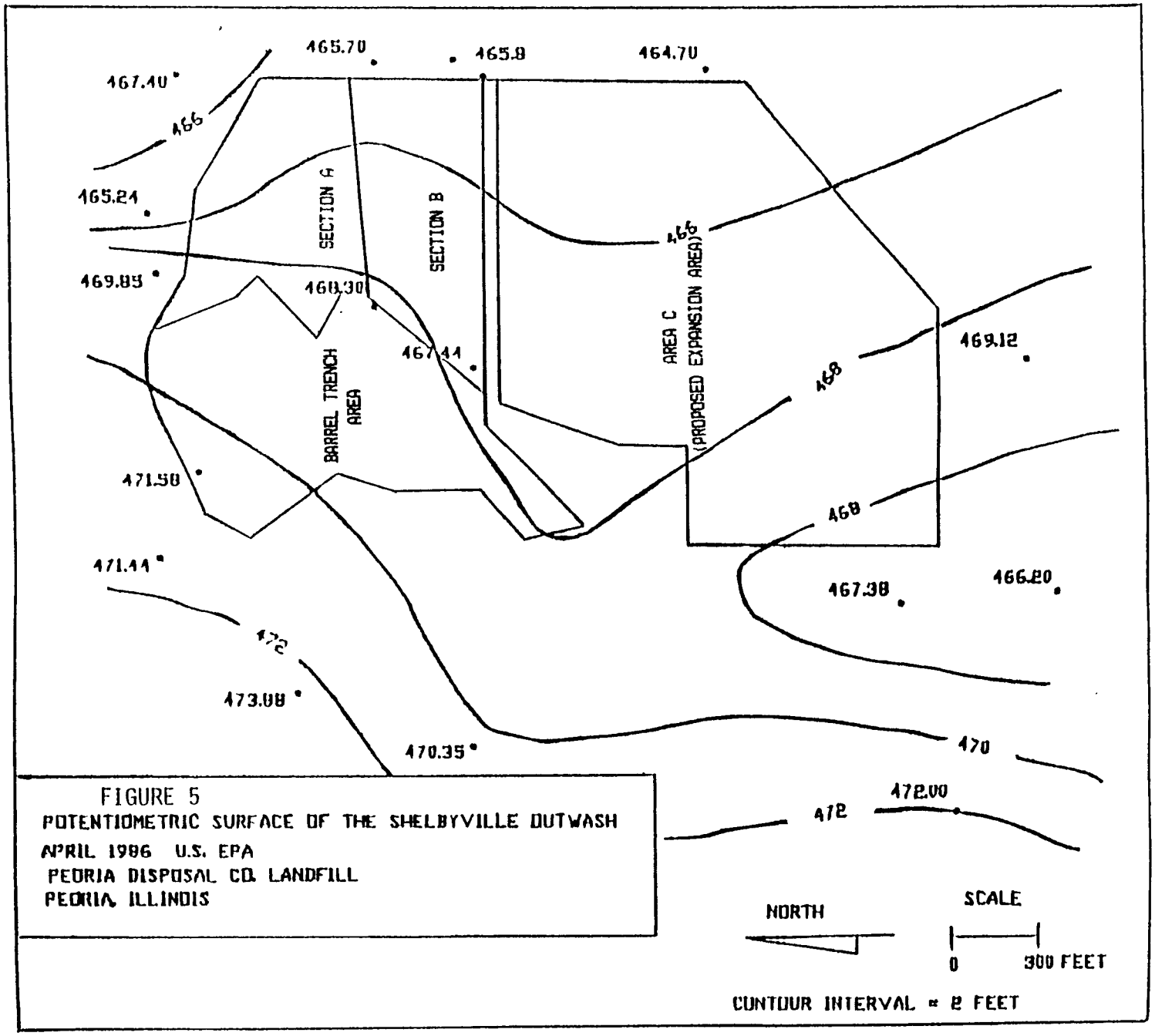


FIGURE 5
POTENTIOMETRIC SURFACE OF THE SHELBYVILLE OUTWASH
APRIL 1986 U.S. EPA
PEORIA DISPOSAL CO. LANDFILL
PEORIA, ILLINOIS

Above the Shelbyville Outwash sand and extending 90 to 100 feet to the surface is the Illinoian Drift. This is a silty-clay till with bedded sands and gravels. Regionally, these sands are saturated and are sometimes used for domestic water supplies. At PDC, these bedded sands do not appear to be laterally continous under the site, but some borings, particularly at the northern end of the site, reveal significant thicknesses of sand (10 to 25 feet). The silty-clay till is unsaturated, although some of the sand lenses contain perched water and have monitoring wells screened in them. The sands in the Illinoian Drift are recharged primarily by infiltration of precipitation and they discharge to the Shelbyville Outwash below or to the surface through springs.

The Task Force has concluded that the general hydrogeology of the Peoria Disposal Company facility has been fairly well described, but there are some weaknesses in the specific description of the Illinoian Drift. PDC has relied upon spaced samples from borings and regional descriptions from various publications, rather than using continuous sampling techniques during drilling to better define the occurrences and impact of sand seams and lenses beneath its site.

HYDRAULIC CONDUCTIVITIES

Laboratory permeability tests were performed by PDC on samples of till from various intervals in different boreholes. The tests indicated permeabilities in the till ranging from 6.6×10^{-6} to 1.3×10^{-9} cm/sec (Table 2). PDC estimates the effective porosity of the till to be 0.05 with a flow velocity of 0.0128 feet/day (assuming 0.5 feet water head and a permeability of 5×10^{-7} cm/sec).

The permeability of the Shelbyville Outwash beneath the PDC site was estimated to range from about 1.1×10^{-4} to 5.3×10^{-5} cm/sec, based upon laboratory permeability tests (Table 3) and from 2×10^{-2} to 6×10^{-3} cm/sec from grain-size analyses.

TABLE 2

Laboratory Permeability of the Till

Boring Number	Soil Type	Sample Depth (ft)	Coefficient of Permeability (cm/sec)
B-43	Clay	10-12	2.53×10^{-8}
B-43	Clay	20-22	5.38×10^{-9}
B-50	Silty Clay Till	35-37	1×10^{-8}
B-51	Clay Loam	35-37	5.60×10^{-8}
B-53	Silty Clay Till	50.0-52.5	9.06×10^{-9}
B-60	Silty Clay Till	65-67	5.54×10^{-8}
B-61	Silty Clay Till	26-28	7.68×10^{-7}
B-63	Silty Clay Till	45-46.5	4.09×10^{-8}
B-108	Silty Clay Till	5- 6.5	8.6×10^{-9}
B-108	Silty Clay Till	10-11	9.2×10^{-9}
B-109	Silty Clay Till	5- 6	3.7×10^{-9}
B-109	Silty Clay Till	10-11.5	7.8×10^{-9}
B-110	Silty Clay Till	30-32	2.8×10^{-7}
B-111	Silty Clay Till	45-47	2.6×10^{-7}
B-115	Silty Clay Till	10-11.5	8.5×10^{-9}
B-116	Silty Clay Till	70-71.5	4.6×10^{-9}
B-117	Silty Clay Till	60-61.5	9.4×10^{-9}
B-118	Silty Clay Till	85-86.5	1.3×10^{-9}
B-123	Silty Clay Till	10-13	3.8×10^{-9}
B-153	Silty Clay Till	10-11	1.4×10^{-7}
B-153	Silty Clay Till	15-16	6.6×10^{-6}
B-153	Silty Clay Till	35-36	8.8×10^{-8}
B-154	Silty Clay Till	5- 6	1.8×10^{-6}
B-154	Silty Clay Till	10-11	5.8×10^{-7}
B-154	Silty Clay Till	15-16	1.8×10^{-7}

TABLE 2 (cont'd)

Laboratory Permeability of the Till

Boring Number	Soil Type	Sample Depth (ft)	Coefficient of Permeability (cm/sec)
B-158	Silty Clay Till	10-11.5	4.9×10^{-8}
B-159	Silty Clay Till	10-12	1.4×10^{-8}
B-160	Silty Clay Till	20-22	1.2×10^{-8}
B-161	Silty Clay Till	10-11.5	6.2×10^{-7}
B-162	Silty Clay Till	27.5-30	3.1×10^{-7}
B-163	Silty Clay Till	17-20	1.4×10^{-7}
B-171	Gray Clayey Silt	55-57	2.5×10^{-6}
B-179	Gray Silty Clay	31-32.5	3.0×10^{-7}
B-179	Gray Silty Clay	51-53	7.0×10^{-7}

Taken from Peoria Disposal Co.'s RCRA Part B Application revision of 8/23/85.

TABLE 3

Laboratory Permeabilities of Shelbyville Outwash (Whitney and Associates, 1983)

Sample Number	Sample Location	Moist Density* (p.c.f.)	Permeability (cm/sec)
1	G-114	121.8	2.2×10^{-4}
2	G-114	118.4	1.1×10^{-4}
3	G-114	126.5	5.3×10^{-5}

* Remolded samples compacted to Standard Proctor Density (ASTM D-698).

Taken from Peoria Disposal Co.'s RCRA Part B Application revision of 8/23/85.

GROUND-WATER MONITORING

GROUND-WATER SAMPLING AND ANALYSIS PLAN

The Sampling and Analysis Plan (SAP) presented to the Task Force was dated March 28, 1986, and included PDC's procedures for collecting, preserving, handling, and shipping samples.

Water Level Measurements

The sampling team for PDC uses two methods of taking water level measurements. Eight of the twenty-one wells contain the QED Environmental System pneumatic static water level finder. The remaining wells are measured with an electronic water level indicator, the Johnson Water Marker. During the installation of the QED pump and water level indicator in Well G-119, the water level tubing became jammed between the pump and the well casing. This resulted in damage to the QED water level indicator and requires that the water level in Well G-119 must be taken with the Johnson Water Marker.

The Johnson Water Marker consists of a sensor, a cable (marked off in one-foot increments), a control panel (containing a buzzer) and a reel. To take the water level measurement, the cable is lowered into the well until the sensor reaches the water and the buzzer is activated. The cable is then slowly raised and lowered until the precise location of the water surface is found. The sampling personnel then pinch the cable at a point near the top of the PVC well casing. The distance between the sampler's finger and the nearest cable marker is measured with a tape and either added or subtracted from the cable marker.

