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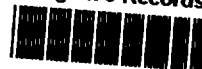
UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

PROPOSED PLAN
FOR THE

BIG D CAMPGROUND SUPERFUND SITE
KINGSVILLE, OHIO

July 28, 1989

EPA Region 5 Records Ctr.



227278

I. Introduction

The U.S. Environmental Protection Agency (U.S. EPA) and Ohio Environmental Protection Agency (OEPA) have identified a preferred alternative to remediate contamination at the Big D Campground Superfund site (the site) in Kingsville, Ohio. The Proposed Plan (the Plan) summarizes the site history, the Remedial Investigation (RI) report, the Feasibility Study (FS) report, the cleanup alternatives evaluated in the FS and presents the preliminary decision on a preferred alternative to clean up the site with the rationale for the preference. The RI and FS reports should be consulted for a full description of the site investigation and the alternatives evaluated.

Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), requires that notice be published and a brief analysis of the Proposed Plan for site remediation be made available to the public. The Proposed Plan also outlines the public's role in helping U.S. EPA and OEPA make a final choice on the preferred alternative.

II. Opportunities for Public Involvement

U.S. EPA and OEPA rely on the public to ensure that the cleanup method selected for each Superfund site meets the needs of the local community, in addition to being an effective solution to the problem. Therefore, U.S. EPA and OEPA have set a public comment period from July 28, 1989 through August 26, 1989 to encourage public participation in the remedy selection process. This comment period includes a public meeting where U.S. EPA and OEPA will discuss the FS report, the Proposed Plan, answer questions and receive comments. Comments are being solicited on all alternatives in the Proposed Plan and the FS.

The FS report and numerous other documents regarding the site are available at the Kingsville Township Public Library in Kingsville, Ohio. These documents comprise the administrative record for the site.

The preferred alternative is the preliminary choice to solve the contamination problems at the site. U.S. EPA and OEPA will make the final selection only after consideration of all written and oral comments received on any of the remedial alternatives addressed in the Proposed Plan and the FS report.

Significant comments, criticisms and new data will be responded to in the Responsiveness Summary Section of the Record of Decision (ROD). The ROD is the document that presents U.S. EPA's final alternative selection for cleanup. The public can send written comments to or obtain further information from:

Gina Weber
Office of Public Affairs (5PA)
U.S. Environmental Protection Agency
230 S. Dearborn
Chicago, IL 60604
(312) 353-3207
or toll free: 1-800-621-8431

Information can also be obtained from:

Janice L. Bartlett
Remedial Project Manager
Office of Superfund (5HS-11)
U.S. Environmental Protection Agency
230 S. Dearborn
Chicago, IL 60604
(312) 886-5438

Public Meeting on Feasibility Study and Proposed Plan

U.S. EPA and OEPA will hold a public meeting to present the findings of the FS and the Proposed Plan. Personnel from U.S. EPA and OEPA will be at the meeting to respond to questions on the FS and the Proposed Plan and to formally receive public comment.

Date: August 8, 1989
Time: 7:00 p.m.
Location: Kingsville Fire Hall, 3130 East Main Street

III. Site Background

The Big D Campground site is located in Kingsville, Ashtabula County, Ohio (R2W, T13N), which is approximately 2.5 miles south of Lake Erie and 50 miles northeast of Cleveland (Figure 1).

The site was operated as a sand and gravel quarry and was subsequently filled with hazardous and non-hazardous substances from 1964 to 1976. The landfill and surrounding property is owned by the Dreslinski family.

The transporter, Brenkus Excavation, who disposed of wastes at the site stated that most of the waste was contained in metal and plastic drums, however, bulk toluene diisocyanate (TDI) was also disposed of.

Olin Corporation, a generator of wastes taken to the site, stated that chlorobenzene, toluenediamine and other wastes were disposed of at the site. Olin estimated the quantity of waste in the landfill to be 29,620 cubic yards.

The Big D Campground site is south of Creek Road and bordered by the Conneaut Creek to the south, a campground to the southeast, open land to the west and residences with small acreage to the north and northwest.

The topography of the site divides it into two areas. The northern area of the site is generally flat and gently slopes north, the southern area slopes steeply to Conneaut Creek. The topographic divide occurs approximately 50 feet south of the southern edge of the landfill (see Figure 2).

Some residents located within 1/2 mile from the site use ground water for drinking.

IV. Remedial Investigation and Feasibility Study Summary

A. Remedial Investigation

U.S. EPA conducted a Remedial Investigation from November, 1986 to October, 1988 to (1) determine the nature and extent of contamination at the site, (2) determine whether substances migrating from the site endanger the public health, welfare or the environment, and (3) gather the data necessary to support the feasibility study.

1. Nature and Extent of Contamination

The RI investigated the contaminant source area (landfill), soils outside the source area, groundwater and surface water and sediment. Table 1 summarizes the maximum concentrations of indicator chemicals identified in different media at the site.

a. Source Area

A geophysical survey was performed which indicated a rectangular trench area in the northern area of the site (approximate size 1.2 acres). Based on the geophysical survey two test pits were excavated which verified the presence of buried drums (intact and either partially crushed or ruptured), bulk waste and contaminated soil in the source area. Analytical results revealed that the same organic compounds (compound which contains carbon) found in the ground water and subsurface soil samples are also present in the source area, but at greater concentrations.

b. Soils (outside the source area)

The geologic investigation identified five geologic units at the site; three glacially deposited units, one alluvial (stream-deposited) unit and one bedrock (solid rock) unit. At the upper (northern) portion of the site, the three glacial units overlay bedrock. These three units are not present at the lower (southern) portion of the site near Conneaut Creek. At the lower portion of the site, bedrock is overlain by alluvial deposits.

Surface and subsurface soil samples were collected from nine on-site locations surrounding the source area. Inorganic compounds (compound which does not contain carbon) were detected in isolated areas.

Organic compounds were detected in the soils. Chlorobenzene was the organic compound detected most frequently and at the highest concentrations.

c. Ground Water

Five hydrogeologic units were identified at the site; three aquifers (a subsurface zone capable of producing water from a well) and two aquitards (a subsurface zone which does not produce water). The units present at the upper portion of the site are the water table aquifer (uppermost), the silt-clay aquitard, the hard grey clay till aquitard, and the bedrock aquifer. The units present at the lower portion of the site are the alluvial aquifer and the bedrock aquifer. Figure 3 is a cross section of the site prepared from well logs.

At the upper portion of the site the water table aquifer is hydraulically separated from the bedrock aquifer (water does not move between the two aquifers). At the lower portion of the site the alluvial aquifer and the semi-confined aquifer are hydraulically connected (water is able to move between the aquifers).

