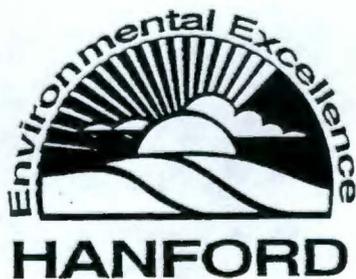


## 216-B-3 Pond Interim Stabilization Final Report

Author  
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## 216-B-3 POND INTERIM STABILIZATION FINAL REPORT

### 1.0 INTRODUCTION

This final report has been prepared to provide a description of the activities performed to interim stabilize the 216-B-3 Pond, and the associated 216-B-3-3 Ditch, and 216-B-3A Lobe. The 216-B-3 Pond was removed from service as part of the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) milestone M-17-10 ("Cease all liquid discharges to hazardous land disposal units unless such units have been clean closed in accordance with the Resource Conservation and Recovery Act") (Ecology et al. 1989). Interim stabilization was required to maintain the 216-B-3 Pond, 216-B-3A Lobe, and 216-B-3-3 Ditch in a stable configuration until closure actions have been determined and initiated.

### 2.0 FACILITY DESCRIPTION

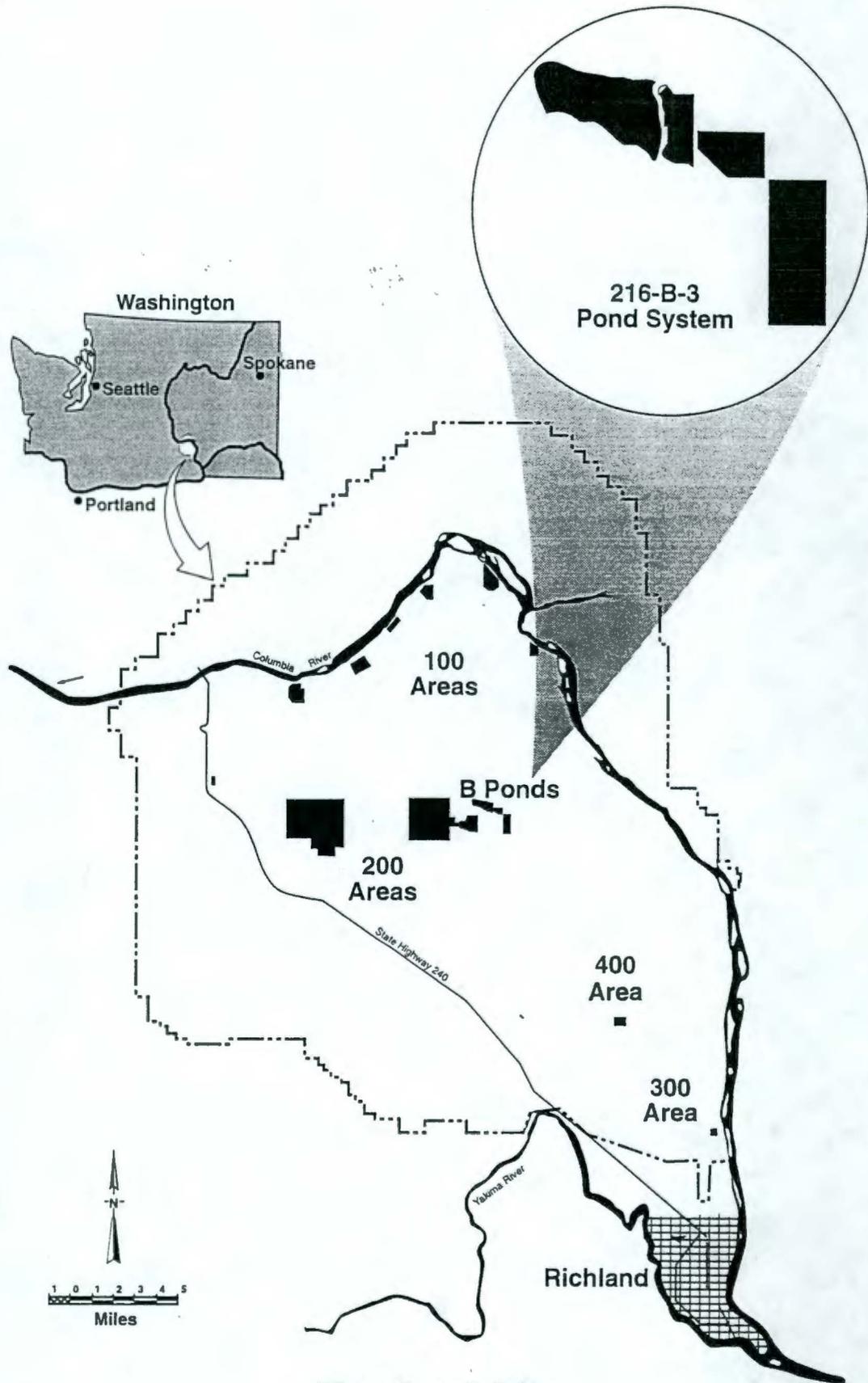
#### 2.1 THE HANFORD SITE

The Hanford Site covers approximately 560 square miles of semiarid land owned by the U.S. Government and managed by the U.S. Department of Energy-Richland Operations Office. The Hanford Site is located northwest of the City of Richland, Washington, in the Columbia Basin. The City of Richland adjoins the southernmost portion of the Hanford Site boundary and is the nearest population center. In early 1943, the U.S. Army Corps of Engineers selected the Hanford Site as the location for reactor, chemical separation, and related facilities and activities for the production and purification of plutonium. As a result of plutonium production, large volumes of low level waste effluent were generated, most of which was disposed of in ponds and ditches.

The 216-B-3 Pond is located in the central portion of Hanford, and was the result of plutonium production activities in the 200 Areas. See Figure 1 for a map of Hanford, and the location of the 216-B-3 Pond in relation to the rest of Hanford. It is part of the 216-B-3 Pond System, which consist of four individual ditches (216-B-3-1, 216-B-3-2, 216-B-3-3, and 216-A-29), six unlined earthen ponds (216-B-3, 216-B-3A, 216-B-3B, 216-B-3C, 216-B-3 West Lobe, and the 216-E-28), and associated underground piping and flow control structures. The 216-B-3-1, 216-B-3-2, 216-B-3 West Lobe and 216-A-29 sites have all been previously interim stabilized (Smith 1991 and Smith and Hayward 1993). The 216-E-28 Pond has never been used, and the 216-B-3B and 216-B-3C are active and as such were not part of the 216-B-3 Pond interim stabilization (Smith 1992).

This report details interim stabilization of the 216-B-3 Pond, 216-B-3A Lobe, and 216-B-3-3 Ditch.

Figure 1



**Hanford Site**

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## 2.2 THE 216-B-3 POND, 216-B-3A LOBE, AND 216-B-3-3 DITCH