To measure the water level in a well containing the QED system, the control box is connected to a tube permanently installed in the well. The system is then pressurized. The dial on the control box then indicates the number of inches above or below a reference level that was measured when the water level indicator was initially installed. The reading, taken from the control box dial, is then added or subtracted from the reference point depending on whether the level is below or above the reference point. PDC's Sampling and Analysis Plan, describes methods of water level measurement (Page III-4, III-5). This description, although detailed, needs to include additional information. The plan should (1) reference by name the two water level measuring devices used by PDC; (2) include a decontamination procedure for cleaning the sensor and cable of the electronic water level indicator after each use; and (3) a specific procedure for periodically recalibrating the QED static water level indicators used in a number of its wells. This last procedure is especially important when a pump is removed from a well for repair or replacement.

Purging

PDC uses bailers or QED Well Wizard® pumps for purging and sampling the wells in the ground-water monitoring system. PDC has two criteria for purging a well. For good-yielding wells, a minimum of five well volumes are removed before sampling. For the slow-yielding wells, three to five well volumes are removed. In addition, the sampling personnel measure pH and specific conductance after every quarter well volume and do not sample (even if five well volumes have been removed) until six consecutive readings show a stable pH and specific conductance. The pH must remain within $\pm$0.1 pH units. The specific conductance must be $\pm$100 umhos/cm and exhibit neither an increasing nor decreasing trend.

Sample Collection, Handling, Preservation and Field Measurements

PDC uses two types of equipment for sampling its wells. Ten of the wells use dedicated stainless steel and Teflon® Well Wizard® bladder pumps driven by a gasoline power compressor, which is regulated by a high pressure control box. The sample is discharged from a Teflon® discharge tube. The remaining eleven wells are sampled using a Teflon® bailer.

During the inspection, the following discrepancies were found and discussed with PDC. An addendum to the Sampling and Analysis Plan addressing these problems was sent to the Field Team Leader by PDC the week after the inspection.

(1) The plan was not clear on the order that sample bottles are to be filled after the pH and specific conductance samples are taken.

(2) In both the text and on the Table on Page IV-6, it should be stated that all samples, not just pesticides/herbicides, need to be stored at 4°C.

(3) Page IV-3 of the text gives the preservative for TOC/TOX as nitric acid, whereas, Table 4-1 lists the preservative for TOC as hydrochloric acid and TOX as sodium sulfide.

(4) On Page IV-4, nitrate-nitrite (N) is listed as being included in the unpreserved sample bottle. This is incorrect. If the facility is to analyze nitrate-nitrite (N), the sample should be taken from a bottle preserved with H_2SO_4 and analyzed within 28 days. If nitrite is to be analyzed, then the sample should be taken from the unpreserved bottle

® Well Wizard and Teflon are trademarks and will appear hereafter without the ®.

and analyzed within 48 hours.

(5) The cleaning procedure that is used between samples to clean the filtering equipment needs to be included with the filtration procedures on Page IV-7.

The plan needs to include the procedure used by PDC to clean the nondedicated bailer between wells. For wells with the Well Wizard® pumps, the plan needs to state clearly if the Teflon discharge tubing is dedicated to each well or if there is only one tube used on each well. If PDC uses only one tube, then the decontamination procedures used to clean the tubing between wells needs to be added to the plan.

Shipping and Chain-of-Custody

Two of the contract laboratories used by PDC do not maintain chain-of-custody on the samples they receive. Controls for Environmental Pollution (CEP) laboratories in Santa Fe, New Mexico analyze PDC's radiation samples. CEP does not handle samples under chain-of-custody since PDC has not requested that samples remain under custody. Residuals Management Technology (RMT) of Madison, Wisconsin analyzes PDC's TOX and TOC samples. Although RMT has an adequate tracking system, the receiving room and laboratories are open and may be left unattended during business hours.

Sample Analysis and Data Quality Evaluation

The following laboratories, which were being used by PDC at the time of the Task

Force inspection, were evaluated by various members of the U.S. EPA Region V Quality Assurance Office.

1. Controls for Environmental Pollution (CEP), Inc., Santa Fe, New Mexico. Parameters - Gross Alpha, Gross Beta, Radium.

2. Hazelton Laboratories, Madison, Wisconsin. Parameters requiring analysis by mass spectroscopy.

3. Residuals Management Technology (RMT), Madison, Wisconsin. Parameters - TOC and TOX.

4. Daily Analytical Laboratories, Peoria, Illinois. Parameters - Drinking water, pesticides, herbicides, fecal coliforms, nitrates, TOC and TOX.

5. PDC site laboratory, Pottstown, Illinois. Parameters - Metals.

Controls for Environmental Pollution, Inc.

On April 22, 1986, the Task Force conducted an on-site evaluation of Controls for Environmental Pollution (CEP), Inc., Santa Fe, New Mexico pursuant to the Task Force ground-water monitoring activities at PDC. The purpose of this evaluation was to evaluate the laboratory's facilities, personnel, equipment, chain-of-custody, analytical methodology, recordkeeping, and quality control program for the measurement of gross alpha, gross beta, radium-226 and radium-228 in ground-water samples from PDC.

The facility is divided into the main space categories of office, shipping and receiving, wet chemistry laboratory and counting rooms. Lighting, ventilation,

bench space, electrical hoods, etc. are adequate. Building security is adequate. The facility has a warning system in place which will detect undesirable levels of radioactivity in the laboratory.

The laboratory staff is adequate and competent to perform the gross alpha, gross beta, radium-226 and radium-228 analysis of ground-water samples from hazardous waste sites.

The laboratory has adequate general equipment (e.g., analytical balances, pH meters, drying ovens, desiccators, hotplates, glassware, furnaces and centrifuges) for sample preparation steps for which it was used. The laboratory uses gas-flow proportional counting systems for the measurement of gross alpha and gross beta activities, radium-226 and radium-228. The laboratory has five gas-flow proportional counting systems. The sensitivity of these systems meets the requirements of 40 CFR § 141.25 of the National Interim Primary Drinking Water Regulations. All five counters were in good working condition.

Samples do not arrive at the laboratory under custody. Custody is not maintained for samples, since PDC has not requested custody.

The laboratory has documented analytical methodology for gross alpha, gross beta, radium-226 and radium-228. Sample preparation protocol is essentially the same as depicted in Standard Methods (15th Edition) for gross alpha and gross beta. Sample preparation protocol is essentially the same as depicted in EPA 600/4-80-032 for radium-226 and radium-228. Written protocols were being followed by the bench analyst.

The laboratory has a formal paper trail for each sample. Log books are maintained at the receiving room, preparation bench, and the counting instruments. A final data file is maintained for each client. The file was reviewed for traceability of paper trail. The file was found to be complete. Analysts do not initial bench sheets for loading and unloading counting instruments, nor do they initial bench sheets when recording activity counts.

The laboratory has a documented quality assurance plan. A Quality Assurance Office is also in place. Quality control records were also available for review. The laboratory participates in the U.S. EPA radiochemistry cross-check and performance (blind) sample program. Results of last performance of record at time of the on-site inspection are listed in Table 4.

The laboratory had unacceptable performance for radium-228 in the August 9, 1985, performance study. The laboratory also had unacceptable performance in the radium-226 for the December 12, 1985, cross-check study.

Hazelton Laboratories

On August 21, 1986, the Task Force conducted an on-site inspection of Hazelton Laboratories America, Inc., Madison, Wisconsin. The purpose of the brief visit was to determine whether the laboratory has technical capabilities to analyze water samples for volatile organics and to determine whether the laboratory data are of acceptable quality.

Based on the observations made during the on-site evaluation the Task Force concluded that the Hazelton Laboratories America, Incorporated, was technically competent to analyze water samples for volatile organics listed in the Hazardous Substances List (HSL) of U.S. EPA Contract Laboratory Program (CLP) protocol and data were of good quality.

TABLE 4

CROSS-CHECK AND PERFORMANCE (BLIND) SAMPLE RESULTS FOR RADIATION SAMPLES AT CEP

	DATE	RESULT (pCi/l)	KNOWN VALUE (pCi/l)	DEVIATION	PERFORMANCE	TYPE STUDY
Gross Alpha	08/09/85	31	32	- .34	ACCEPTABLE	PERFORMANCE
Gross Beta	08/09/85	64.33	72	- 2.65	ACCEPTABLE	PERFORMANCE
Gross Alpha	11/22/85	9	10	- .34	ACCEPTABLE	CROSS CHECK
Gross Beta	11/22/85	14	13	+ .34	ACCEPTABLE	CROSS CHECK
Radium-226	08/09/85	3.56	4.1	- 1.54	ACCEPTABLE	PERFORMANCE
Radium-228	08/09/85	3.16	6.2	- 5.84	UNACCEPTABLE	PERFORMANCE
Radium-226	12/13/85	10.63	7.10	+ 5	UNACCEPTABLE	CROSS CHECK
Radium-228	12/13/85	5.8	7.3	- 2.36	ACCEPTABLE	CROSS CHECK

Comments on the On-Site Evaluation

1. The Hazelton Laboratory has extensive experience in analyzing U.S. EPA Superfund site samples for volatile and semi-volatile organics by Gas Chromatography/Mass Spectrometry (GC/MS) techniques, pesticides and polychlorinated biphenyls by GC-Electron Capture Detector techniques, and dioxins by GC/MS selected ion monitoring techniques using the U.S. EPA CLP protocols. Each year the laboratory analyzes several hundreds of water samples for HSL volatile organics.

2. The laboratory analyzed a total of about 20 water samples from PDC for HSL volatile organics.

3. The laboratory facilities are adequate. It is equipped with sophisticated GC/MS instruments, several GC instruments, and several data acquisition and processing units.

4. The laboratory has a computer to keep track of all samples and all projects.

5. The laboratory chain-of-custody, data collection, reduction validation and reporting procedures are acceptable.

Residuals Management Technology

On August 22, 1986, the Task Force performed an on-site evaluation of the Residuals Management Technology, Inc. (RMT), Madison, Wisconsin.

The purpose of the evaluation was to establish whether or not RMT's standard operating procedures produce data of acceptable quality. The laboratory was evaluated for Total Organic Carbon (TOC) and Total Organic Halides (TOX).

The overall performance of the laboratory is acceptable for TOC and TOX parameters. The laboratory data are usable for the client's self-monitoring activities. The following observations were made during the brief on-site visit:

1. The laboratory TOC test procedures and quality control practices are acceptable.

2. The laboratory TOX test procedures and quality control practices are acceptable.

3. The laboratory instruments are suitable for the analysis of TOC and TOX.

4. The laboratory has an adequate sample tracking system but had no chain-of-custody protocol. The sample receiving room is open during business hours and may be left unattended. Occasionally, laboratory doors do not appear to be locked during business hours. This is partly due to the physical lay-out of the laboratory, since the rooms open on a hall rather than being interconnected. This problem was discussed with the laboratory manager.