Ground water in the water table aquifer at the upper portion of the site flows both north and south. The approximate location of the ground water divide occurs at the southern edge of the landfill. Ground water flows north towards local discharge points and flows south toward Conneaut Creek. The confined bedrock aquifer locally flows south to Conneaut Creek.

Two rounds of ground water sampling were conducted at wells around the source area, wells located south of the source area near the creek and six off-site residential wells. Shallow wells on-site and near the creek showed concentrations of inorganic contaminants above background levels (determined by

taking samples a distance away from the site to identify naturally occurring chemical levels). Deep on-site wells also have concentrations of some inorganic constituents above background levels.

Organic indicator compounds were detected in shallow on-site wells and wells near the creek. The indicator chemicals (see Fate and Transport) detected include chlorobenzene, 1,2- and 1,4-dichlorobenzene, trans-1,2-dichloroethene, diaminotoluene, tetrachloroethene, trichloroethene and vinyl chloride. Deep wells on-site detected organic compounds at low but significant concentrations. This indicates the possibility of vertical contaminant migration through the aquitard at localized areas.

Compounds found in creek wells (lower portion of the site) were the same as those found in shallow wells (upper portion of the site) however the concentrations in the creek wells were considerably less.

One of the six residential wells sampled showed concentrations of inorganic contaminants similar to wells on site. This residential well is not used by the owner but was sampled due to its proximity to the site. The source of the inorganic contamination is unknown since the aquifer from which the residential well is drawing water is above and separate from the water table aquifer in which on-site monitoring wells are located. The probable source of contamination is the site. Past fluctuations in the ground water levels of the water table aquifer could have caused inorganic contaminations to migrate into the perched aquifer. The remaining residential wells indicate background levels of inorganic compounds.

Organic compounds were detected in one of six residential wells (the Dreslinski campground well). This well had been chlorinated with Chlorox Bleach shortly before the sampling occurred. This chlorination is probably the source of chloroform (12 ug/l), bromo-dichloromethane (2 ug/l) and dibromochloromethane (2 ug/l) in the sample from that well. The remaining residential wells indicated background levels of organic compounds.

d. Surface Water and Sediment

Inorganic contamination in the surface water was detected in Conneaut Creek. However these concentrations of manganese, magnesium, sodium and calcium were only slightly elevated above background levels.

Organic analytical results indicate the presence of chlorobenzene in Conneaut Creek. The concentrations are much lower than those detected in the ground water and lower than applicable regulatory standards.

Inorganic and organic contaminants were identified in the sediment near the site. The increased concentrations noted were only slightly above background levels.

2. Fate and Transport

Thirteen of the twenty-five contaminants identified in the source area, soils, ground water and surface water were identified as indicator chemicals. Indicator chemicals were chosen based on factors such as the number of times a chemical was detected, the maximum concentration, and persistence and toxicity to human health and the environment. The indicator chemicals at Big D Campground are listed below:

Inorganics

barium
beryllium
chromium
lead
nickel

Organics

chlorobenzene
1,2-dichlorobenzene
1,4-dichlorobenzene
trans-1,2-dichloroethene
diaminotoluene
trichloroethene
tetrachloroethene
vinyl chloride

a. Inorganic Contaminants

Inorganic contaminants are present in the source area, surface soils, subsurface soils and ground water. Inorganics in the soils can (1) migrate to Conneaut Creek by runoff from surface soils and move with the creek, eventually collecting as stream sediment, (2) migrate up from the saturated zone into the unsaturated zone due to fluctuating ground water levels, (3) remain attached to unsaturated subsurface soils, or (4) move with ground water from the source area and subsurface soils.

Inorganics in ground water in the water table aquifer are not expected to migrate to a significant degree, however, part of the source area is in the ground water. Ground water coming in contact with the source area can have contaminant concentrations as high as the solubility limit (ability of a compound to dissolve in water) for specific compounds.

Inorganics present in the alluvial and bedrock aquifers may (1) attach to subsurface soils and not migrate, or (2) discharge to Conneaut Creek and decrease in concentration due to dilution or attaching to creek sediments.

b. Organic Contaminants

Organics were detected in the source area, surface soils, subsurface soils and ground water. Organics in the source area and soils can (1) migrate to Conneaut Creek by runoff from surface soils and volatilize (evaporate when in contact with the air) or accumulate in stream sediments, and (2) migrate from the source area and soils into ground water by moving vertically via precipitation (rain or snow) or fluctuating ground water levels (the bottom of the source area is located in ground water).

The major pathway for organic contaminant movement at the site is by ground water flow. Organics will generally move with the bulk ground water flow and the attachment to soils will be minimal because less than 10 percent silt and clay is present in the sandy water table aquifer; sands do not typically adsorb organics. Organics in the ground water can also diffuse upward from the ground water into the unsaturated zone soils or atmosphere.

Organics in the ground water can discharge into Conneaut Creek where the concentrations of organics will decrease due to dilution, attaching to sediments, sedimentation and aquatic uptake (ingestion). In addition, organic contaminants in the surface water may decrease due to volatilization.

3. Baseline Risk Assessment

The baseline risk assessment evaluates risks to both public health and the environment posed by contaminants at or released from the site.

An exposure scenario based on contaminants in the source area was not evaluated. Limited sampling was conducted in the test pits excavated in the source area. The sampling in the source area was conducted only to get general information on the material in the landfill and to confirm that contaminants identified in the ground water and soils originated in the landfill. Any carcinogenic or non-carcinogenic risks identified through other exposure scenarios also apply to the source area because the contamination originated from the source area. However the risks in the source area would be greater because the concentration of contaminants in the source area are greater.

Six site-specific exposure scenarios were identified:

- Ingestion of contaminated soil
- Direct contact with contaminated soil
- Ingestion of contaminated ground water
- Incidental ingestion of contaminated surface water
- Direct contact with contaminated surface water
- Ingestion of contaminated aquatic life

Table 2 presents a summary of the potential risks associated with the various scenarios evaluated. Potentially significant risks are defined as those with a Hazard Index greater than 1 or a cancer risk greater than 1×10^{-6} (one-in-one-million).

Ingestion of contaminated soil and direct contact with contaminated soil risk characterization did not identify any noncarcinogenic or total cancer risks (see Table 2).

Ingestion of ground water identified total cancer risks as high as 1×10^{-2} under worst case conditions. Risks were identified for the ingestion of ground water, under worst case conditions, from all three aquifers. The contaminants associated with these risks are 2,4-diaminotoluene, tetrachloroethene, trichloroethene and vinyl chloride. Trichloroethene contamination levels identified in ground water were up to 1500 times in excess of federal standards for drinking water. Noncarcinogenic risks, based on worst case exposure doses, were identified for all three aquifers. The primary contaminants associated with these risks are chlorobenzene and tetrachloroethene. Chlorobenzene contamination levels identified in ground water were up to 750 times in excess of federal standards for drinking water.