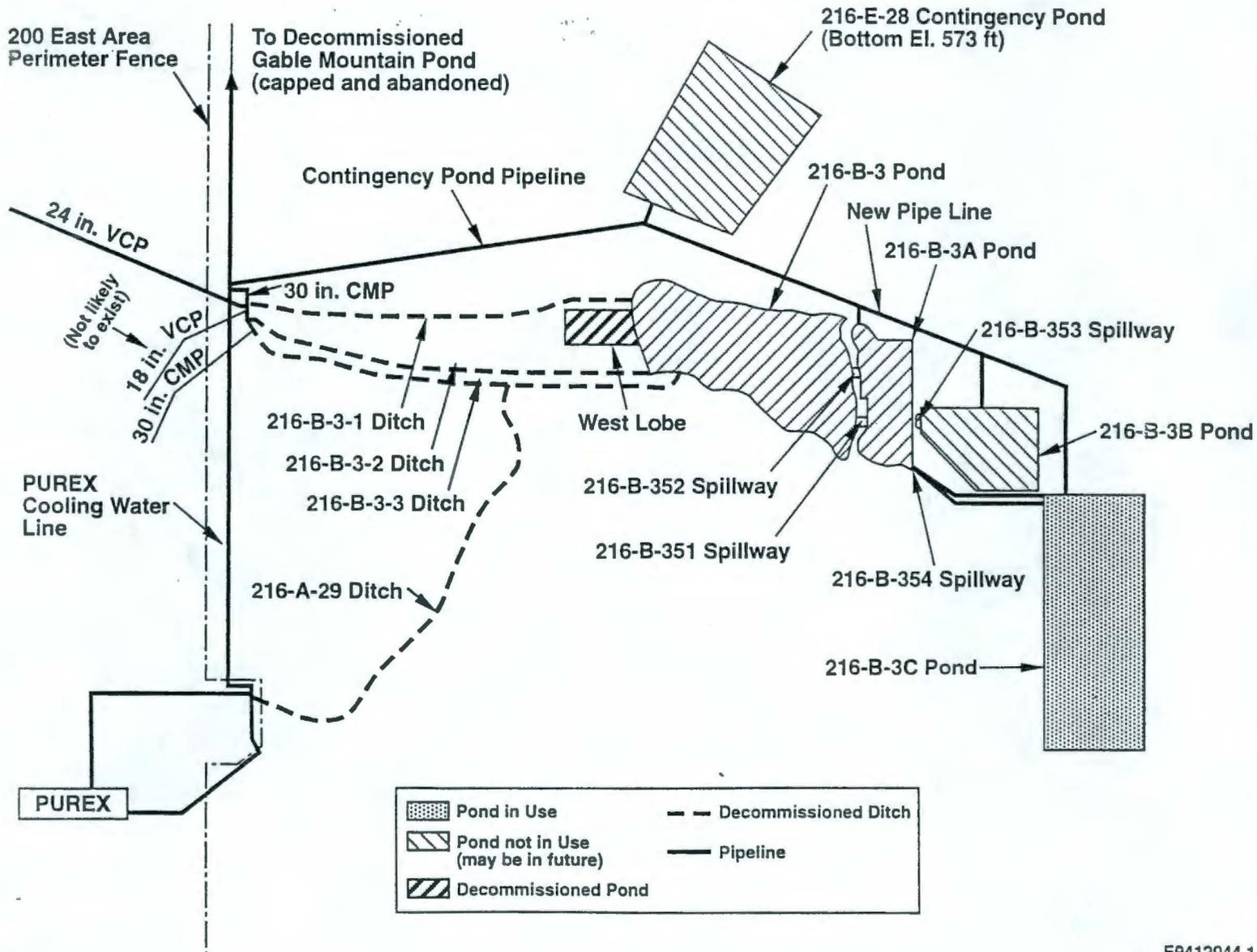
The 216-B-3 Pond was placed in service in 1945. A natural topographic depression and a constructed earthen dam were utilized to create the pond. It received effluent via the 216-B-3-1, 216-B-3-2, 216-B-3-3 and 216-A-29 Ditches while active. The source of the effluent was varied. The Plutonium-Uranium Extraction Plant (PUREX) and B Plant were the major contributors. However, there were numerous miscellaneous sources of effluent as well. Some of this effluent contained hazardous materials as defined under the Resource Conservation and Recovery Act (RCRA). Prior to interim stabilization, the pond covered approximately 32 acres, with a maximum depth of 13 feet (Smith 1993a). The pond shoreline was surrounded by a post and chain fence placarded with surface contamination signs. In addition, the areas immediately north and south of the pond were posted as underground radioactive material areas. Because of the water, the pond developed lush vegetation, and attracted wildlife. There were two structures associated with the pond (216-B-351, and 216-B-352), both of which transferred water from the 216-B-3 Pond to the 216-B-3A Pond.

The 216-B-3A Lobe was built in 1983 to increase the disposal capacity of the 216-B-3 Pond system. The pond covered approximately 11 acres, and had a maximum depth of approximately 3 feet. The pond did not have enough percolation capacity, so a trench was dug in the bottom of the pond in an effort to increase percolation. This increased the maximum depth of the pond to approximately 6 feet (Appendix A). The pond was surrounded by a post and chain fence placarded with surface contamination signs. Due to the presence of water, there was moderately heavy vegetation growing along the shores. There were several structures associated with pond. The 216-B-353 transferred water from the 216-B-3A Pond to the 216-B-3B Pond. The 216-B-354 allowed transfer of water from the 216-B-3A Pond to the 216-B-3C Pond. In addition, a pipeline was installed that allowed water to be routed around the 216-B-3-3 Ditch and Pond and straight into the 216-B-3A Pond. The inlet structure associated with this pipeline was located on the north shore of the pond. Water could also be routed around via new pipelines to the 216-B-3B Pond, and 216-B-3C Pond thereby bypassing 216-B-3A Pond entirely (Frederick 1992).

The 216-B-3-3 Ditch was excavated in 1970 after the 216-B-3-2 Ditch was decommissioned. The ditch was approximately 3,700 feet long, 30 feet wide at ground level, and ranged from 4 to 8 feet deep. Flow rates prior to decommissioning were approximately 1,500 gallons/minute. The ditch was surrounded by a post and chain fence placarded with surface contamination signs. South of the ditch and within the surface contamination zone, were numerous spoil piles that resulted from ditch construction and maintenance activities (dredging). The ditch had a moderate amount of vegetation associated with it due to the presence of water. There were three structures associated with the ditch. At the ditch outlet were two concrete headwall structures, one for each of the pipes discharging to the ditch. In addition, there was a flume and flow rate recorder in the ditch. The flume was constructed of fiberglass and concrete.

Refer to Figure 2 for a map of the 216-B-3 Pond System. For a more complete history and description of the 216-B-3 Pond system refer to the *216-B-3 Pond System Closure/Post Closure Plan* (DOE-RL 1994).

Figure 2



### 3.0 OBJECTIVES

The interim stabilization of the 216-B-3 Pond, 216-B-3-3 Ditch, and 216-B-3A Lobe achieved several objectives. The major objective was placing the pond system in a configuration which will maintain the environmental control of any radioactive or hazardous sediments after the wastewater was routed away from the 216-B-3 Pond. This was accomplished through interim stabilization followed by surveillance and maintenance.

The second objective was to reduce the size of the radiologically posted zone around the 216-B-3 Pond System and reclassify the remainder as underground radioactive material. This was accomplished through radiological surveys followed by reposting.

The final objective was to provide a stable foundation for an engineered barrier that may be placed over the site in the future. This objective was met by using coarse backfill over the soft bottom sediments, and by minimizing the amount of vegetation concentrated in any one spot.

### 4.0 SITE STABILIZATION ACTIVITIES

This section describes interim stabilization activities. These activities are site preparation, earthmoving and isolation, and post interim stabilization.

#### 4.1 SITE PREPARATION

The preparatory activities were performed in advance of earthmoving. These activities included engineering and administrative tasks to be performed through the completion of the field work. Significant activities are described below.

##### 4.1.1 Work Plan Preparation

A written work plan (Smith 1992) was prepared prior to field work. This plan broadly defined interim stabilization activities, and was intended to provide a description of the planned activities.

##### 4.1.2 National Environmental Policy Act Documentation

A Categorical Exclusion was used to satisfy National Environmental Policy Act (NEPA) documentation requirements (Englemann 1993 and Rued 1993).

#### 4.1.3 Borrow Area Preparation and Backfill Preparation

The estimated volume of fill required for interim stabilization of B Pond was 450,000 cubic yards. Approximately 170,000 yards of material were stockpiled at the site already. This consisted of the spoil from construction of the 216-E-28 Contingency Ponds (spoil was placed north and adjacent to the 216-B-3 Pond) and spoil from the excavation of the percolation trench in A Lobe (spoil was placed south and adjacent to the 216-B-3 Pond). Construction of the Project W-049 Treated Effluent Disposal Ponds generated approximately 250,000 cubic yards of material. This material was hauled and stocked piled next to the existing spoilpile north of the 216-B-3 Pond. Most of this material consisted of rock with diameter ranging up to twelve inches. Topsoil was obtained from a borrow pit located inside the Grout Facility, south of the 216-B-3 Pond. See Appendix F for approximate location of borrow pit.

#### 4.1.4 Topographic Surveys

The 216-B-3 Pond and the 216-B-3 Ditch were mapped in March 1993. The edge of the surface contamination zone, bottom of the ditch, location of the flowmeter and headwalls were recorded. In addition, the perimeter of the 216-B-3A Lobe was recorded. This included the surface contamination boundary, and the flow control structures. Refer to Figure 3, sheets 1, 2, 3, and 4, for the preinterim stabilization surveys.