Daily Analytical Laboratories

On April 29, 1986, the Task Force performed an on-site evaluation of the Daily Analytical Laboratories (DAL), Peoria, Illinois.

The purpose of the evaluation was to establish whether or not DAL's standard operating procedures produce data of acceptable quality for the following parameters: nitrates, total organic carbon, total organic halides, pesticides, and herbicides. DAL routinely analyzes U.S. EPA water pollution performance evaluation samples to demonstrate its analytical capabilities.

Based on the system audit, the Task Force determined that DAL had an acceptable quality assurance/quality control program and it produced data of acceptable quality. The laboratory has adequate facilities and qualified personnel. It has methodology which is appropriate for the parameters of interest. It has participated in one performance evaluation series WP (water pollution) and two WS (drinking water) series provided by U.S. EPA's Environmental Monitoring and Support Laboratory in Cincinnati, Ohio. Results have been variable for pesticides and acceptable for herbicides. The Task Force had data for only three sets of performance samples and all the parameters were not done on each set. It is, therefore, difficult to determine whether the variable pesticide results are indicative of poor analytical performance, or simply the laboratory's unfamiliarity with analyzing performance samples.

The laboratory has been certified by the Illinois Department of Public Health for microbiological parameters. This certification program has been approved by Region V of U.S. EPA.

Peoria Disposal Company On-Site Laboratory

On April 28 and 29, 1986, the Task Force performed an evaluation of PDC's on-site laboratory.

The purpose of the evaluation was to establish whether or not PDC's standard operating procedures produce data of acceptable quality. The parameters of interest were silver, cadmium, chromium, lead, iron, manganese, copper, nickel, zinc, sodium, calcium, magnesium, potassium, barium, mercury, arsenic, and selenium. PDC was requested to analyze U.S. EPA water pollution performance evaluation samples from U.S. EPA Region V to demonstrate its analytical capabilities.

U.S. EPA provided PDC with one set of performance samples, but PDC did not return the data. They were also provided Environmental Monitoring and Support Laboratory-Cincinnati (EMSL-CI) performance samples but those data were not available.

The Task Force makes the following observations:

Observation 1 : The construction of the instrument calibration curve for each parameter, which consisted of a blank and three or more standards, was generated on a quarterly basis by atomic absorption technique.

Recommendation: The construction of the instrument calibration curve for a parameter, which consists of a blank and three or more standards, should be generated when that parameter is to be analyzed by atomic absorption technique.

Observation 2 : The daily instrument calibration curve for each parameter by atomic absorption technique consisted of a blank and two standards.

Recommendation : Modify the present procedure for construction of instrument calibration curves used for the quantitation of metals parameters by atomic absorption technique. The instrument calibration curve should consist of a blank and three to five standards.

The laboratory should have a systematic acceptance criterion for the linearity of the standard calibration curve for metals by atomic absorption. The correlation coefficient should be calculated and documented after calibration. The correlation coefficient should meet a specific criterion (e.g., $\geq$ 0.995). The laboratory should establish this specific criterion based on their past standard calibration data.

Observation 3 : The laboratory did not have a written quality assurance plan.

Recommendation : The laboratory should prepare and follow a written quality assurance plan.

Observation 4 : The laboratory has made modification in the following methods:

EPA 206.2	Arsenic
EPA 218.1	Chromium
EPA 258.1	Potassium
EPA 273.1	Sodium
EPA 239.1	Lead
EPA 270.2	Selenium

Recommendation : PDC should justify these modifications of methods and provide references relevant in the scientific literature.

MONITORING WELLS

At the time of the inspection, PDC had 18 wells in its RCRA ground-water monitoring network, plus 3 more in its Illinois solid waste disposal program. All wells except for G-123 and G-124 (Figure 6) were located around the perimeter of the site near PDC's property line. In November 1985, PDC certified that this system was in compliance with RCRA interim status ground-water monitoring requirements.

Well History

PDC began installing its ground-water monitoring system in June 1980 (Figure 6). These first wells were completed in the shallow till of the Illinoian Drift and most did not yield water reliably. The three wells that did yield water were G-106, G-107, and G-108. These three have been incorporated into the Illinois solid waste disposal permit and are still being used. The other wells were destroyed.

Additional deeper wells were completed in the Shelbyville Outwash during 1981 (G-109, G-110, G-113), 1982 (R-113, a replacement for the damaged G-113), 1983 (G-114 through G-120), and 1985 (G-121 through G-128). Only these deeper, Shelbyville wells are included in the RCRA program.

Wells G-114, R-118, and G-117 have been designated upgradient wells by PDC. Well G-127 is used only for water level measurements due to a bent casing. All other wells are designated as downgradient wells by PDC.

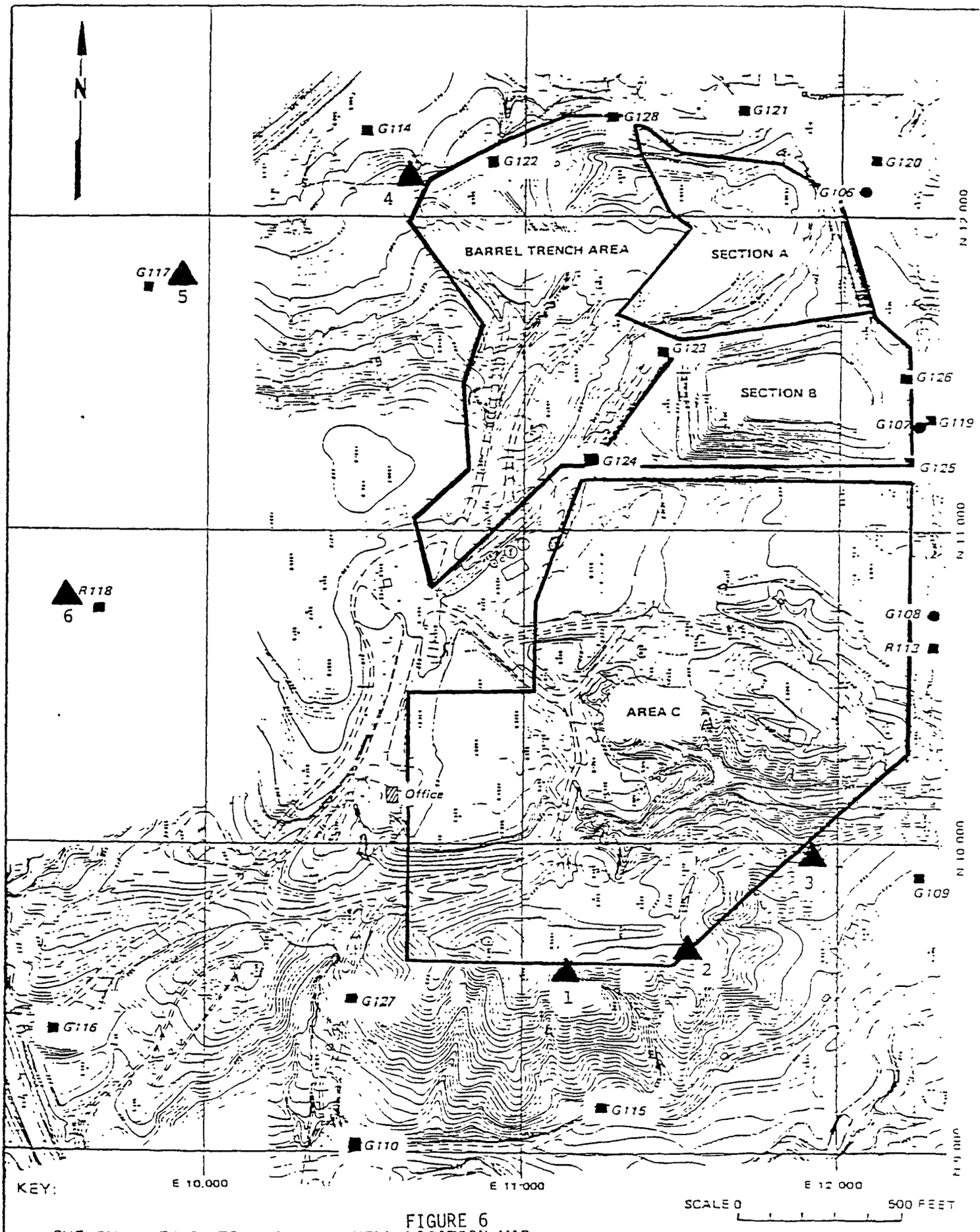


FIGURE 6
WELL LOCATION MAP

Well Locations

PDC defines its waste management area as including the Barrel Trench Area, Section A landfill, Section B landfill, and Area C. However, Area C is being reserved for future expansion and does not contain hazardous waste. Therefore, it is the Task Force's view that the waste management boundary should only circumscribe the Barrel Trench Area, Section A, and Section B. It follows, then, that the downgradient limit of the present waste management area should be from the southwest corner of Section B to the eastern facility boundary, north to the northeastern facility corner, then west to the northwestern facility corner (Figure 6). Along this proposed point-of-compliance line, there are several lengthy segments between monitoring wells:

1. Between Wells G-124 and G-125 there is an 1100 ft. gap
2. Between Wells G-126 and G-120 there is a 750 ft. gap
3. Between Wells G-120 and G-121 there is a 450 ft. gap
4. Between Wells G-128 and G-122 there is a 400 ft. gap

Because of the significant net thickness of the noncontinuous permeable sand identified in the Illinoian Drift on boring logs, there is a high probability that narrow downward migration pathways exist through the Illinoian Drift to the Shelbyville Outwash. Therefore, the Task Force recommends reducing the spacing between wells by installing additional monitoring wells in these four segments along the downgradient limit of the waste management area.

PDC also has a number of superfluous wells near the perimeter of Area C (G-108, G-109, G-110, R-113, and G-115). Whereas these wells are valuable for piezometric information, they are too far from the current waste management boundary to be of use in the interim status indicator evaluation program (G-108 is 500 feet

from the closest regulated unit (Section B), G-109 is 1300 feet away, G-110 is 2500 feet away, R-113 is 660 feet away, and G-115 is 2100 feet away). When Area C is developed, wells should be placed at the point of compliance for each unit as it is brought online.