Risks associated with incidental ingestion of contaminated surface water, direct contact with contaminated surface water and ingestion of contaminated aquatic life were not evaluated. Minimal contamination was found in the surface water and the contamination detected which exceeded federal regulations (lead and beryllium) were only found in one downstream sample. Also, contamination detected in the surface water was only slightly above background values.

The potential risks to the environment were evaluated by focusing on the aquatic life in Conneaut Creek next to and downstream of the site. Data on bottom-dwelling populations collected from Conneaut Creek indicated that the biological community downstream of the site may be slightly impaired, however further extensive studies of the data would be required to confirm this. The water quality data were compared to the U.S. EPA's Ambient Water Quality Criteria and no significant impacts were detected. Therefore, releases of contamination

from the site may be only slightly impacting Conneaut Creek at this time.

The proposed alternative to remediate contamination at the site will address contamination in the ground water and the source area. The site risk objectives will reduce health risks in the ground water and source area soils to a cumulative Hazard Index of less than 1.0 and a cumulative carcinogenic risk of less than 10^{-6} .

B. Feasibility Study

The Feasibility Study was conducted to identify and screen technologies and alternatives for addressing the source area and ground water contamination at the site.

Nine alternatives were evaluated in detail in the Feasibility Study. Alternative numbers 2 through 5 were not in full compliance with ARARs because ground water treatment was not included. The FS details all nine alternatives. Alternative 1, the no-action alternative, was also not in compliance with Applicable and Relevant or Appropriate Requirements (ARARs - other environmental statutes), however it is being retained as a baseline for comparison to other alternatives. Therefore Alternative number 1 and numbers 6 through 9 are summarized below:

Alternative 1 - No Action

| | |
|-------------------------------|------|
| Estimated Capital Cost: | \$0 |
| Estimated Present Worth Cost: | \$0 |
| Estimated Annual O&M Cost: | \$0 |
| Estimated Time to Implement: | None |

Under Alternative 1, no remedial action would take place at the site, therefore no costs are involved. This alternative would not eliminate, reduce or control the risks associated with the contaminants present in the soils, source area and ground water.

Alternative 6 - Source Area Containment, Treatment of Ground Water Outside the Contained Area

Estimated Capital Cost: \$5,000,000
 Estimated Present Worth: \$8,000,000
 Estimated Annual O&M Cost \$ 360,000
 Estimated Time to Implement: 1.5 to 2.5 years.

This alternative involves installing a soil-bentonite slurry wall around the source area and covering the source area with an impermeable multilayer cap. Ground water will be collected by wells and interceptor trenches, treated with activated carbon and discharged to Conneaut Creek. Surface water will be monitored.

Alternative 7 - On-Site Incineration, Vitrification, Ground Water Treatment

Estimated Capital Cost: \$36,000,000
 Estimated Present Worth: \$39,000,000
 Estimated Annual O&M Cost \$ 350,000
 Estimated Time To Implement: 3.5 to 5 years

This alternative involves removing approximately 2,500 to 5,000 buried drums from the source area, incinerating the drums on-site, delisting the ash (special tests to measure the existence of any residual contamination), placing the ash back in the excavated source area and vitrification (applying an electrical current into the ground which melts soils and turns them into a solid glass-like substance) of approximately 25,000 to 30,000 cubic yards of contaminated soil and approximately 500 cubic yards of incinerator ash. Ground water will be collected by wells and interceptor trenches, treated with activated carbon and discharged to Conneaut Creek. Surface water will be monitored.

Alternative 8 - Off-Site Incineration, Ground Water Treatment

Estimated Capital Cost: \$63,000,000
 Estimated Present Worth: \$67,000,000
 Estimated Annual O&M Cost: \$ 420,000
 Estimated Time to Implement: 4 to 5.5 years

This alternative involves excavating, transporting and incinerating approximately 2,500 to 5,000 buried drums and approximately 25,000 to 30,000 cubic yards of contaminated soil and bulk waste in an off-site federally permitted incinerator. Ground water will be collected by wells and interceptor trenches, treated with activated carbon and discharged to Conneaut Creek. Surface water will be monitored.

Alternative 9 - On-Site Incineration, Ground Water Treatment

Estimated Capital Cost: \$36,000,000
Estimated Present Worth \$39,000,000
Estimated Annual O&M Cost: \$ 320,000
Estimated Time to Implement: 3.5 to 5 years

This alternative involves excavating and incinerating approximately 2,500 to 5,000 buried drums and approximately 25,000 to 30,000 cubic yards of contaminated soil and bulk waste in an on-site mobile incinerator, delisting the ash (special tests to measure the existence of any residual contamination) and placing the ash into the excavated area. Ground water will be collected by wells and interceptor trenches, treated with activated carbon and discharged to Conneaut Creek. Surface water will be monitored.

VI. U.S. EPA's and OEPA's Proposed Plan

In selecting the remedial alternative, U.S. EPA and OEPA will consider the following nine criteria:

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection, and describes how risks are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.
2. Compliance with ARARs addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements (ARARs) of other environmental statutes and/or provide grounds for invoking a waiver.
3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.
4. Reduction of toxicity, mobility, or volume is the anticipated performance of the treatment technologies a remedy may employ.
5. Short-term effectiveness involves the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.
6. Implementability is the technical and administrative feasibility of a remedy, including the availability of goods and services needed to implement the chosen solution.

7. Cost includes capital and operation and maintenance costs.
8. Agency acceptance includes whether, based on its review of the RI/FS and Proposed Plan, the State agency (OEPA) concurs, opposes, or has no comment on the preferred alternative.
9. Community acceptance will be assessed in the Record of Decision following a review of the public comments received on the RI/FS Report and the Proposed Plan.

Table 3 summarizes the comparison of the alternatives evaluated to the evaluation criteria. The U.S. EPA and OEPA have determined that the preferred alternative is the best balance of tradeoffs with respect to the nine criteria. Long-term effectiveness is maximized by removing and burning the source area. Ground water treatment will meet site risk objectives associated with ingestion of ground water.

The preferred alternative at the Big D Campground Site is Alternative 9. Alternative 9 involves excavating the buried drums, bulk waste and contaminated soils (approximately 30,000 cubic yards) in the source area (see Figure 4). Excavation will stop when native (undisturbed) soils around and under the source area are encountered. Soil sampling will be conducted around the edges of the excavated area from the ground surface to eight feet below the ground. The purpose of the sampling is to determine if soils which may pose an exposure risk for ingestion or direct contact have been removed. Soils below eight feet will not be sampled. Ground water sampling has already determined that contamination has begun migrating from the source area. If necessary, more soils in the upper eight feet will be removed and sampling will be conducted again until the exposure risk has been removed. After excavation, the source area materials will be incinerated on-site in a mobile incinerator. The non-combustible material and ash remaining after incineration will be used as backfill material in the excavated area as long as the ash is able to be delisted. In addition, an estimated 4,000 to 5,000 cubic yards of additional backfill, similar to existing strata, will be needed to fill the existing excavated area to within two feet of the original surface elevation. The fill material will be covered with two feet of top soil, then graded and seeded. Top soil will cap the area to allow infiltration of rain water to aid movement of contaminants out of the native soils into the ground water collection/treatment/discharge system.