#### 4.1.5 Bathymetric Surveys

The bottom of the pond was mapped using standard bathymetric survey instrumentation (Smith 1993b). This effort recorded the edge of vegetation (which is not necessarily the edge of the surface zone). Information from this effort was used to calculate the exact volume of the pond. Refer to Figure 4 for the bathymetric map produced from this effort.

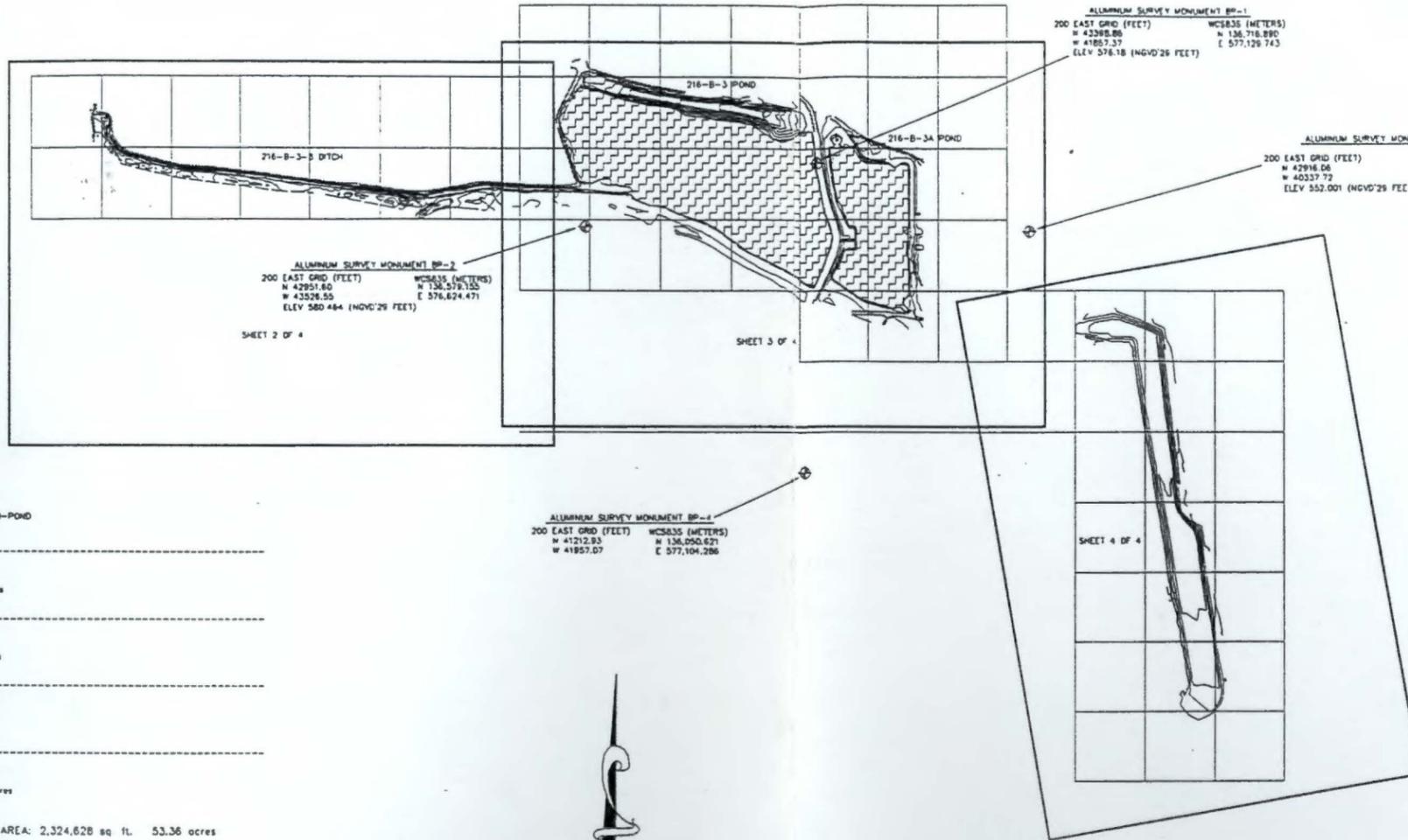
#### 4.1.6 Herbicide Treatment and Cutting of Trees

All trees, consisting of cottonwood, Russian olive, and willows, were treated with herbicide. Cottonwoods were the largest in size and most prevalent in numbers. This was necessary to minimize resprouting of the trees after interim stabilization was completed. The herbicide was RODEO, which was labelled for use in aquatic environments. Initial treatments began in the spring with injection of the larger trees. This was only marginally effective. All trees (mature and sapling) were sprayed. This killed the smaller trees, but the larger ones were still alive. Subsequent treatment involved cutting the trees down, and treating the stump with herbicide. Herbicide treatment is intended to prevent regrowth of trees after interim stabilization.

All portions of trees larger than 4 inches in diameter were cut into 4 to 6 inch long segments, and left inside the surface contamination zone. All tree portions less than four inches in diameter were not segmented. The stumps were left in place.

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Project: B-POND  
Lot Area Listing

- 
- Lot name: 216-B-3 3A POND  
Perimeter: 3621.07 Area: 527,825 sq.ft. 12.11 acres
- 
- Lot name: 216-B-3 -3 DITCH  
Perimeter: 6857.44 Area: 301,752 sq.ft. 6.93 acres
- 
- Lot name: 216-B-3 -3 PUMP/USE  
Perimeter: 84.10 Area: 523 sq.ft. 0.01 acres
- 
- Lot name: 216-B-3 POND AREA  
Perimeter: 6463.91 Area: 1,494,727 sq.ft. 34.31 acres

CONSOLIDATED SURFACE CONTAMINATION AREA: 2,324,628 sq. ft. 53.36 acres



SCALE: 1"=400'

|                           |       |            |       |            |           |      |    |      |       |      |       |       |    |
|---------------------------|-------|------------|-------|------------|-----------|------|----|------|-------|------|-------|-------|----|
| DRAWING TRACEABILITY LIST |       | REF NUMBER | TITLE | REFERENCES | REVISIONS | DATE | BY | CHKD | APP'D | DATE | SCALE | SHEET | OF |
| DWG NO                    | TITLE | REF NUMBER | TITLE | REFERENCES | REVISIONS | DATE | BY | CHKD | APP'D | DATE | SCALE | SHEET | OF |
|                           |       |            |       |            |           |      |    |      |       |      |       |       |    |

U.S. DEPARTMENT OF ENERGY  
Nuclear Operations Office  
Westinghouse Nuclear Company