Based upon earlier work by PDC consultants, IEPA, U.S. EPA, Region V, and its own geological review of the PDC site, the Task Force contends that perched water table zones exist beneath the PDC site in discontinuous or interfingering sand bodies that are part of the Illinoian Drift. These shallow water-bearing sands could be a conduit for contaminants to migrate, and monitoring of these sands is necessary in an attempt to immediately detect any contaminant releases from disposal units. Some of this sand at PDC is presently being monitored by three shallow wells which are sampled as a condition of PDC's Illinois solid waste disposal permit. The Task Force strongly recommends that other shallow waterbearing sand zones in the Illinoian Drift be monitored as they are discovered. For the present, monitoring could continue under the solid waste permit, but eventually should be replaced with RCRA monitoring.

Well Construction

At PDC, ground-water monitoring wells were installed at five different times between 1980 and 1985. However, despite the lapses of time, PDC records indicate that the well construction techniques remained the same over the five years, except that well casing and screen materials in pre-1984 wells were PVC and in post-1984 wells were galvanized steel and stainless steel.

Each well in the ground-water monitoring system at PDC was bored, using the rotary drill method, to a depth corresponding to the bottom of the well screen or lower. The borehole was flushed with water and then the screen, with a bottom cap, and the well casing were installed. Coarse-grained filter material (pea gravel) was then placed around and above the screen. A foot of soil backfill was placed above the gravel, followed by a foot of bentonite pellets. Above the bentonite pellets, a mixture of cement and bentonite grout was added to the annular space to a point three feet below the surface. In this three-foot space, a metal well-protection pipe was placed over the well casing stick-up and held in place by a bentonite/soil seal. A typical sketch of a well installation is shown in Figures 7 and 8. Construction data are summarized in Table 5.

When completed, the wells were flushed to remove fine-grained material and then further developed as follows:

(1) Wells were pumped for several hours to remove as much water as possible.

(2) The well was allowed to recover taking from 1/2 day to two days.

(3) The well was again evacuated and measurements for pH and conductivity were taken at one-gallon intervals.

(4) When the pH and specific conductivity values were stable, the well was considered developed.

FIGURE 7
TYPICAL SKETCH OF MONITORING WELLS
INSTALLED FROM 1980 to 1983 (Wells G-106 - G-120)

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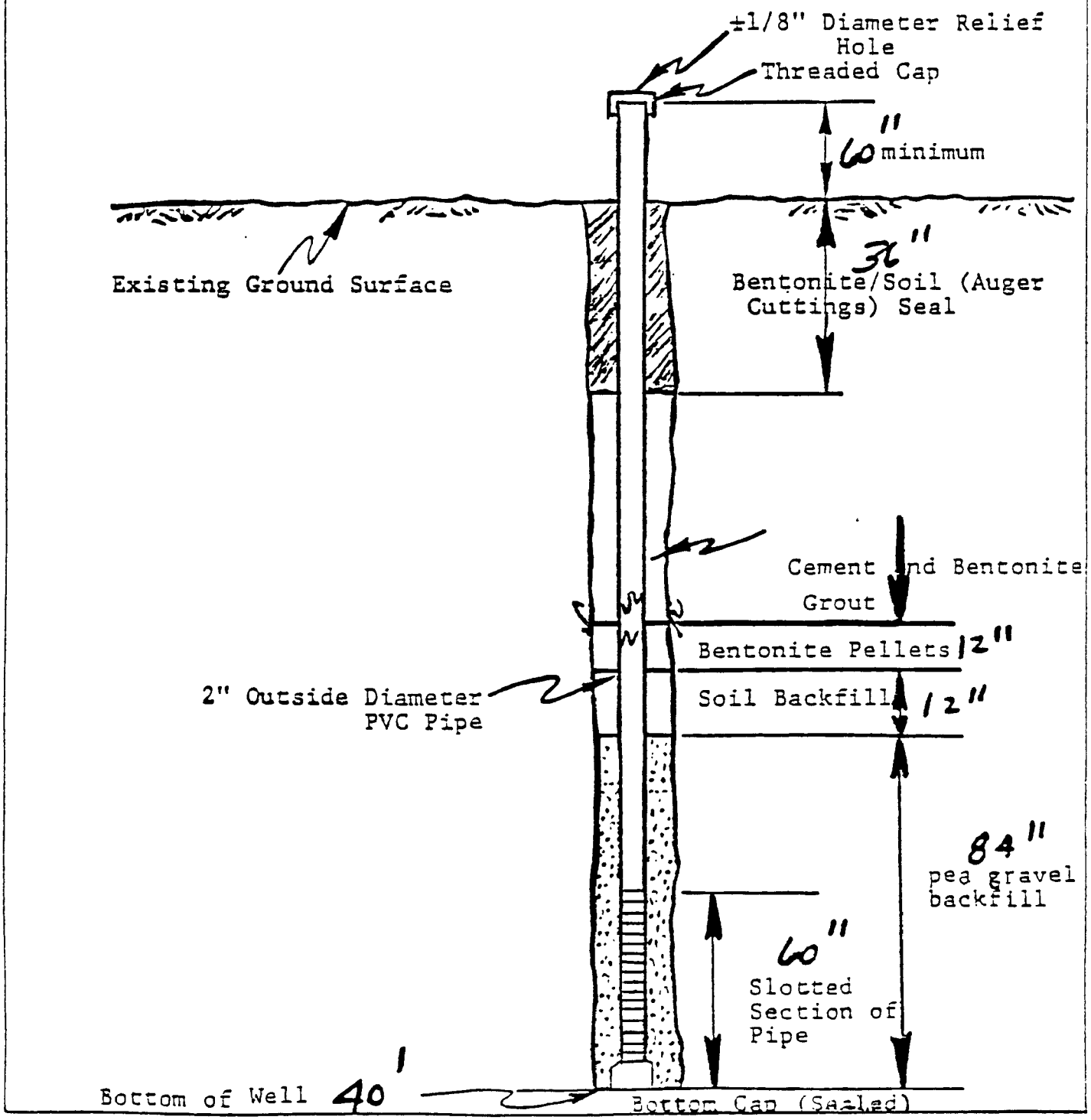
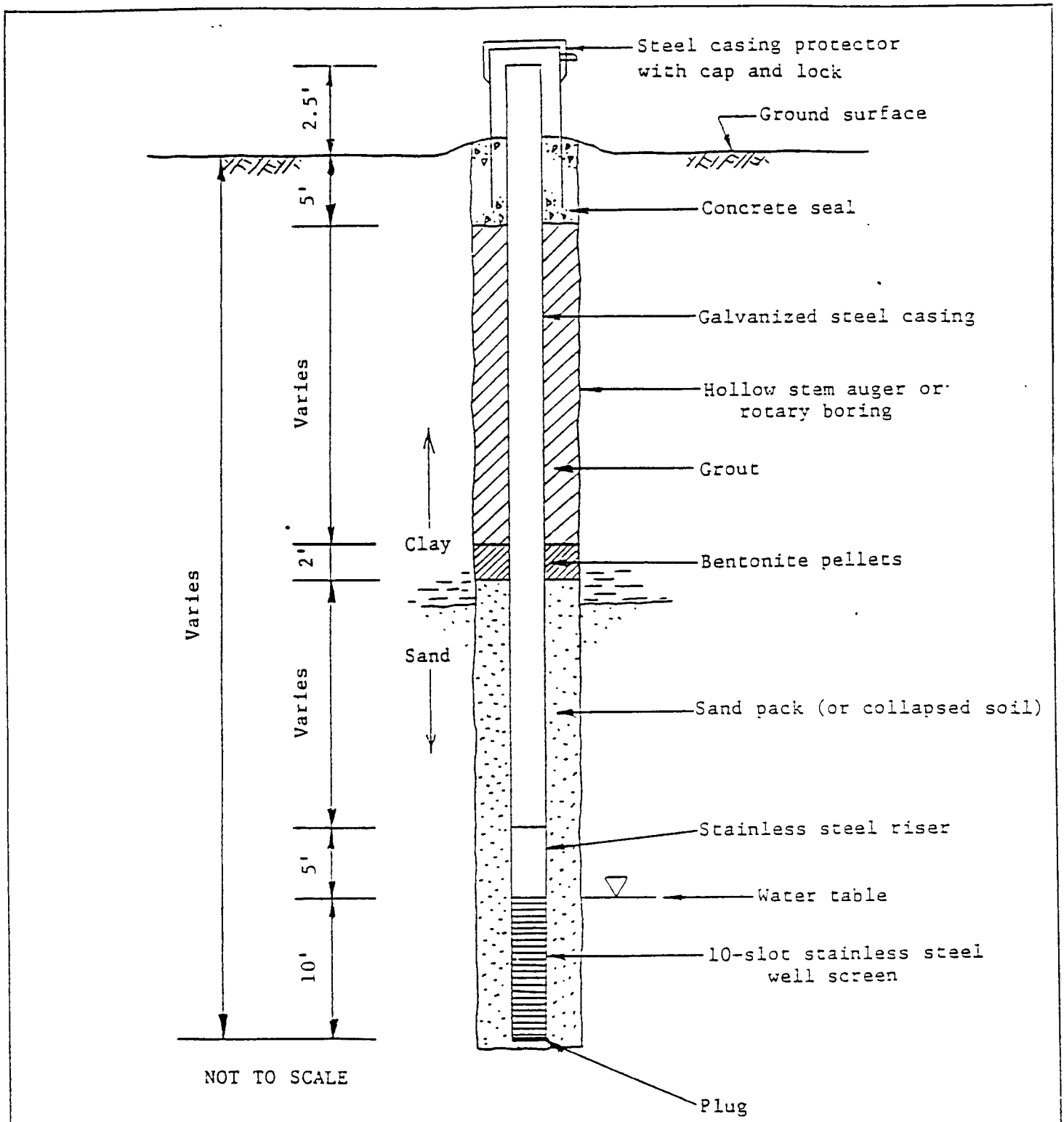
TYPICAL SKETCH OF MONITORING WELL INSTALLATION
PEORIA DISPOSAL LANDFILL FACILITY
PEORIA COUNTY, ILLINOIS



HARZA ENVIRONMENTAL SERVICES, INC.

FIGURE 8
TYPICAL SKETCH OF MONITORING WELLS
INSTALLED IN 1985 (Wells G-121 THROUGH G-128)



NOTE: Final well construction details to be based on subsurface conditions.