The ground water collection system will intercept ground water in the water table aquifer and collect it with two interceptor trenches (one at the down gradient edge of the plume and one at

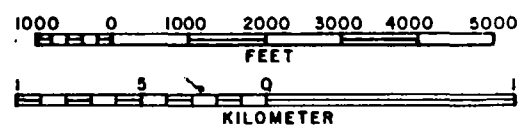
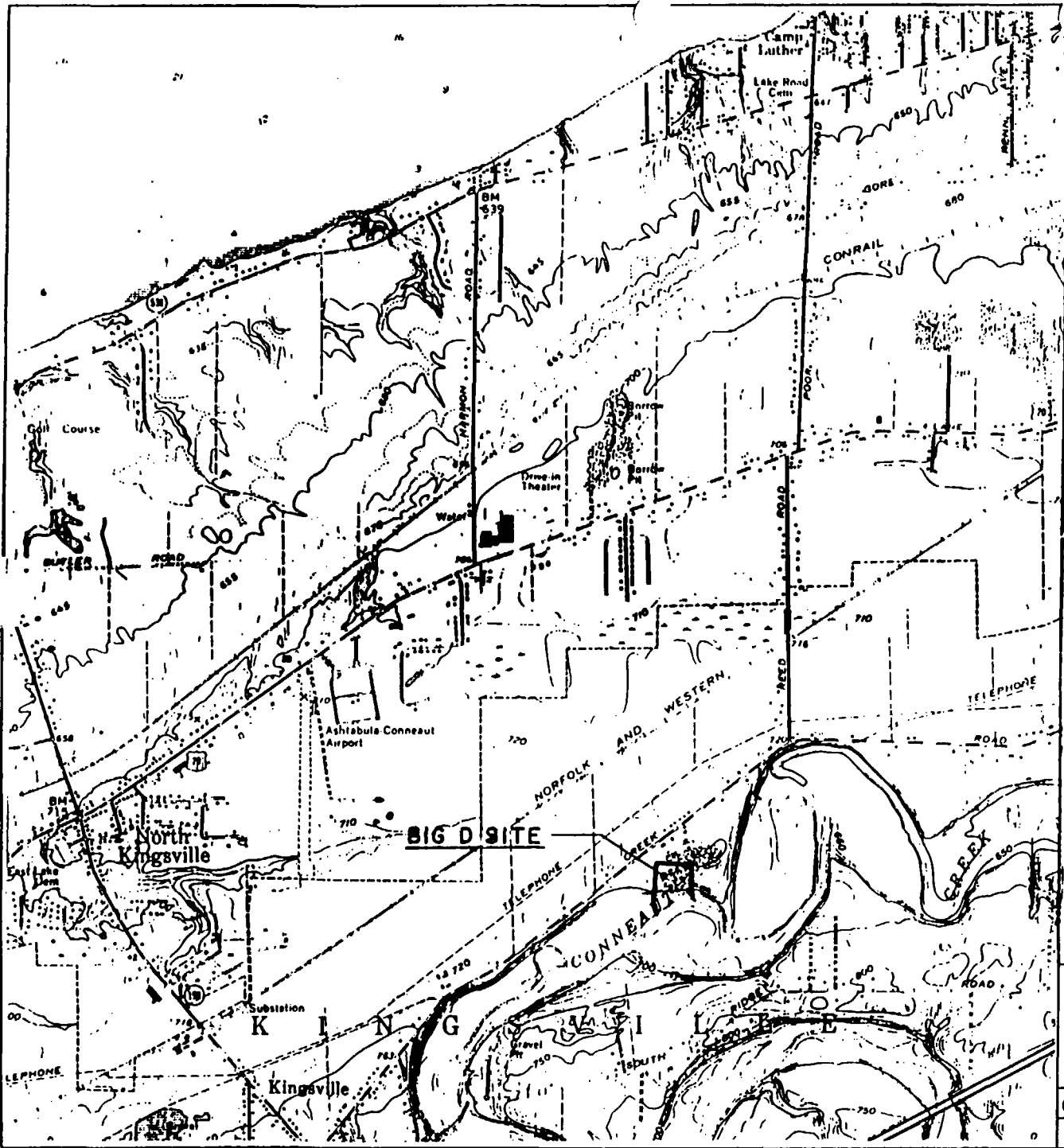
the north edge of the site, see Figure 5). Ground water in the alluvial aquifer and the semi-confined bedrock aquifer will be collected with 30 extraction wells spaced 25 feet apart. Ground water in the confined bedrock aquifer will be collected with 3 deep extraction wells. The collected ground water will be treated to meet the requirements of the State of Ohio's National Pollutant Discharge Elimination System program followed by discharge to Conneaut Creek.

Ground water monitoring wells will be installed north of each collection trench to monitor for any possible contamination bypassing the trenches. The existing shallow and deep wells on the lower portion of the site shall be used to monitor contaminant migration upgradient of the groundwater moving towards the creek. A collection time of 20 to 60 years will be required to reach ground water cleanup levels. If contaminant concentrations change over time, the sampling program may be modified.

Surface water monitoring will also be implemented at 3 locations in Conneaut Creek (one upstream, one downstream and one adjacent to the site). If contaminants are detected at concentrations that present a risk to human health and the environment in the surface water, additional site remediation of the surface water may be necessary.

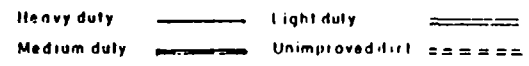
The U.S. EPA and OEPA have determined that the preferred alternative is the best balance of tradeoffs among alternatives with respect to the nine criteria. Based on information available at this time, the U.S. EPA and OEPA believe the preferred alternative is the best protection of human health and the environment, complies with ARARs, eliminates long-term risks, reduces toxicity, mobility and volume, is easily implemented and is cost effective compared to off-site incineration. If the source area is not removed, ground water cleanup will take an infinite amount of time for all the buried drums and bulk waste to decompose and flush from the soils in the landfill and then be collected and treated by the ground water treatment system. Containment reduces mobility of contamination but does not eliminate long term risks.