TOPOGRAPHIC SURVEY  
216-B-3 STABILIZATION

DATE OF SURVEY: 12/15/93

DATE OF PLOTTING: 1/15/94

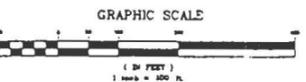
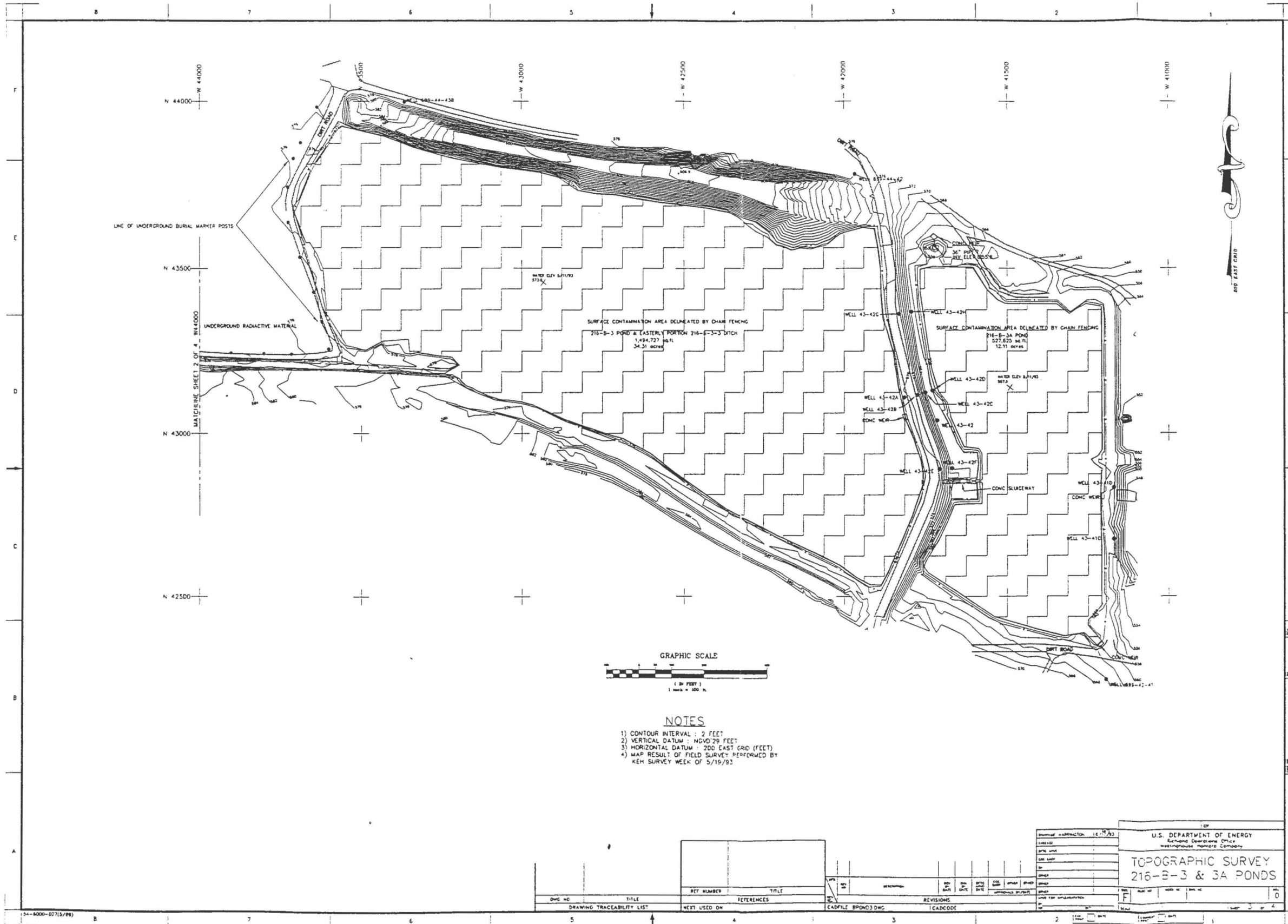
SCALE: AS SHOWN

SHEET 1 OF 4



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- NOTES**
- 1) CONTOUR INTERVAL : 2 FEET
  - 2) VERTICAL DATUM : NGVD 29 FEET
  - 3) HORIZONTAL DATUM : 200 EAST GRID (FEET)
  - 4) MAP RESULT OF FIELD SURVEY PERFORMED BY KEH SURVEY WEEK OF 5/15/93

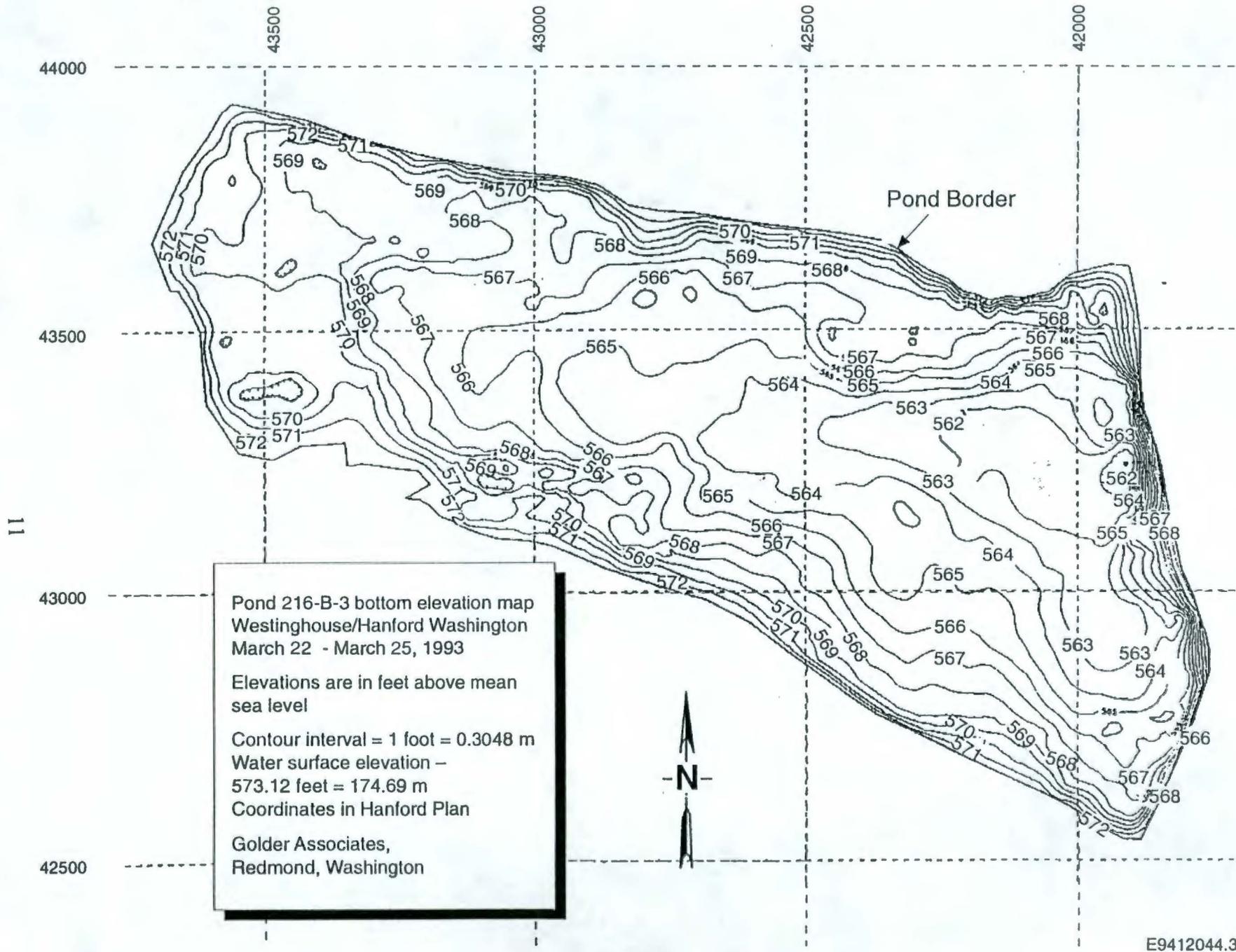
| DRAWING TRACEABILITY LIST |       | REFERENCES |       | CADFILE (BPOND3) DWG |      | REVISIONS |      | ICADCODE  |      |
|---------------------------|-------|------------|-------|----------------------|------|-----------|------|-----------|------|
| DWG NO                    | TITLE | REF NUMBER | TITLE | NO                   | DATE | BY        | CHKD | APPROVALS | DATE |
|                           |       |            |       |                      |      |           |      |           |      |

|                            |         |
|----------------------------|---------|
| U.S. DEPARTMENT OF ENERGY  |         |
| Contract Operations Office |         |
| Washington, D.C. 20545     |         |
| TOPOGRAPHIC SURVEY         |         |
| 216-B-3 & 3A PONDS         |         |
| DATE                       | 16-7-93 |
| BY                         |         |
| CHKD                       |         |
| APP                        |         |
| DATE FOR IMPLEMENTATION    |         |
| SCALE                      |         |
|                            |         |



Figure 4



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#### **4.1.7 Photographs**

Numerous photographs were taken before, during and after the project. A list of pertinent photographs is found in Appendix B. Examples of earthmoving, vegetation, tree cutting, and many other activities are listed.

#### **4.1.8 Cultural Resource Reviews and Ecological Assessment**

Cultural resource reviews were completed for the borrow areas (Crist 1994 and Gard 1992). Ecological reviews were completed for the borrow areas and the pond itself (Sonnichsen 1993, Landeen 1994 and Sackschewsky 1992). No artifacts or threatened or endangered plants or animals were found.

#### **4.1.9 Waterline and Bridge**

A temporary waterline was installed to provide dust control water. A tap was made in a 12 inch line serving the 200 Area Treated Effluent and Disposal Facility. Approximately 3,500 feet of 8 inch irrigation pipe, and several specialized valves were used to provide water.