TABLE 5

CONSTRUCTION DATA FOR PDC'S MONITORING WELLS[a]

Well I.D.	DATE COMPLETED	ELEVATIONS (FEET)[b] TOP OF PLASTIC PIPE	GROUND BASE	WELL BOTTOM	SCREEN LENGTH (FEET)	CONST. MAT. (c)	Dedicated QED PUMP (d)	QED LEVEL SENSOR (e)
G-106	6/23/80	614.6	611.3	590.2	5	PVC	N	N
G-107	6/23/80	620.3	617.4	577.6	5	PVC	N	N
G-108	6/30/80	618.0	615.2	573.7	5	PVC	N	N
G-109	6/30/81	518.4	515.1	446.4	7	PVC	N	N
G-110	6/29/81	492.1	489.1	451.6	3	PVC	N	N
R-113	5/07/82	611.5	608.2	416.0	20	PVC	Y	Y
G-114	5/27/83	522.4	518.0	463.9	5	PVC	Y	Y
G-115	3/17/83	508.2	504.8	449.6	5	PVC	N	N
G-116	3/28/83	512.4	509.5	464.3	5	PVC	N	N
G-117	/83	581.4	579.2	431.5	20	PVC	Y	Y
R-118	/83	590.2	588.0	439.5	20	PVC	Y	Y
G-119	/83	620.2	617.2	423.8	20	PVC	Y	Y
G-120	/83	613.9	611.3	427.3	20	PVC	Y	Y
G-121	7/16/85	609.0	605.7	463.2	5	SS	Y	N
G-122	6/18/85	607.1	604.8	466.1	5	SS	N	N
G-123	7/24/85	632.7	630.3	462.8	5	SS	N	N
G-124	7/18/85	650.8	648.3	463.6	5	SS	N	N
G-125	7/08/85	615.8	613.4	461.3	5	SS	Y	Y
G-126	7/12/85	611.7	609.2	451.1	5	SS	Y	N
G-127	7/22/85	554.8	552.4	451.8	5	SS	N	N
G-128	7/19/85	594.0	591.4	463.6	5	SS	Y	Y

TABLE 5 (cont'd)

* NOTE: (a) Source: PDC's Sampling and Analysis Plan and other information supplied by PDC.

(b) Elevations are given relative to mean sea level

(c) Construction material of screen: PVC - polyvinyl chloride SS - stainless steel. All well casings are 2 inches inner diameter

(d) QED Model T-2000 Pump (stainless steel with Teflon bladder)

(e) QED Static water level sensor

NOTE: Wells G-106, G-107, and G-108 are in the till. All remaining wells are in the Shelbyville Outwash.

The Task Force concludes that the records kept at PDC indicate that good well construction techniques were used in constructing these wells. The newer wells (G-121 through 128) have followed the recommendations of U.S. EPA's RCRA Ground-Water Monitoring Technical Enforcement Guidance Document and have incorporated chemically inert stainless steel in the sample-contact portions of the wells. The Task Force recommends PDC continue using inert materials in its new or replacement wells since PDC has historically accepted and disposed of large quantities of halogenated organic wastes.

TASK FORCE SAMPLE COLLECTION, HANDLING PROCEDURES, AND ANALYTICAL RESULTS

During the inspection, samples were collected by a U.S. EPA contractor to determine if the ground water contains hazardous waste constituents or other indicators of contamination. Water was collected from 19 of PDC's 21 ground-water monitoring wells. Well G-127 is used by PDC only for water level measurement, and Well G-116 is south of a ground-water divide and thus is not impacted by the landfill operations.

SAMPLE COLLECTION AND HANDLING

Ten of the wells were equipped with Well Wizard pumps, while the remaining wells were sampled with Teflon bailers cleaned at U.S. EPA contractor's laboratory. The following procedures were used to collect samples:

1. U.S. EPA sampling contractor monitored open well head for chemical vapors and radiation.

2. The U.S. EPA contractor measured depth to ground water using either a stainless steel tape or the Well Wizard static water level indicator.

3. U.S. EPA's field team member then calculated the height of the water column from the depth-to-water measurement and well depth (from well construction information).

4. The field team member then calculated water volume using the height of water column and well radius.

5. Wells were then either purged to dryness or purged until at least three well volumes were removed.

6. Wells were sampled immediately after three volumes were removed or allowed to recover overnight if purged dry.

7. U.S. EPA's contractor collected sample aliquots for field measurements (pH, water temperature, specific conductance).

8. After collecting field measurements, sample containers were filled in the order shown on Table 6. The volatile organic samples were collected by filling the sample container directly from the bailer. At wells with QED pumps, a small beaker was filled first, and then the sample containers were filled.

9. Four wells, G-106, G-107, G-122, and G-123, were poorly-recharging wells and required that the sampling team return on more than one day to obtain sufficient water to fill all bottles. Wells G-106 and G-123 were purged and sampled over a three-day period and Wells G-107 and G-122 were purged and sampled over a four-day period (Table A-3).

10. Samples were placed in insulated containers filled with ice.

TABLE 6

PREFERRED ORDER OF SAMPLE COLLECTION

BOTTLE-TYPE, AND PRESERVATIVE LIST

PARAMETER	BOTTLE-TYPE	PRESERVATIVE
1. Volatile organics		
Purge and Trap	2 - 60 ml VOA vials	Cool 4°C No head space
Direct Inject	2 - 60 ml VOA vials	Cool 4°C No head space
2. Purgeable Organic Carbon (POC)	1 - 60 ml VOA vial	Cool 4°C No head space
3. Purgeable Organic Halogens (POX)	1 - 60 ml VOA vial	Cool 4°C No head space
4. Extractable organics	4 - 1 qt. amber glass	Cool 4°C
5. Total metals	1 qt. plastic	HNO_3, Cool 4°C
6. Total Organic Carbon (TOC)	4 oz. glass	H_2SO_4 Cool 4°C
7. Dioxin	1 - 1 qt. amber glass	Cook 4°C
8. Total Organic Halogens (TOX)	1 qt. amber glass	Cool 4°C No head space
9. Phenols	1 qt. amber glass	H_2SO_4 Cool 4°C
10. Cyanide	1 qt. plastic	NaOH Cool 4°C
11. Sulfate, chloride, and nitrate	1 qt. plastic	Cool 4°C
12. Nitrate and ammonia	1 qt. plastic	H_2SO_4 Cool 4°C

11. The U.S. EPA contractor took the samples to a staging area, within two hours after sampling, where measurements were taken for turbidity. In addition, phenols, cyanide, nitrate, TOC, total metals, and ammonia samples were preserved as shown in Table 6.

12. PDC requested and was given split samples from seven of the nineteen wells that the Task Force sampled. These wells were G-113, G-114, G-117, R-118, G-120, G-121, and G-123. Duplicate volatile organic analysis (VOA) samples and split samples were then collected by the U.S. EPA contractor and given to PDC.

13. All samples were collected from wells by the U.S. EPA contractor, with the exception of the parameters taken from Wells G-106 and R-113 on April 23. These samples were taken by PDC as a demonstration of PDC's sampling technique. The U.S. EPA contractor's Teflon bailer was used, instead of PDC's equipment.

The U.S. EPA contractor also prepared and submitted to the contract laboratories three types of blanks during the inspection period. These blanks were submitted with no distinguishing labels or markings. A field blank was prepared on April 22, 1986, by pouring high performance liquid chromatography (HPLC) water into the appropriate containers near R-118 after the well was sampled. One set of sample containers was filled with HPLC water at the U.S. EPA contractor's laboratory, brought to the site but not opened, and submitted for analysis for each parameter as a trip blank. The trip blank was shipped with samples collected on April 24, 1986. On April 22, a Teflon bailer was rinsed with HPLC water and the water collected in the appropriate containers for submittal to the laboratory as an equipment blank. This rinsing procedure was conducted near the U.S. EPA contractor's supply truck, which was parked near the landfill office/laboratory building.

ANALYTICAL RESULTS FOR TASK FORCE SAMPLES

Field measurements were made by the U.S. EPA contractor at the time of sampling for pH, specific conductance, and turbidity. Laboratory analysis results were obtained from two U.S. EPA contractor laboratories participating in the Contract Laboratory Program. Specified organic compounds were analyzed at Compuchem Laboratories, Inc., and metals and other parameters at Centec Laboratories. Table A-1 gives a summary of analytical techniques and reference methods, by parameter, for sample analyses and Table A-2 gives the detection limits for all organic compounds.

Standard quality control measures were taken including: (1) the analysis of field and laboratory blanks to allow distinction of possible contamination due to sample handling, (2) analysis of laboratory-spiked samples to estimate accuracy, (3) analysis of both laboratory and field duplicates to estimate precision, and (4) the review and interpretation of the results of these control measures.

Specific Organic Analytical Results

Of the 19 wells sampled during the inspection, five samples contained organic compounds above the method detection limit. These data are summarized in Table A-4. One well, G-123, contained 1,1-dichloroethane at 16.0 ug/l. The other four wells all contained methylene chloride. These were Wells G-114 (5.1 ug/l), G-124 (Dup) (5.0 ug/l), G-125 (7.1 ug/l), and G-128 (32.0 ug/l). Methylene chloride was found above the detection limit in only one of the two samples taken from Well G-124.

The U.S. EPA contractor took duplicate samples from well G-120. Neither sample contained methylene chloride above the detection limit. A number of historical samples taken by PDC have contained methylene chloride for this well.

Methylene chloride was detected in two laboratory blanks at 2.05 ug/l and 2.65 ug/l (which is better than the 5.0 ug/l that the laboratory is required to meet). Four laboratory blanks contained acetone at concentrations of 2.35 ug/l to 10.2 ug/l. This raises questions about acetone and methylene chloride contamination in the laboratory and makes low-level positive results for these compounds unreliable. Quality control on the remaining volatile compounds was acceptable, including 1,1-dichloroethane, and data are considered semi-qualitative.

None of the other organic compounds shown in Table A-2 were positively identified in any of the samples. Overall, the semi-volatile (including Acids and Base/Neutrals) data are acceptable and should be considered semi-quantitative, except for two samples. Sample spikes for Wells G-123 and G-120 (Dup) recoveries were low and unacceptable for two phenol compounds. The pesticide quality control results show that the data should be considered unreliable with an unknown probability of false negatives. The laboratory performed well on quality control measures for herbicides and the data should be considered qualitative with acceptable probability of false negatives. The dioxin data should be considered unreliable. The laboratory has had significant problems in the analysis of performance evaluation samples. Also, the extraction of these samples (Wells G-106, G-108, and G-115) was performed after the 15-day holding time.