Alternative 9 includes excavation and on-site incineration of buried drums and contaminated soils in the disposal area, collection and treatment of ground water and surface water sampling. Based on new information or public comments, U.S. EPA and OEPA may modify the preferred alternative or select another response action presented in the Proposed Plan and the FS report. The public, therefore, is encouraged to review and comment on all of the alternatives identified in this Proposed Plan. The RI report and FS report should be consulted for more information on these alternatives.



CONTOUR INTERVAL 10 FEET

ROAD CLASSIFICATION

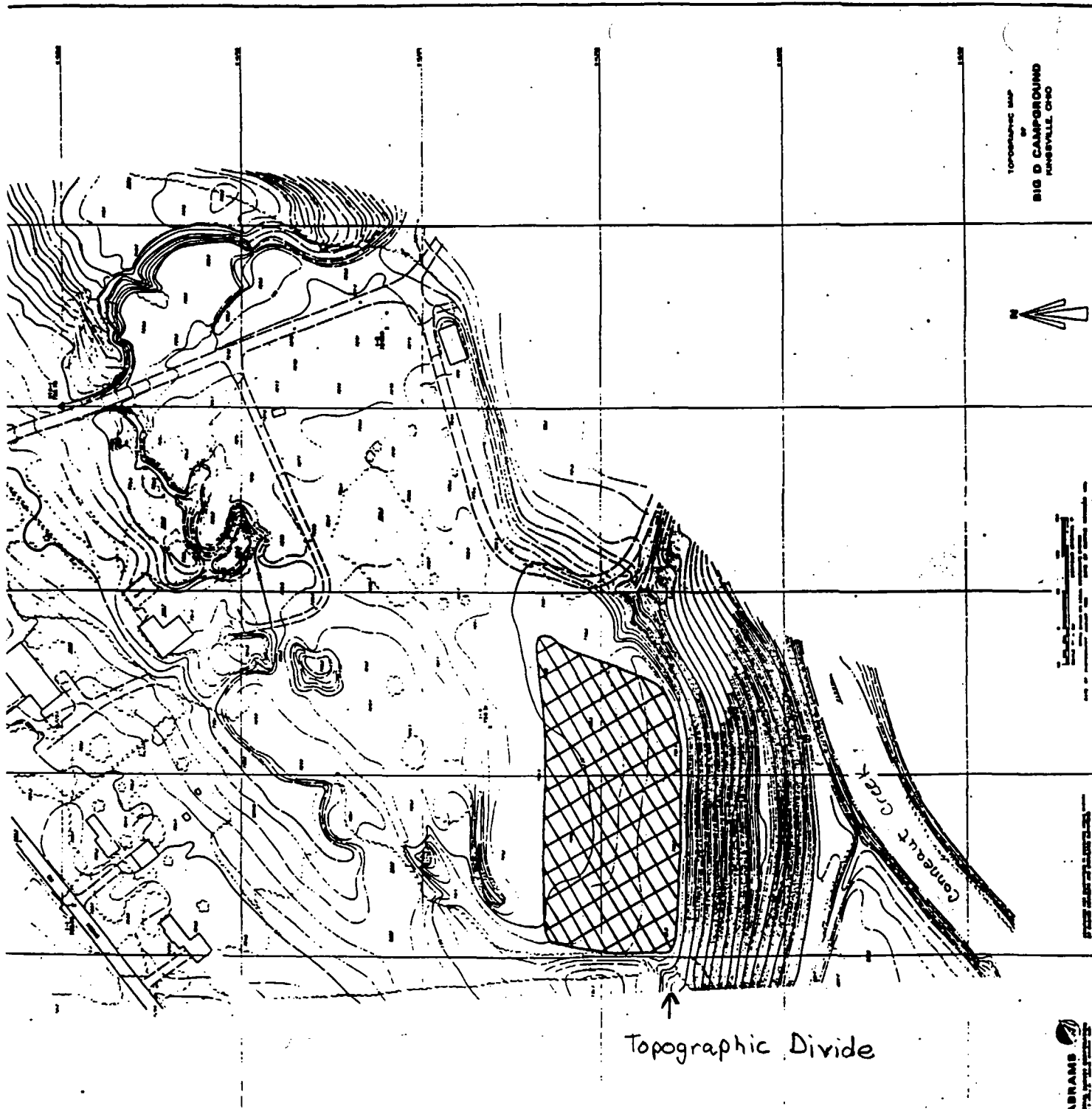


QUADRANGLE LOCATION

NOTE: Reproduced from U.S.G.S. 1979

FIGURE 1
TOPOGRAPHIC MAP OF
NORTH KINGSVILLE QUADRANGLE

CREATED: 1/10/89 REVISED: 1/10/89 drwg
PRC ENVIRONMENTAL MANAGEMENT, INC.