An earthen bridge was placed over the 216-B-3-3 Ditch. This bridge consisted of a 3 foot diameter culvert covered with a layer of backfill. The purpose of the bridge was to allow heavy equipment to move around the entire perimeter of the pond. The culvert was located where the west perimeter road around the 216-B-3 Pond intersected the north perimeter road of the 216-B-3-3 Ditch. The culvert was removed after interim stabilization was complete.

#### **4.1.10 Installation of Bypass Piping**

Interim stabilization of the 216-B-3 Pond, 216-B-3-3 Ditch, and 216-B-3A Lobe required that waste water that is still discharged from 200 East Area facilities be permanently routed around the 216-B-3 and 216-B-3A Ponds to the 216-B-3B and 216-B-3C Ponds before the 216-B-3-3 Ditch, 216-B-3 Pond, or 216-B-3A Lobe could be interim stabilized. Refer to Figure 2 for location of bypass piping, and to Frederick (1992) for a description of the bypass installation.

### **4.2 EARTHMOVING AND ISOLATION**

Earthmoving and isolation of the 216-B-3 Pond, and 216-B-3-3 Ditch, and 216-B-3A Lobe occurred concurrently. Any radiological surveys and associated downposting occurred during earthmoving and isolation activities.

#### 4.2.1 Earthmoving

Earthmoving involved all backfilling, hauling, and scraping. The general work plan was to drain the pond, let the exposed sediments dry to some degree, then cover them with backfill. The purpose of letting the sediments dry was to minimize sediment movement as it was covered with backfill. Consolidation of contaminated sediments from 216-B-3A Pond into the 216-B-3 Pond or interim stabilization of the 216-B-3A Pond was planned (Smith 1992), but did not occur. Work proceeded according to this general plan with two differences. Because of the slow percolation rate, backfill was placed across the center (north to south) of the pond to provide an earthen bridge, and no soil was removed from the 216-B-3A Lobe because no mobile surface contamination was found.

Effluent was rerouted around the 216-B-3-3 Ditch to the 216-B-3A Lobe via existing bypass lines (Figure 2) in late February, 1994. Due to faulty valving at the head of the 216-B-3-3 Ditch, a small volume of water was discharged into the ditch for several months until the influent line could be cut and capped.

As the pond level receded, backfill was worked out over the bottom of the pond. Woody vegetation was pushed in front of the backfill toward the center of the pond, then covered. Reeds and other soft vegetation associated with the shoreline were covered in place. It became clear early on that the estimated percolation rate of 1.5 gallon/ft<sup>2</sup>/day was high. It was estimated during interim stabilization that the percolation rate was approximately 0.3 to 0.5 gallons/ft<sup>2</sup>/day. This slower rate impacted earthmoving activities, so that the date at which interim stabilization was complete was later than planned.

During backfilling operations, trees were pushed out toward the center of the pond. As previously stated, portions of trees larger than 4 inches in diameter were cut into pieces no more than 6 inches long. The remaining portion of the tree (mainly branches) were left uncut. Trees were cut and left where they fell. There was no stockpiling or consolidation of woody material. As backfilling began, the smaller diameter portions of the trees (mainly branches) were pushed out in front of the advancing backfill. The individual segments were quickly covered due to their small size. The smaller diameter portions were pushed a minimum of 30 feet and maximum of 60 feet from the edge of 216-B-3 Pond. Because of the small diameter and flexible nature of the branches, this material was easily incorporated into the backfill by the mechanical action of the heavy equipment. All non-woody vegetation was left in place. In particular, the west and southwest end (inlet area) had a large amount of cattails and reeds. This material was very dense, and grew out from the edge of the surface contamination area approximately 30 feet. Backfill was simply pushed out over this vegetation. The mechanical action of the heavy equipment compacted and incorporated this material into the backfill.

The course backfill from the W-049 Project was used as the source of fill for initial material placed on the pond bottom. Because of the large void space in this backfill, it tended to absorb or incorporate the soft bottom sediments. This appeared to minimize sediment movement during backfilling operations when backfill was placed over the soft sediments, such as the placement of the earthen bridge across the center of the pond. When the pond sediment was allowed to

solidify, the use of course backfill was not as critical because the sediment did not shift under the weight of the backfill. However, the coarsest backfills were placed in the 216-B-3 Pond first. As such, the material from the spoil piles located north and south of the pond (from the excavation of 216-E-28 and the 216-B-3A Lobe Pond Percolation Trench) were generally placed into the pond during the same time frame as the W-049 material. The total amount of course material placed in the pond was approximately 396,000 yd<sup>3</sup> of material. The course layer was topped with 12 inches of fine grained soils from the borrow pit located south of the 216-B-3 Pond inside the grout facility perimeter.

Because of the slow percolation rate, an earthen bridge was placed across the center of the pond, running north to south. Pumps were then placed on the bridge, and water was pumped from the west end into the 216-B-3-3 Ditch, or alternately the east end of the pond. The pumping allowed continued earthmoving as the level of the west portion of the pond began to drop faster, thereby exposing more bottom. The placement of fill into the water was a fair departure from planned activities, since it was planned that the sediment be allowed to solidify before covering with backfill. Previous experience (Hayward 1989) indicated that filling into the pond can lead to concentrating mud in front of the backfill. This caused delays during the interim stabilization of Gable Mountain Pond. However, the amount of pond bottom covered by this activity was less than 10% of the pond bottom, and the resulting sediment movement was not significant. Refer to Appendix C for the approximate location of the earthen bridge.

With the exception of the earthen bridge, very little fill was actually pushed into the water. Most backfill was placed on the exposed pond bottom. Only a day or two was required before the mud could be covered with a layer of uncontaminated backfill. Attempts to cover it any sooner caused the mud to move in front of the fill. When the mud was concentrated in this fashion, it took a minimum of two weeks for it to solidify enough to be covered.

In an effort to increase the percolation rate in the east side of the pond (the pond was now divided in half by the earthen bridge), five holes were dug in the bottom of the pond. Each hole was approximately 10 feet square and 8 feet deep. Excavated soil was placed on the north edge of the excavation. Samples of the sediment were obtained from the three excavations from the earthen bridge. Determining the depth from which the samples were taken was difficult. It was estimated that the samples were obtained from a depth of approximately 6 feet deep in the sediment. Radiation levels were consistent throughout the sediment, and were approximately 300 count per minute as detected with Geiger Mueller instrument. No detectable contamination was evident in the sediment from the two percolation holes in the east end of the pond. No samples were taken here. Sediment below approximately one foot was much drier than expected, but the suspected bentonite layer (DOE-RL 1994) was never observed. Excavation of the percolation holes did not appear to increase the percolation rate. Refer to Appendix C for locations of percolation holes, and for results of the sample analysis.

Throughout the drawdown process, a number of fence poles were revealed. These poles presumably were the earlier boundary of the 216-B-3 Pond. Some of the poles still had signs hanging on them, but were unreadable. The location of the majority of the poles were recorded.

It was sometimes difficult to discern a pole from other debris, so the recorded locations should be used for guidance only. Refer to Appendix E for post location information.

The 216-B-352 flow control structure was downposted to no posting except for the flow collection basins and associated pipe entrances. The 216-B-351 was also downposted to no posting. In both cases, the associated underground pipelines remain posted as radioactive. The downstream end of the 216-B-351 pipeline was capped.

Interim stabilization of the 216-B-3-3 Ditch occurred during the same time frame as interim stabilization of the 216-B-3 Pond. Activities consisted of consolidating the spoil piles into the ditch, removal of the fiberglass flume, demolition of the concrete headwall found at the ditch outfall, isolation of the pipes leading into the ditch, and interim stabilization of contaminated soil with 18-24 inches of uncontaminated soil.

As a result of ditch construction and maintenance activities, there were several large spoil piles located south of the 216-B-3-3 Ditch. These spoil piles were contained in a common surface contamination zone. The spoil piles and the associated surface contamination zone were consolidated in the 216-B-3-3 Ditch. The surface contamination posting was moved north toward the edge of the ditch. Some areas (near the head of the ditch and near the confluence with the 216-A-29 Ditch [Figure 2]) could not be successfully decontaminated, and were interim stabilized and posted as underground radioactive material. Contamination levels in the spoil piles was a maximum of 600 counts per minute as measured with a Geiger Mueller instrument. Approximately 7 acres were downposted to no posting, with approximately 3 acres, including the 216-B-3-3 Ditch, being posted as underground radioactive material.