Metals Analytical Results

With the exception of lead in well (G-124), the only metals found in high concentrations were those that are commonly found in ground water (aluminum, calcium,

iron, magnesium, potassium, and sodium). For Well G-124, which was sampled in duplicate, both results for lead were slightly above the limit of 50 ug/l given in 35 Ill. Adm. Code Part 725 Appendix C (40 CFR Part 265, Appendix III). Metals results are summarized in Table A-5 of Appendix A.

With only a few exceptions, the laboratory analysis of the metals data quality objectives and detection limits set by the Task Force were met. Therefore, for all samples except those listed below, the metals results are acceptable and quantitative. The laboratory had a number of problems with matrix spike recovery on three of the four furnace metals (thallium, antimony, and chromium). This resulted in a low bias and higher detection limits for antimony (Well G-106), cadmium (Well G-106), and thallium (G-119). Cadmium analysis for samples from Wells G-108 and G-107, as well as lead analysis for Wells G-108, G-115, G-122, and G-128, which were performed by the method of standard addition, were below an acceptable correlation coefficient. These data are therefore considered unreliable and the identification of cadmium and lead in these wells is uncertain. The chromium and manganese recoveries for low-level linearity range checks were very low. Chromium data below 261 ug/l (Wells G-106 (21 ug/l), G-107 (8.0 ug/l), G-108 (13.0 ug/l), G-110 (12.0 ug/l), R-113 (15.0 ug/l), G-115 (25.0 ug/l), G-120 (Dup) (13.0 ug/l), G-123 (41.0 ug/l), G-124 (22 ug/l), G-124 (Dup)(26.0 ug/l), G-128 (1.0 ug/l)) should be considered to be biased low with unacceptable probability of false negatives. Manganese data below 348 ug/l (Wells G-108 (189 ug/l), G-109 (22.0 ug/l), G-110 (49.0 ug/l), R-113 (4.0 ug/l), G-115 (287 ug/l), G-117 (3.0 ug/l), G-118 (7.0 ug/l), G-119 (152 ug/l), G-121 (89 ug/l), G-122 (59 ug/l), G-124 (169 ug/l), G-124 (Dup) (163 ug/l), G-125 (38 ug/l), G-126 (134 ug/l), and field blanks (5.0 ug/l)) should be considered to be biased low by about 30 percent.

No contamination was reported for laboratory blanks. The trip, equipment, and field blanks showed metal contamination involving one or more of the following: aluminum, calcium, iron, manganese, and sodium.

Inorganic And Indicator Parameters

Field measurements were conducted by U.S. EPA's sample contractor for pH, specific conductance, temperature, and turbidity. The first three parameters were taken at the well location, whereas, the turbidity sample was taken back to the contractor's sample preparation area. Data for the field parameters and the remaining inorganic compounds are given in Table A-6. For four wells (G-106, G-114, G-122, and G-123) the turbidity results were not recorded in field log books supplied by the U.S. EPA contractors.

A comparison of the Task Force sample results for Wells G-106 through G-120 (Table A-7) and the facility data collected for pH, TOC, TOX, and specific conductance is given in Table A-7. The results compare very well for pH, but for TOC, the U.S. EPA data are all lower than the facility's results. The specific conductance data compared well with only a few exceptions in which the PDC data were higher. Both PDC's and U.S. EPA's TOX data varied from well to well.

Nine samples could not be analyzed for POC and POX because the sample containers were broken in shipment. These were POC samples for Wells G-107, G-108, G-110, G-115, G-119, and G-122. Also, POX bottles broken were from Wells G-107, G-115, and G-123.

No laboratory blank contamination was reported for any inorganic or indicator parameters. TOX contamination (7.4 ug/l) was found in the field blank, while sulfate contamination (200 ug/l) was found in the equipment blank. All reported detection limits are those required by the contract or lower except for nitrate-nitrogen in the sample from Well G-124 (167 times the detection limit) and cyanide in Well R-113 and G-125 (twice the detection limit). There are no required contract detection limits for bromide and nitrite-nitrogen.

Analyses of POC and nitrite samples were performed after the contract required holding time. POC samples were analyzed 12 to 14 days after they were taken. The contract required holding time is 7 days. Four nitrite-nitrogen samples were analyzed 24 to 27 days after collection instead of the required 48 hours.

The inorganic and indicator parameter data should be considered acceptable and quantitative for cyanide, ammonia-nitrogen, total phenols, and TOC. POX results for Wells G-108, G-110, R-113, G-119, G-122, G-125, G-126, the equipment blank and the trip blank should be considered semi-quantitative because of improper calibration procedures. The remaining POX results are acceptable and qualitative. The data should be considered acceptable and semi-quantitative for nitrate-nitrogen, chloride, sulfate, TOX, bromide, and nitrite-nitrogen. The POC data should be considered to be unreliable due to the lack of a performance evaluation sample or any other independent calibration verification. The nitrate-nitrogen, chloride, sulfate, bromide, and nitrite-nitrogen data (all ion chromatography data) should be considered acceptable, but unreliable for enforcement uses because of the inability to verify the analytical laboratory's claim that QC analyses were performed daily in conjunction with the ion chromatography analyses.

A P P E N D I X A

ANALYTICAL TECHNIQUES AND TABULATED RESULTS OF TASK FORCE SAMPLES

PEORIA DISPOSAL COMPANY, POTTSTOWN, ILLINOIS

Table A-1

Sample Preparation and Analysis Techniques and Methods

Parameter	Preparation Technique	Analysis Technique	Method Reference
Conductance	None	Electrometric, Wheatstone Bridge	Method 120.1 (a)
pH	None	Potentiometry	Method 150.1 (a)
Turbidity	None	Nephelometric	No reference
POX	None	Purgable combusted, Microcoulometry	EPA 600/4-84-008
TOX	Carbon absorption	Carbon combusted, Microcoulometry	Method 9020 (b)
POC	None	Purgable combusted, Non-dispersive Infrared	No reference
NPOC	Acidify and purge	Liquid combusted, Non-dispersive Infrared	Method 415.1 (a)
Ammonia	Particulates settled	Phenolate Colorimetry of supernatant	Method 350.1 (a)
Chloride	Particulates settled	Mercuric Precipitation Titration of supernatant	Method 9252 (b)
Nitrate	Particulates settled	Brucine Sulfate Colorimetry of supernatant	Method 9200 (b)
Sulfate	Particulates settled	Barium Sulfate Turbidimetry of supernatant	Method 9038 (b)
Cyanide	Manual distillation	Pyridine Barbituric Acid Colorimetry	CLP Method (c)
Phenol	Manual distillation	Ferricyanide 4-Aminoantipyrine Colorimetry	Method 420.1 (a)
Mercury	Wet digestion for dissolved and total	Cold Vapor Atomic Absorption Spectroscopy	CLP Method
As, Pb, Se and Tl	Acid digestion for total	Furnace Atomic Absorption Spectroscopy	CLP Method
Other Elements	Acid digestion for total	Inductively Coupled Plasma Emission Spectroscopy	CLP Method
Volatiles	Purge and trap	Gas Chromatography with Electron Capture Detection	CLP Method
	Direct injection	Gas Chromatography - Mass Spectroscopy or	CLP Method
		Gas Chromatography with Flame Ionization Detection	CLP Method
Semi-volatiles	Methylene chloride extraction	Gas Chromatography - Mass Spectroscopy	CLP Method
Pesticides/PCB	Methylene chloride/hexane extraction	Gas Chromatography with Electron Capture Detection	CLP Method
Herbicides	Diethylether extraction/methylation	Gas Chromatography with Electron Capture Detection	Method 8150 (b)

a) Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020.
b) Test Methods for Evaluating Solid Wastes, SW-846.
c) Contract Laboratory Program, IFB methods.