TOPOGRAPHIC MAP
 OF
BIG D CAMPGROUND
 HANESVILLE, OHIO



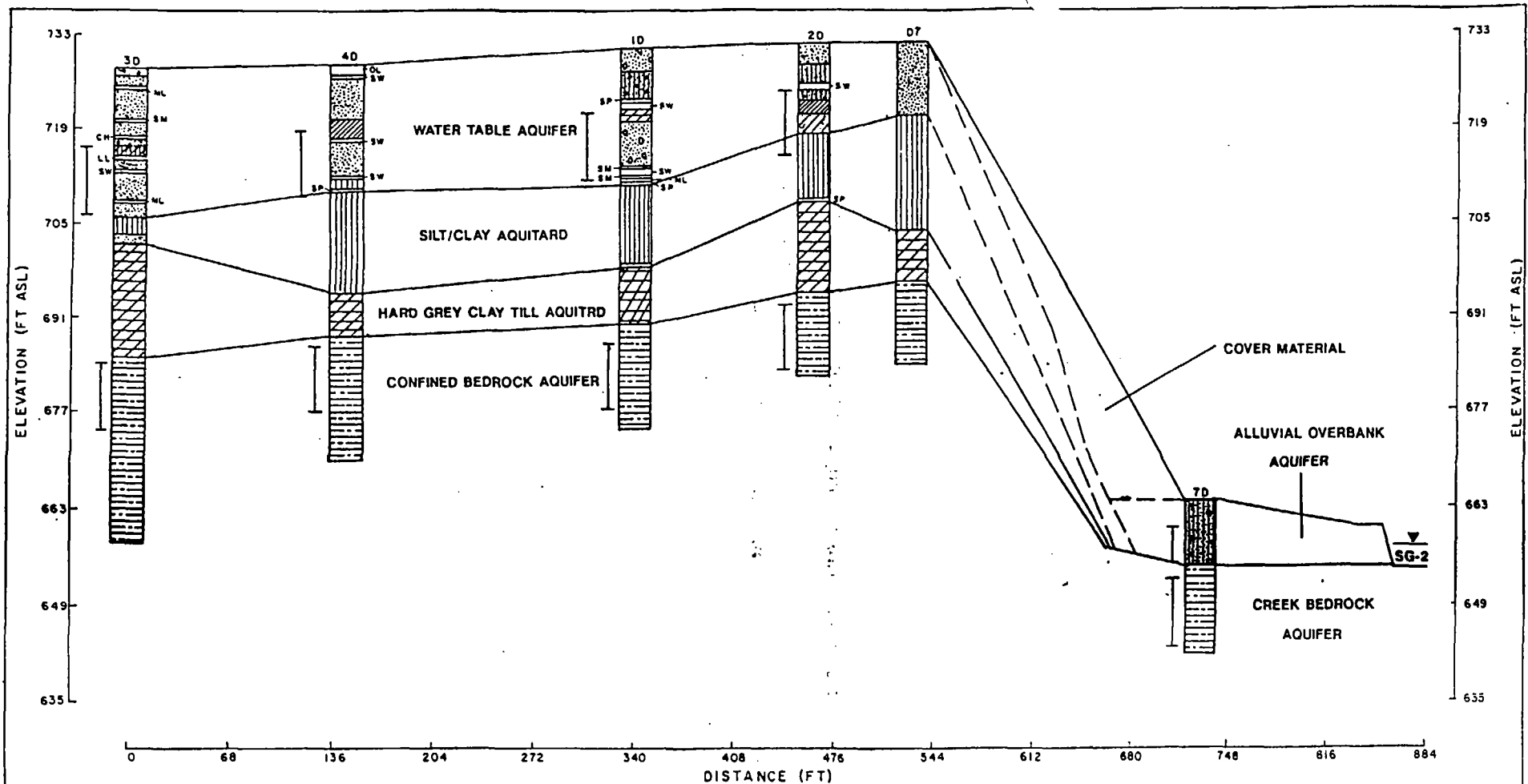
**SUSPECTED LANDFILLED
 AREA**




Topographic Divide

ABRAMS
 ENVIRONMENTAL SERVICES

FIGURE 2
TOPOGRAPHIC MAP OF
BIG D SITE AREA



LEGEND  Static water level (May 1987)

Note: D7 was completed by Olin prior to the RI.