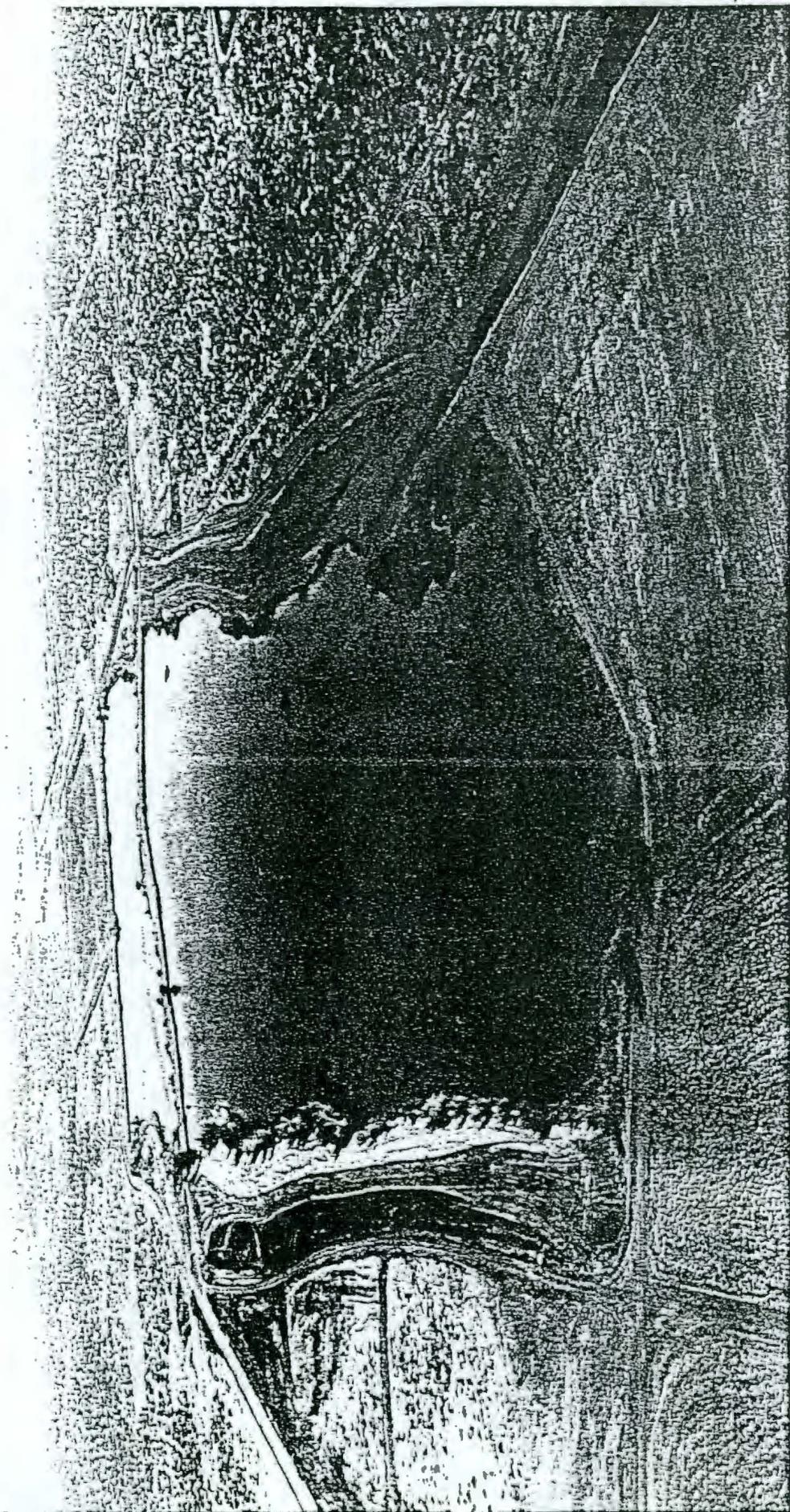
The flowmeter found in the 216-B-3-3 Ditch was constructed of concrete, metal, and fiberglass. The fiberglass and metal portions were removed from the ditch. The concrete portions of the flowmeter were left in place. No detectable contamination was found on any portions of the flowmeter. The headwall at the beginning of the ditch was demolished using a bulldozer. All concrete rubble was left in place at the outfall. Fiberglass portions of the flowmeter were surveyed and released from radiological posting, then sent to the sanitary landfill. The metal portions of the flowmeter were surveyed and released from radiological posting, then recycled.

Once all contaminated soil from the spoil piles and surrounding surface area was consolidated in the 216-B-3-3 Ditch, it was covered with uncontaminated soil. Approximately 18 to 24 inches of the fine grained soil was used to cover the contaminated soil.

Over the course of the job approximately 410,481 yd<sup>3</sup> of uncontaminated backfill was placed in the pond and ditch. No contaminated soils from the 216-B-3A Pond were consolidated in the 216-B-3 Pond. Refer to Figures 5 and 6, and 7 for aerial views of the pond from before, during, and after interim stabilization occurred.