Table A-2
LIMITS OF QUANTITATION FOR ORGANIC COMPOUNDS

Base/Neutral Compounds	Limit of Quantitation (µg/ℓ)	Acid Compounds	Limit of Quantitation (µg/ℓ)	Pesticides/PCBs	Limit of Quantitation (µg/ℓ)
Acenaphthene	10	2,4,6-Trichlorophenol	10	Aldrin	0.05
1,2,4-trichlorobenzene	10	Parachlorometacresol	20	alpha-BHC	0.05
Hexachlorobenzene	10	2-Chlorophenol	10	beta-BHC	0.05
Hexachloroethane	10	2,4-Dichlorophenol	10	gamma-BHC	0.05
bis(2-Chloroethyl)ether	10	2,4-Dimethylphenol	10	delta-BHC	0.05
2-Chloronaphthalene	10	2-Nitrophenol	10	Chlordane	0.5
1,2-Dichlorobenzene	10	4-Nitrophenol	50	4,4'-DDD	0.1
1,3-Dichlorobenzene	10	2,4-Dinitrophenol	50	4,4'-DDE	0.1
1,4-Dichlorobenzene	10	4,6-Dinitro-o-cresol	50	4,4'-DDT	0.1
2,4-Dinitrotoluene	10	Pentachlorophenol	50	Dieldrin	0.1
2,6-Dinitrotoluene	10	Phenol	10	Endosulfan I	0.05
1,2-Diphenylhyurazine[a]	NA*	Benzoic acid	50	Endosulfan II	0.1
Fluoranthene	10	4-Methylphenol (p-cresol)	10	Endosulfan sulfate	0.1
4-Chlorophenyl phenyl ether	10	2-Methylphenol (o-cresol)	10	Endrin	0.1
4-Bromophenyl phenyl ether	10	2,4,5-Trichlorophenol	50	Endrin aldehyde	0.1
bis(2-Chloroisopropyl)ether	10			Heptachlor	0.05
bis(2-Chloroethoxy)methane	10			Heptachlor epoxide	0.05
Hexachlorobutadiene	10	Volatile Compounds		Toxaphene	1
Hexachlorocyclopentadiene	20			Methoxychlor	0.5
Isophorone	10	Benzene	5	Endrin ketone	0.1
Naphthalene	10	Bromodichloromethane	5	PCB-1016	.5
Nitrobenzene	10	Bromoform	5	PCB-1221	1
N-nitrosodimethylamine	NA	Bromomethane	10	PCB-1232	1
N-nitrosodiphenylamine[b]	40	Carbon Tetrachloride	5	PCB-1242	0.5
N-nitrosodi-n-propylamine	20	Chlorobenzene	5	PCB-1248	0.5
Bis(2-Ethylhexyl)phthalate	40	Chloroethane	10	PCB-1254	1
Butylbenzylphthalate	10	Chloroform	5	PCB-1260	1
Di-n-butylphthalate	10	Chloromethane	10		
Di-n-octylphthalate	10	Dibromochloromethane	5		
Diethylphthalate	10	1,1-Dichloroethane	5		
Dimethylphthalate	10	1,2-Dichloroethane	5		
Benzo(a)anthracene	10	1,1-Dichloroethene	5		
Benzo(a)pyrene	10	trans-1,2-Dichloroethene	5		
Benzo(b)fluoranthene and/or Benzo(k)fluoranthene	10	1,2-Dichloropropane	5		
		Ethylbenzene	5		
Chrysene	10	Methylene chloride	5		
Acenaphthylene	10	1,1,2,2-Tetrachloroethane	5		
Anthracene	10	Tetrachloroethene	5		
Benzo(g,h,i)perylene	10	Toluene	5		
Fluorene	10	1,1,1-Trichloroethane	5		
Phenanthrene	10	1,1,2-Trichloroethane	5		
Dibenzo(a, h)anthracene	10	Trichloroethene	5		
Indeno(1,2,3-c,d)pyrene	10	Vinyl chloride	10		
Pyrene	10	Acetone	50		
Benzidine	NA	2-Butanone (MEK)	20		
3,3'-Dichlorobenzidine	100	1,2-Dibromoethane (EDB)	20		
Aniline	10	2-Hexanone	20		
Benzyl chloride	10	Xylenes	5		
Benzyl alcohol	20	1,4-Dioxane	500		
p-Chloroaniline	100	1,2-Dibromo-2-chloropropane	100		
Dibenzofuran	10	Pyridine	100		
2-Methylnaphthalene	10	Acrolein	500		
4-Nitroaniline	100	Acrylonitrile	500		
Pentachlorobenzene	10	Carbon disulfide	5		
1,2,4,5-Tetrachlorobenzene	10	trans-1,3-Dichloropropene	5		
1,2,3,4-Tetrachlorobenzene	10	cis-1,3-Dichloropropene	5		
Pentachloronitrobenzene	10	2-Chloroethylvinylether	40		
2-Methylnaphthalene	10	Styrene	5		
2-Nitroaniline	100	Vinyl acetate	40		
3-Nitroaniline	100	4-Methyl-2-pentanone (MIBK)	20		

a Measured as Azobenzene
b Measured as diphenylamine
* Not Analyzed

TABLE A-3

SUMMARY OF DATA COLLECTED DURING THE COLLECTION OF TASK FORCE SAMPLES FROM PEORIA DISPOSAL COMPANY'S MONITORING WELLS

WELL NO. DATE/TIME	REMARKS
G-106	
4/21/86 1625-1640	Well purged dry, using a Teflon bailer after 2 gallons (0.4 well volumes) are removed.
4/22/86 1545-1620	Facility demonstration of its sampling technique, using the same Teflon bailer that was used to purge well. Bailer supplied by EPA contractor. Sufficient water in well to collect only pH, specific conductance, temperature, turbidity, Volatile Organic Analysis (VOA), Purgeable Organic Halogens (POX), Purgeable Organic Carbon (POC), Acid, Base/Neutral Organics (ABN), and Pesticide Herbicide Samples.
4/23/86 1005-1025	Remainder of samples from this well and all other wells, except Well R113, taken by EPA contractors. Collected dioxin, total metals, Total Organic Carbon (TOC), Total Organic Halogens (TOX), and phenols.
4/23/86 1505-1515	Remaining samples collected (Cyanide, sulfate, chloride, ammonia, and nitrate). Turbidity not recorded in field log book.
G-107	
4/22/86 1640-1710	Well purged to dryness with a Teflon bailer after 3.75 gallons (0.4 well volumes) are removed.
4/23/86 1050-1105	Samples collected for pH, specific conductance, temperature, turbidity, VOA, POX, POC, and ABN.

TABLE A-3 (cont'd)

WELL NO. DATE/TIME		REMARKS
4/24/86	0830-0855	Samples collected for pesticide/herbicide and dioxin.
4/24/86	1620-1630	Samples collected for total metals and TOC.
4/25/86	0827-0922	Samples collected for TOX, phenolics, cyanides, sulfate, chloride, ammonia, and nitrate. The POX and POC bottles broke in shipment, and could not be analyzed.
G-108		
4/24/86	0835-0907	Well purged with a bailer, 7 gallons (3.3 well volumes) removed.
4/24/86	0928-1003	All samples and field measurements taken. POC bottle broken in shipment and not analyzed.
G-109		
4/23/86	1340-1410	Well purged with bailer, 9 gallons (3.5 well volumes) removed.
4/23/86	1400-1445	All samples and field measurements taken.
G-110		
4/24/86	1115-1140	Well purged with bailer, 8 gallons (3 well volumes) removed.
4/24/86	1140-1210	All samples and field measurements taken. POC bottle broken in shipment, sample not analyzed.
R-113		
4/23/86	1102-1332	PDC demonstrated their technique for sampling wells with QED pumps. Well purged with pump until 24.6 gallons (3.2 well volumes) removed.
4/23/86	1332-1526	All samples and field measurements taken. Facility took a split of all samples. VOA vials filled directly from pump tubing.

T A B L E A-3 (cont'd)

WELL NO. DATE/TIME		REMARKS
G-114		
4/21/86	1430-1502	Well purged with QED pump, 3.7 gallons (3.33 well volumes) removed.
4/21/86	1510-1545	All samples and field measurements taken. Facility given a split of all samples. Due to high pumping rate, VOA, POX, and POC samples collected in amber glass jar and then transferred to sample containers. Turbidity measurement not recorded in log book.
G-115		
4/24/86	1000-1020	Well purged with bailer, 6 gallons (3.1 well volumes) removed.
4/24/86	1025-1055	All samples and field measurements taken. The POX and POC bottles were broken in shipment and not analyzed.
G-117		
4/22/86	0906-1008	Well purged with QED Well Wizard, 20 gallons (3.2 well volumes) removed.
4/22/86	1015-1105	All samples and field measurements taken. Split given to facility. Due to high pump rate VOA, POX, and POC samples collected in amber glass jar and then transferred to sample containers.
R-118		
4/22/86	1151-1245	Well purged with QED pump, 15.35 gallons (3.1 well volumes) removed.
4/22/86	1300-1325	All samples and field measurements taken. Split given to facility. Due to high pump rate VOA, POX, and POC samples collected in amber glass jar and then transferred to sample containers.

TABLE A-3 (cont'd)

WELL NO. DATE/TIME		REMARKS
G-119		
4/24/86	1138-1344	Well purged with QED pump, 20.5 gallons (3 well volumes) removed. Top of well does not have cap and was covered with plastic garbage bags.
4/24/86	1345-1614	All samples and field measurements taken. POC bottle broken in shipment, sample not analyzed.
G-120		
4/23/86	0829-0932	Well purged with QED pump, 18 gallons (3.1 well volumes) removed.
4/23/86	0940-1030	All samples including a duplicate and field measurements taken. Split sample given to facility. Due to high pump rate, VOA, POC, and POX samples collected in an amber glass jar and then transferred to sample containers.
G-121		
4/23/86	1120-1128	Well purged with QED pump, 1.22 gallons (3 well volumes) removed.
4/23/86	1140-1226	All samples and field measurements taken. Due to high pump rate VOA, POC, and POX samples collected in an amber glass jar and then transferred to sample containers.
G-122		
4/21/86	1417-1435	Well bailed dry after removal of 0.75 gallons (0.8 well volumes). Field measurements taken.
4/22/86	0900	Collected VOA, POX, and POC samples.
4/22/86	1136	Collected ABN samples.
4/23/86	0830-0835	Collected pesticide/herbicide and dioxin samples.

T A B L E A-3 (cont'd)

WELL NO. DATE/TIME	REMARKS
G-122	
4/23/86 1610-1620	Collected phenols and cyanide samples.
4/24/86 0910-0920	Collected sulfate, chloride, ammonia, and nitrate samples. POC sample broken in shipment, sample not analyzed. Turbidity measurement not recorded in log book.
G-123	
4/21/86 1455-1540	Well bailed dry after removal of 2 gallons (1.6 well volumes). Field measurements taken.
4/22/86 0950-1055	Collected VOA, POX, POC, and ABN samples.
4/23/86 0910-0935	Collected pest./herb. and dioxin samples.
4/23/86 1215-1245	Collected total metals, TOC, TOX, phenols, and cyanide samples.
4/23/86 1525-1555	Collected sulfate, chloride, ammonia, and nitrate samples. POX sample broken in shipment, sample not analyzed. Sample split given to facility. Turbidity measurement not recorded in log book.
G-124	
4/22/86 1215-1250	Well purged with bailer, 2 gallons (3.2 well volumes) removed.
4/22/86 1315-1505	All samples, including a duplicate, and field measurements taken. Split sample given to facility.
G-125	
4/24/86 1034-1056	Well purged with QED pump, 3 gallons (3 well volumes) removed.
4/24/86 1100-1130	All samples and field measurements taken.

T A B L E A-3 (cont'd)

WELL NO. DATE/TIME	REMARKS
G-126	
4/24/86 1437-1454	Well purged with QED pump, 3 gallons (4 well volumes) removed.
4/23/86 1610-1620	Collected phenols and cyanide samples.
4/24/86 0910-0920	Collected sulfate, chloride, ammonia, and nitrate samples. POC sample broken in shipment, sample not analyzed. Turbidity measurement not recorded in log book.
4/24/86 1455-1513	All samples and field measurements taken. Due to high pump rate, VOA, POC, and POX samples collected in an amber glass jar and then transferred to sample containers.
G-128	
4/22/86 1450-1503	Well purged with QED pump, 5 gallons (3.4 well volumes) removed.
4/22/86 1515-1535	All samples and field measurements taken, Due to high pump rate, VOA, POC, and POX samples collected in amber glass jar and then transferred to sample containers.

TABLE A-4

ORGANIC COMPOUNDS SHOWING

POSITIVE RESULTS FOR WELLS SAMPLED AT

PEORIA DISPOSAL CO.