PROJECT: BIG D CAMPGROUND

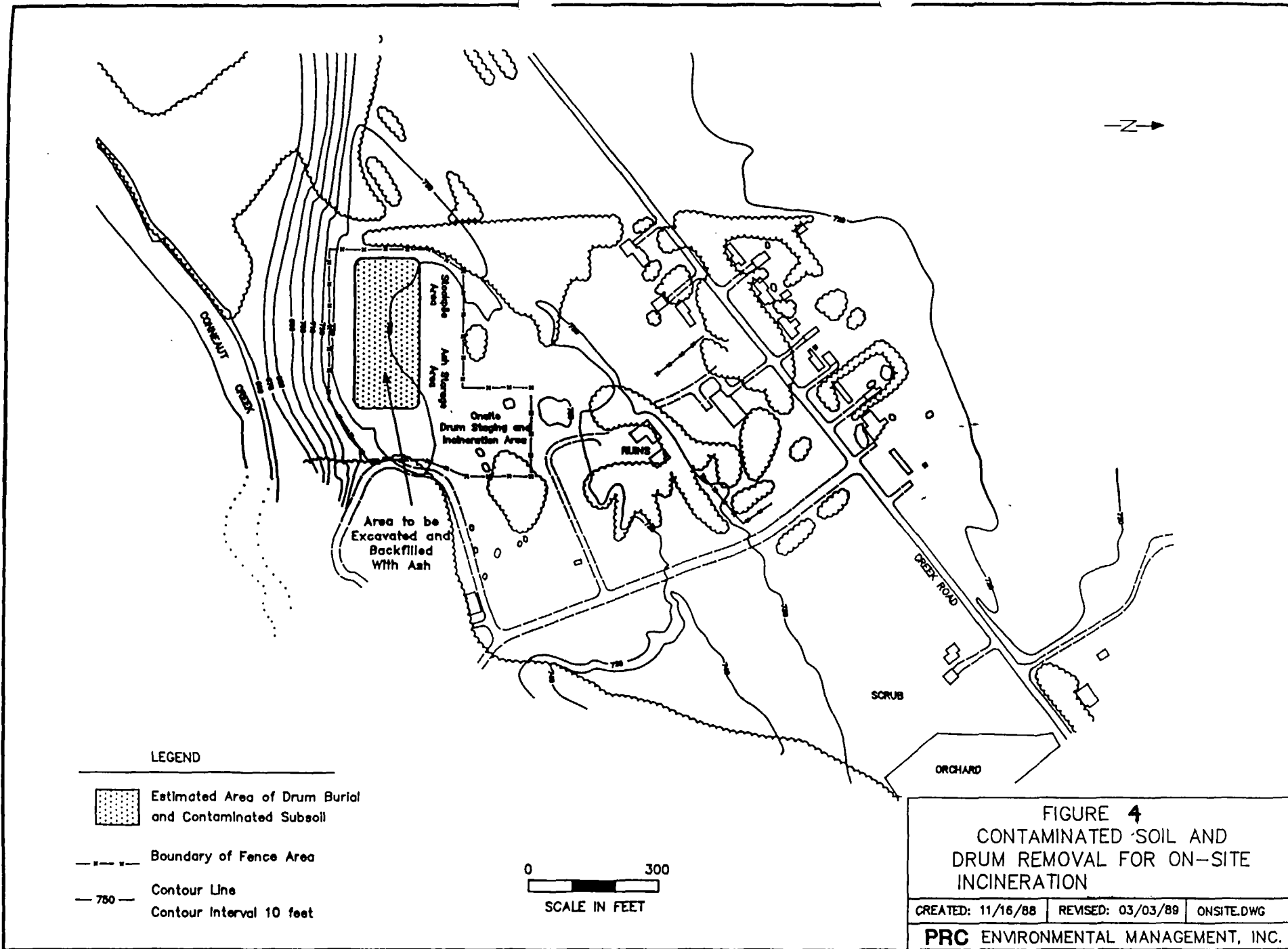
FIGURE 3

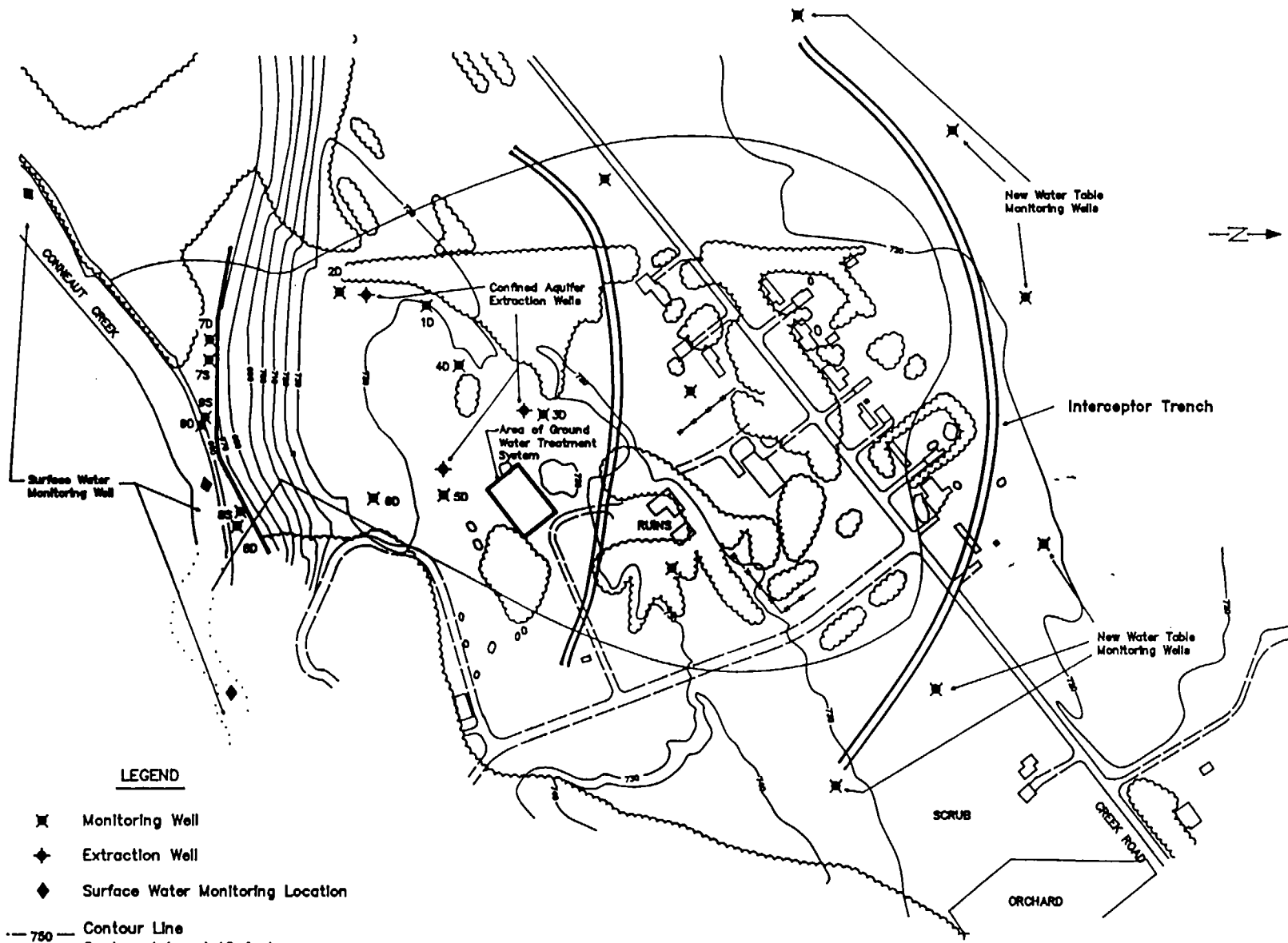
FILE: W64532R1

LOCATION: KINGSVILLE

GEOLOGIC CROSS SECTION
3D-SG2

PRC Environmental Management, Inc.





LEGEND

- ✕ Monitoring Well
- ◆ Extraction Well
- ◆ Surface Water Monitoring Location
- - 750 - - Contour Line
Contour Interval 10 feet
- Extraction Wells with Header
- Estimated Extent of Contaminant Plume
- Interceptor Trench



FIGURE 5
GROUND-WATER COLLECTION
TREATMENT AND DISCHARGE

| | | |
|-------------------|-------------------|-------------|
| CREATED: 11/16/88 | REVISED: 02/28/89 | COLLECT.DWG |
|-------------------|-------------------|-------------|

PRC ENVIRONMENTAL MANAGEMENT, INC.

Table 1
Maximum Concentration Detected

| Inorganic | Source Area (mg/kg) | Soils (mg/kg) | Ground Water (ug/l) | Surface Water (ug/l) |
|--------------------------|------------------------|------------------|---------------------------|----------------------------|
| barium | 154 | 204 | 3,813 | 76 |
| beryllium | - | 1.5 | 3 | 1.5 |
| chromium | 21.7 | 28 | 132 | 18 |
| lead | 136 | 25 | 146 | 21 |
| nickel | 34 | 45 | 134 | 28 |
| ! | | | | |
| Organics | Source Area (ug/kg) | Soils (ug/kg) | Ground Water (ug/l) | Surface Water (ug/l) |
| chlorobenzene | 12,000,000 | 59,000 | 75,000 | 22 |
| 1,2-dichlorobenzene | 7,500 | 9,300 | 210 | - |
| 1,4-dichlorobenzene | 16,000 | 4,300 | 430 | - |
| trans-1,2-dichloroethene | - | 21 | 14,000 | - |
| diaminotoluene | - | - | 70 | - |
| trichloroethene | 3,000 | 46 | 7,500 | - |
| tetrachloroethane | 63,000,000 | 3,624 | 2,300 | - |
| vinyl chloride | 180,000 | 41 | 12 | - |

Table 2.

Summary of Potential Risks Associated With the Big D Campground

| Exposure Scenario | <u>Total Cancer Risks¹</u> | | <u>Noncarcinogenic Hazard Index²</u> | |
|---|---------------------------------------|---------------------|---|-----|
| | <u>Probable Case</u> | <u>Worst Case</u> | <u>Worst Case</u> <u>Child Adult</u> | |
| <u>Ingestion of Contaminated Soil</u> | | | | |
| Upper Portion of Site | - ³ | 1×10^{-10} | <1 | <1 |
| Lower Portion of Site | - | 2×10^{-9} | <1 | <1 |
| <u>Direct Contact with Contaminated Soils</u> | | | | |
| Upper Portion of Site | - | 3×10^{-12} | <1 | <1 |
| Lower Portion of Site | - | 5×10^{-11} | <1 | <1 |
| <u>Ingestion of Ground Water</u> | | | | |
| Upper Portion of Site | | | | |
| Water Table Aquifer | 6×10^{-6} | 1×10^{-2} | 290 | 82 |
| Bedrock Aquifer | - | 4×10^{-5} | 5.4 | 1.6 |
| Lower Portion of Site | | | | |
| Alluvial Overbank and Bedrock Aquifer | - | 6×10^{-3} | 24 | 6.6 |

- Notes:
- 1 Total Cancer Risk = Average Lifetime Dose x Carcinogenic Potency Factor
 - 2 Noncarcinogenic Hazard Index = Exposure Dose ÷ Acceptable Chronic Intake
 - 3 Not Available or Not Calculated