Figure 5 Pre-Interim Stabilization Photo, Looking East

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Figure 6 Interim Stabilization Photo, 50% Complete, Looking East  
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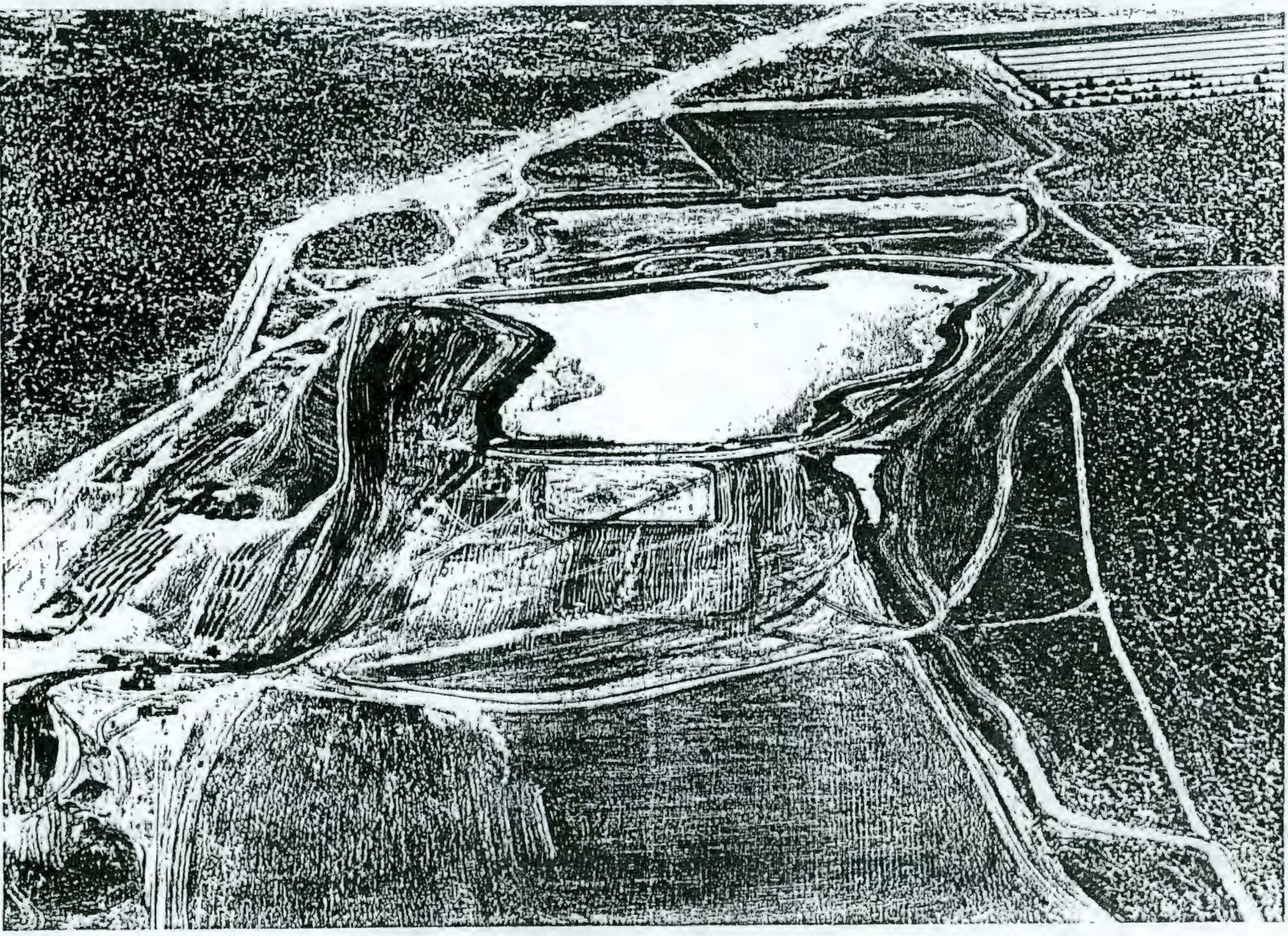
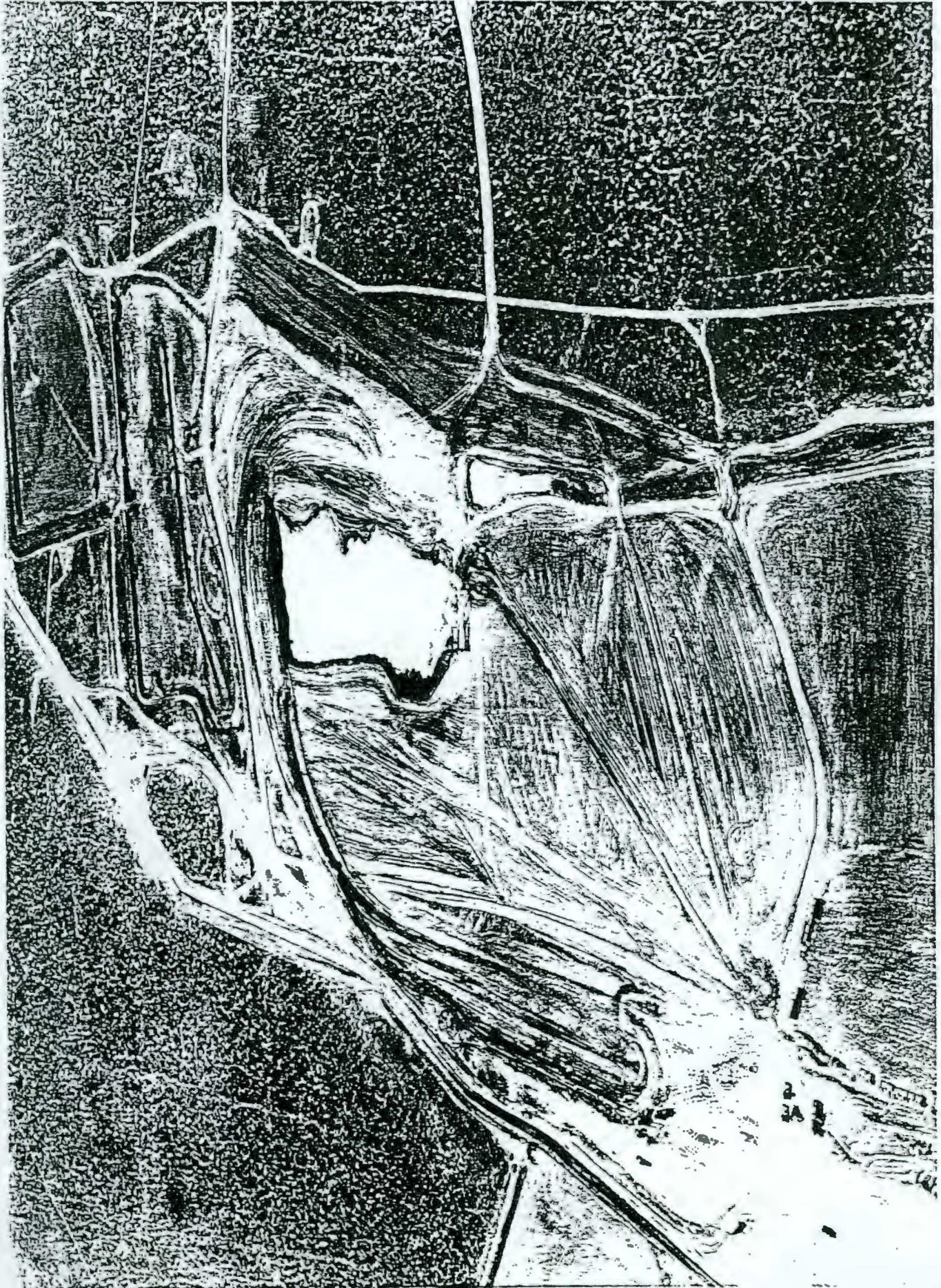


Figure 7 Interim Stabilization Photo, 75% Complete, Looking East  
94080418-5CN



As part of the interim stabilization effort, radiologically posted areas north and south of the 216-B-3 Pond were surveyed and sampled as required with the intent of downposting these areas. These areas (Figure 3) were covered by spoil piles, which were likely the result of pond overflows (DOE-RL 1994), were posted as underground radioactive material. These spoil piles were used as backfill for the interim stabilization activities. No contamination was ever found during removal of the spoil piles. Spot checks using a Geiger Mueller were conducted throughout spoil pile removal. The downposted area covers approximately 15 acres.

Spot checks throughout the job using Geiger Mueller instrumentation gave a general idea as to the level and distribution of radioactive contamination found in the 216-B-3 Pond and 215-B-3-3 Ditch. The highest levels were found in the outfall area of the 216-B-3-3 Ditch. Approximately 6,000 counts per minute were found. While interim stabilizing the pond, radioactive contamination was detected most frequently in the west end of the pond. Approximately 300 to 600 counts per minute were detected in the west end. Similar levels of contamination were detected in the central and east portions of the pond, but radioactive contamination was detected less frequently.

Minimal work occurred in the 216-B-3A Lobe. This was because of the results of radiological surveys and samples. After water was routed around the 216-B-3A Lobe to the 216-B-3B and 216-B-3C Ponds via the existing bypass (Figure 2), the bottom of the pond was allowed to dry.

It was then surveyed using the Ultra Sonic Ranging and Data System (USRADS) and Geiger Muller instrumentation. There were some elevated readings (up to 10 times background) associated with the percolation trench (Appendix D) using sodium iodide detectors. Sample analysis of the pond sediment indicated nonpostable levels of contamination (Appendix D). However, because of the increased background associated with the trench when using sodium iodide detectors, the trench was posted as a soil contamination area. The remainder of the pond was downposted to no posting. The 216-B-353, and 216-B-354 structures were downposted to no posting. The underground pipelines from the 216-B-353 and 216-B-354 structures to the 216-B-3B Pond and 216-B-3C Lobe remain posted as underground radioactive material.

A total of approximately 10 acres were downposted to no posting, and approximately 1 acre (the percolation trench) was posted as a soil contamination area.

#### **4.2.2 Isolation**

There were three active lines discharging to the 216-B-3-3 Ditch. These were the PUREX cooling water line (24 inch steel line), the B Plant line (16 inch vitrified clay pipe line), and a three inch steel drain line for the PUREX cooling water line. There was a fourth line (18 inch vitrified clay pipe) whose existence was suspect (DOE 1994 and Smith 1992). In addition, the flow control structure that directed flow into the 216-B-3A Lobe had to be isolated after wastewater flow was routed around the 216-B-3A Lobe into the 216-B-3C Pond. All the lines had to be isolated such that effluent from the active systems could not be inadvertently discharged to the ditch or surrounding soil.

Isolation of the B Plant line occurred in two steps. First, the slide gate that directs water into the pipeline was closed. Second, the area between the pipeline and slidegate was filled with concrete. Flow into the 216-B-3-3 Ditch via this pipeline was eliminated. No radiation as measured with a Geiger Mueller instrument was ever detected.