WELL #	PARAMETER	CONCENTRATION	DETECTION LIMIT
G-114	Methylene Chloride	5.1 ug/l	5.0 ug/l
G-124	Methylene Chloride	5.0 ug/l	5.0 ug/l
G-125	Methylene Chloride	7.1 ug/l	5.0 ug/l
G-128	Methylene Chloride	32.0 ug/l	5.0 ug/l
G-123	1,1-Dichloroethane	16.0 ug/l	5.0 ug/l

TABLE A-5
TOTAL METALS RESULTS FOR MONITORING WELLS
SAMPLED AT PEORIA DISPOSAL COMPANY

PARAMETER (ug/l)	WELL G106 TOTAL	WELL G107 TOTAL	WELL G108 TOTAL	WELL G109 TOTAL	WELL G110 TOTAL	WELL R113 TOTAL	WELL G114 TOTAL	WELL G115 TOTAL	WELL G117 TOTAL	WELL R118 TOTAL	WELL G119 TOTAL
ALUMINUM	13600	5280	3890	236	1580	185	326	10300	ND	177	118
ANTIMONY	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ARSENIC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BARIUM	152	193	58	112	85	84	134	133	66	74	146
BERYLLIUM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CADMIUM	1.8	2.3	8	ND	ND	ND	ND	2	ND	ND	ND
CALCIUM	159000	139000	115000	126000	119000	91300	156000	125000	94800	122000	123000
CHROMIUM	21	8	13	ND	12	15	ND	25	ND	ND	ND
COBALT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
COPPER	16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IRON	16900	6820	4700	419	. 1800	64	2490	10100	61	73	85
LEAD	33.5	38.8	7.8	3.1	4.3	ND	ND	16.4	13.4	ND	ND
MAGNESIUM	75600	65900	54800	53000	50300	39400	61200	61300	37300	41300	59400
MANGANESE	658	1160	189	22	49	4	1270	287	3	7	152
MERCURY	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NICKEL	26	25	27	ND	22	ND	24	29	ND	ND	24
POTASSIUM	6220	4740	2970	2310	2470	4160	7300	3850	2520	2730	7130
SELENIUM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SILVER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SODIUM	10500	13500	7930	14500	36700	441000	58500	10000	37000	23500	50900
THALLIUM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TIN	ND	ND	ND	ND	ND	ND	ND	66	ND	ND	ND
VANADIUM	24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ZINC	133	295	40	24	23	ND	ND	ND	ND	ND	ND

ND-NOT DETECTED ABOVE THE METHOD DETECTION LIMIT.

TABLE A-5(continued)
TOTAL METALS RESULTS FOR MONITORING WELLS
SAMPLED AT PEORIA DISPOSAL COMPANY

PARAMETER (ug/l)	WELL G120 TOTAL	WELL G120(DUP) TOTAL	WELL G121 TOTAL	WELL G122 TOTAL	WELL G123 TOTAL	WELL G124 TOTAL	WELL G124(DUP) TOTAL	WELL G125 TOTAL	WELL G126 TOTAL	WELL G128 TOTAL
ALUMINUM	693	202	ND	205	12200	3570	3730	ND	ND	1920
ANTIMONY	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ARSENIC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BARIUM	373	376	116	212	183	116	119	159	120	204
BERYLLIUM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CADMIUM	ND	ND	ND	ND	2.1	2.1	1	ND	ND	ND
CALCIUM	105000	106000	130000	155000	202000	146000	144000	162000	110000	139000
CHROMIUM	ND	13	ND	ND	41	22	26	ND	ND	16
COBALT	ND	ND	ND	ND	29	ND	ND	ND	ND	ND
COPPER	ND	ND	ND	ND	13	ND	ND	ND	ND	ND
IRON	6760	6850	301	75	15900	4740	4350	255	304	2880
LEAD	ND	ND	ND	6.6	30.8	76.5	53.5	ND	ND	15.5
MAGNESIUM	56300	56400	61500	69600	106000	117000	113000	87800	59600	60500
MANGANESE	1190	1200	89	59	2440	169	163	38	134	1140
MERCURY	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NICKEL	ND	ND	ND	24	100	41	36	29	20	ND
POTASSIUM	9600	9350	5420	5220	8030	5530	5160	2600	2920	10900
SELENIUM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SILVER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SODIUM	51000	50500	16800	42900	30300	52700	52500	25000	44500	30900
THALLIUM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
VANADIUM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ZINC	ND	ND	72	1850	689	8140	6170	62	587	603

ND-NOT DETECTED ABOVE THE METHOD DETECTION LIMIT.

TABLE A-6
FIELD MEASUREMENTS, INORGANIC AND INDICATOR PARAMETER RESULTS
FOR MONITORING WELLS AT PEORIA DISPOSAL COMPANY

PARAMETER	WELL G106	WELL G107	WELL G108	WELL G109	WELL G110	WELL R113	WELL G114	WELL G115	WELL G117	WELL R118
pH	7	7.2	7.2	7.5	7	7.1	6.7	7	7	6.9
Specific Conductivity	640	740	480	825	810	890	775	800	560	600
Temperature (C)	9.4	13.8	12	12.7	12.7	13.8	11.3	12.3	11.3	12
Turbidity (NTU)	*	1.4	29	6.3	12	0.8	*	8.8	13	13
POX (ug/l)	18	BB	ND	ND	7	ND	ND	BB	ND	ND
POC (ug/l)	ND	BB	BB	ND	BB	ND	ND	BB	ND	ND
TOX (ug/l)	12	ND	5.8	64	16	8.2	38	6.5	14	8
TOC (ug/l)	1300	1600	ND	1300	1300	ND	5800	1000	1400	1200
TOTAL PHENOL (ug/l)	ND	80	101	ND	ND	ND	ND	ND	ND	ND
AMMONIA NITROGEN (ug/l)	ND	150	ND	ND	ND	ND	8400	ND	ND	ND
NITRATE NITROGEN (ug/l)	1850	210	1500	1300	1500	ND	5000	770	730	2460
NITRITE NITROGEN (ug/l)	ND	ND	100	ND	ND	ND	ND	ND	ND	ND
SULFATE (ug/l)	110000	70000	85000	11000	112000	100000	19000	85000	76000	76000
CHLORIDE (ug/l)	12000	32000	24000	60000	51000	70000	87000	190000	72000	56000
BROMIDE (ug/l)	ND	90	ND	100	70	100	260	100	350	60
CYANIDE (ug/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

PARAMETER	WELL G119	WELL G120	WELL G120(DUP)	WELL G121	WELL G122	WELL G123	WELL G124	WELL G124(DUP)	WELL G125	WELL G126	WELL G128
pH	6.9	7		7.1	7.2	6.7	7.2		6.5	7	6.7
Specific Conductivity	725	600		550	1225	1250	1480		750	600	725
Temperature (C)	14.1	12.2		13.1	12	12.5	13		13.8	14.3	13.9
Turbidity (NTU)	0.41	0.5		1.1	*	*	82		1.2	1.4	18
POX (ug/l)	5	13	5	10	5	BB	61	ND	7	16	26
POC (ug/l)	BB	ND	ND	ND	BB	ND	ND	ND	ND	ND	ND
TOX (ug/l)	35	47	44	16	5.3	13	23	20	20	23	36
TOC (ug/l)	2600	5500	5300	2000	5000	2200	2300	2200	2700	2000	3800
TOTAL PHENOL (ug/l)	ND	14	ND	ND	ND	172	36	48	48	ND	ND
AMMONIA NITROGEN (ug/l)	6600	7900	8200	13100	4200	180	ND	ND	ND	ND	22000
NITRATE NITROGEN (ug/l)	ND	ND	ND	250	880	ND	ND	90	600	750	180
NITRITE NITROGEN (ug/l)	ND	ND	ND	ND	ND	ND	ND	ND	50	ND	ND
SULFATE (ug/l)	100000	126000	85000	76000	100000	110000	100000	85000	100000	70000	70000
CHLORIDE (ug/l)	151000	41000	133000	42000	56000	80000	160000	183000	158000	50000	54000
BROMIDE (ug/l)	ND	350	350	100	260	300	ND	610	650	350	250
CYANIDE (ug/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

*DATA NOT RECORDED IN FIELD LOG.
BB-BOTTLE BROKEN IN SHIPMENT, SAMPLE NOT ANALYZED.
ND-NOT DETECTED ABOVE THE METHOD DETECTION LIMIT.

TABLE A-7

COMPARISON OF PDC's SAMPLE RESULTS FOR OCTOBER 1984 - JULY 1985

WITH TASK FORCE SAMPLES TAKEN DURING THE WEEK OF APRIL 21 - 25, 1986

	Specific Cond. (umoh/cm)				pH			TOX (mg/l)			TOX (ug/l)		
	PDC's Data			EPA	PDC's Data		EPA	PDC's Data		EPA	PDC's Data		EPA
Well No.	N	Mean	Stand. Dev.	Data	Mean	Stand. Dev.	Data	Mean	Stand. Dev.	Data	Mean	Stand. Dev.	DATA
G109	16	820	105	825	7.06	0.22	7.5	9.0	8.7	1.3	9	4.1	64
G110	16	760	81.6	810	6.98	0.16	7.0	10.1	9.1	1.3	6	3.4	16
R113	4	900	77.7	890	7.16	0.25	7.1	4.4	3.3	ND	19	14.6	8.2
G114	16	1170	84.8	775	6.73	0.25	6.7	15.1	7.0	5.8	41	7.0	38
G115	4	880	42.4	800	7.27	0.22	7.0	4.9	3.0	1.0	11	12.2	6.5
G116	16	1110	65.5	NS	7.38	0.20	NS	6.3	5.7	NS	27	22.8	NS
G117	16	890	39.0	560	7.12	0.12	7.0	6.6	4.5	1.4	11	7.5	14
R118	16	950	58.8	600	6.94	0.06	6.9	4.6	3.8	1.2	23	17.4	8
G119	4	1080	90.7	725	6.94	0.18	6.9	11.5	6.4	2.6	22	2.9	35
G120*	16	1160	129.8	600	6.90	0.14	7.0	15.3	7.0	5.5(5.3)	50	10.1	47(44)

N - Is the number of observations obtained during a one-year period. In calculation of the mean, PDC used one-half of the detection limit for samples that were reported as "less than" the detection limit.

ND - For EPA samples - Not detected above method detection limit.

NS - Not sampled by EPA during the Task Force inspection.

* - For Well G120 EPA's contractor took duplicate samples for TOC and TOX.