Table 3
SUMMARY OF DETAILED ANALYSIS OF ALTERNATIVES
(1 of 2)

| | <u>Alternative 1</u> | <u>Alternative 2</u> | <u>Alternative 3</u> | <u>Alternative 4</u> | <u>Alternative 5</u> |
|---|---|--|---|--|---|
| <u>Evaluation Criteria</u> | <u>No Action</u> | <u>Ground Water and Source Area Containment</u> | <u>On-Site Incineration, Vitrification, Ground-Water Monitoring</u> | <u>Off-Site Incineration</u> | <u>On-Site Incineration, Ground-Water Monitoring</u> |
| Short-Term Effectiveness | No effects from remediation because there is no remediation. Does not achieve remedial response objectives. | Minimal risk during remedial action. Does protect against further contamination. Only partially meets objectives. No ground-water treatment. 2.5 to 4 years to implement. | High risk during remedial action is reduced by proper application of engineering controls. New technology. Only partially meets objectives. No ground-water treatment. 2 to 2.5 years to implement. | Moderate risk during remedial action. Meets objective for source area but not ground water. 2.5 to 3 years to implement. | High risk during remedial action is reduced by proper application of engineering controls. Meets objective for source area but not ground water. 1 to 2.5 years to implement. |
| Long-Term Effectiveness | Long-term risk remains. Ground-water monitoring will be conducted for 30 years. | Risk reduced by containing source area and ground water but contamination remains in place. Ground-water monitoring will be conducted for 30 years. | Risk reduced but in source area ground-water treatment. Long-term effectiveness of vitrification no known. Ground-water monitoring will be conducted for 30 years. | Risk reduced source area but no ground-water treatment. Ground-water monitoring will be conducted for 30 years. | Risk reduced in source area but no ground-water treatment. Ground-water monitoring will be conducted for 30 years. |
| Reduction of Toxicity (T), Mobility (M), and Volume (V) | No change. | Mobility reduced. No change in toxicity or volume. | Reduced TMV of source area. No change to ground water. | Reduced TMV of source area. No change to ground water. | Reduced TMV of source area. No change to ground water. |
| Implementability | Nothing to implement. | Technologies available but must purchase property from homeowners and rework road. | Few contractors available for vitrification. Otherwise implementable. | Only one RCRA-permitted incinerator in area. May present problem at time of remedial action. | Easily implemented. Mobile incineration available. Treatment technologies proven. |
| Costs | | | | | |
| Capital | \$0 | \$19,000,000 | \$33,000,000 | \$61,000,000 | \$34,000,000 |
| O&M | \$0 | 170,000 | 110,000 | 110,000 | 110,000 |
| Present Worth 10%, 30 Years | \$0 | 21,000,000 | 34,000,000 | 62,000,000 | 35,000,000 |
| Protection of Human Health and the Environment | Not protective. | Protective for soils and water table aquifer. Reduces risk for alluvial overbank and semiconfined aquifer. No change for confined bedrock aquifer. Contamination remains in place. | Protection for soils and future ground water. Does not change existing ground-water contamination. Long-term protection of vitrification uncertain. | Protective for soils and future ground water. Does not change existing ground-water contamination. | Protective for soils and future ground water. Does not change existing ground-water contamination. |
| Compliance with ARARs | No compliance. | Not in full compliance. | Not in full compliance. | Not in full compliance. | Not in full compliance. |
| State Acceptance* | | | | | |
| Community Acceptance* | | | | | |

Note:

* Will be completed and modified following public comment period.

Table 3
SUMMARY OF DETAILED ANALYSIS OF ALTERNATIVES
(2 of 2)

| | <u>Alternative 6</u> | <u>Alternative 7</u> | <u>Alternative 8</u> | <u>Alternative 9</u> |
|---|--|--|---|---|
| <u>Evaluation Criteria</u> | <u>Source Area Containment, Treatment of Ground-Water Outside Contained Area</u> | <u>On-Site Incineration, Ground-Water Treatment</u> | <u>Off-Site Incineration, Ground-Water Treatment</u> | <u>On-Site Incineration, Ground Water Treatment</u> |
| Short-Term Effectiveness | Minimal risk during remedial action. Meets objective for source area and ground water. 1.5-2.5 years to implement. | High risk during remedial action is reduced by application of engineering controls. Meets objective for source area and ground water. New technology. 2-2.5 years to implement. | Moderate risk during remedial action. Meets objective for source area and ground water. Most effective. 2.3-3 years to implement. | High risk during remedial action is reduced by application of engineering controls. Meets objectives for source area and ground water. Very effective. 2-2.5 years to implement. |
| Long-Term Effectiveness | Risk reduced. Smaller containment area than Alternative 2. Source area remains in place. Ground water outside containment area treated. A collection time of 20 to 60 years would be required to reach the risk objectives for ground water in all three aquifers. | Risk reduced. Ground water treated. Long-term effectiveness of vitrification not known. A collection time of 20 to 60 years would be required to reach the risk objectives for ground water in all three aquifers. | Risk reduced. No soils remain on-site, and ground water treated. A collection time of 20 to 60 years would be required to reach the risk objectives for ground water in all three aquifers. | Risk eliminated. Ground water and source area treated. A collection time of 20 to 60 years would be required to reach the risk objectives for ground water in all three aquifers. |
| Reduction of Toxicity (T), Mobility (M), and Volume (V) | Reduced M of source area. Reduced TMV of ground water. | Reduced TMV of source area and ground water. | Reduced TMV of source area and ground water. | Reduced TMV of source area and ground water. |
| Implementability | Easily implemented. Slurry wall and treatment technologies proven. | Few contractors available for vitrification. Otherwise implementable. | Only one RCRA-permitted incinerator in area. May present problem at time of remedial action. | Easily implemented. Mobile incinerators available. Treatment technologies proven. |
| Costs | | | | |
| Capital | \$3,000,000 | \$36,000,000 | \$63,000,000 | \$34,000,000 |
| O&M | 300,000 | 230,000 | 430,000 | 320,000 |
| Present Worth 10%, 30 Years | 8,000,000 | 39,000,000 | 67,000,000 | 39,000,000 |
| Protection of Human Health and the Environment | Protective for soils and ground-water. Contamination remains in contained area, presenting possible risk in future. | Protective for soils and ground water. Long-term protection of vitrification uncertain. | Most protective of soils and ground water. | Most protective of soils and ground water. |
| Compliance with ARARs | Complies with ARARs. | Complies with ARARs. | Complies with ARARs. | Complies with ARARs. |
| State Acceptance* | | | | |
| Community Acceptance* | | | | |

Note:

* Will be completed and modified following public comment period.