The 24 inch PUREX cooling water line was isolated by closing the upstream valve, which eliminated flow to the ditch. The steel line was then cut, and capped with a steel plate. The plate was welded to the end of the steel line. The inside of the pipe registered approximately 6,000 counts per minute as measured with a Geiger Muller handheld instrument. The severed end of the pipe was left in place, the area was surveyed to verify that no contamination was outside the pipe, and then backfilled.

The 3 inch line was difficult to isolate. It was located in a 20 foot by 20 foot corrugated steel building. This line drained the 24 inch PUREX cooling water line, which is always active. Original plans called for closing the valve, cutting the line downstream of the valve, and threading a cap on the end. However, the valve developed a crack as soon as pipe cutting began. The valve held back a flow of approximately 300 gallons per minute, so actions which might risk damaging the valve further were not possible. An attempt was made to freeze the line upstream of the valve, but this also failed. As a last resort, a set of forms were built around the leaky valve, and concrete poured around it.

The 18 inch vitrified clay pipeline was looked for but was never located. Previous excavations and ground penetrating radar surveys (Erb 1990) had also failed to locate this pipeline. Excavation occurred to a depth of approximately 10 feet perpendicular to the suspected location of the pipeline. During excavation, underground radioactive contamination was uncovered. Approximate levels of radiation as detected with a Geiger Mueller instrument were 300 to 400 counts per minute beta gamma. These areas were posted as underground radioactive material. The 18 inch vitrified clay pipeline was not found by excavation, and it is unlikely that it exist.

The flow control structure leading to the 216-B-3A Lobe was isolated by closing the slide gates that lead to the pond, and removing the handle and valve stem from the slide gate structure.

#### **4.3 POST INTERIM STABILIZATION**

Post interim stabilization activities include revegetation, civil surveys, reposting, and surveillance and maintenance. Each activity is described below.

As part of the earthmoving operations, approximately 12 inches of topsoil (sandy loam) was placed over the interim stabilized pond. This served as a base for revegetation activities. The site was then plowed and seeded. A mix of Siberian wheatgrass and Sandbergs bluegrass, or a mixture of Siberian and Thickspike wheatgrass was used on the site (12 pounds Siberian and 3 pounds Sandbergs, or 10 pounds Thickspike to 5 pounds Siberian). Approximately 15 pounds of pure live seed was placed per acre. Twenty pounds of nitrogen per acre was also added to help

initial growth. The area was then mulched and crimped with 1.5 to 2 tons of straw per acre. Revegetation occurred through out the months of September and October.

The original perimeter of the pond was established with civil survey, and used as a guide during reposting activities. Concrete marker posts were placed around the entire perimeter of the pond and ditch.

Civil surveys were performed over the stabilized pond to provide a record of grade change at the site, and to establish the location of the concrete marker posts. Refer to Figure 8 (sheets 1 to 6) for the post interim stabilization maps and cross sections.

In the period between interim stabilization and final remediation, routine surveillance and maintenance of the 216-B-3 Pond and 216-B-3 Ditch will be performed. The area will be monitored for surface radioactive material, potential uptake of radioactivity by vegetation, intrusion into subsurface radioactive materials by animals or insects, proper posting, and general appearance and condition.

Any items found to be out of compliance will be documented in surveillance logs. Items which cannot be fixed immediately will be documented and tracked until they are completed. The site will be periodically inspected to ensure the posting and barriers are in good condition. Besides the surveillances, the 216-B-3 Pond and Ditch will also be placed on the schedule for herbicide application. Annually, the site will be cleaned of unwanted vegetation and sprayed with a selective herbicide. The selective herbicide is used to control deep rooted vegetation without harming the desirable grasses. In addition, the site will be radiologically surveyed, at a minimum, on a annual basis

## 5.0 TIMELINE AND COST

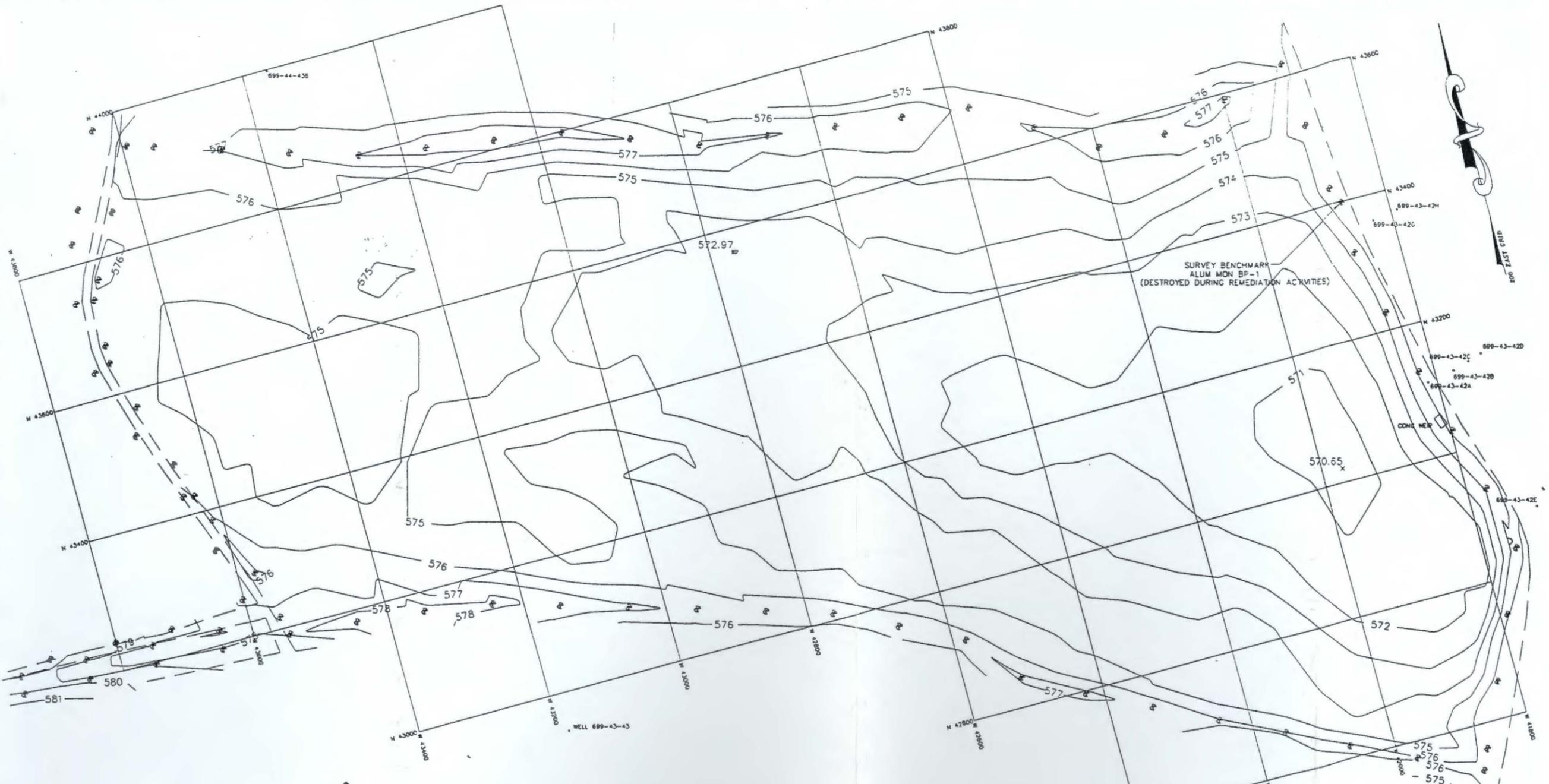
Administrative and engineering tasks began in 1992. Field work began with bathametric surveys in March of 1993. Herbicide treatment and civil surveys also occurred in 1993. Tree cutting, temporary water line (dust control) installation, and other site preparation began February 1, 1994, with earthmoving starting March, 1994. Earthmoving and post stabilization activities were completed by October 30, 1994.

Total cost for all activities was estimated at 1.5 million dollars.

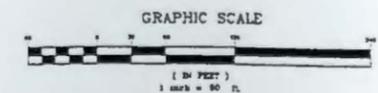


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SURVEY BENCHMARK  
 ALUM MON BP-2  
 200E GRID FEET      WCS83/91 S METERS  
 N 42951.60      N 136.578.904  
 W 43526.55      E 576.624.270  
 ELEV 580.46 (NGVD'29)



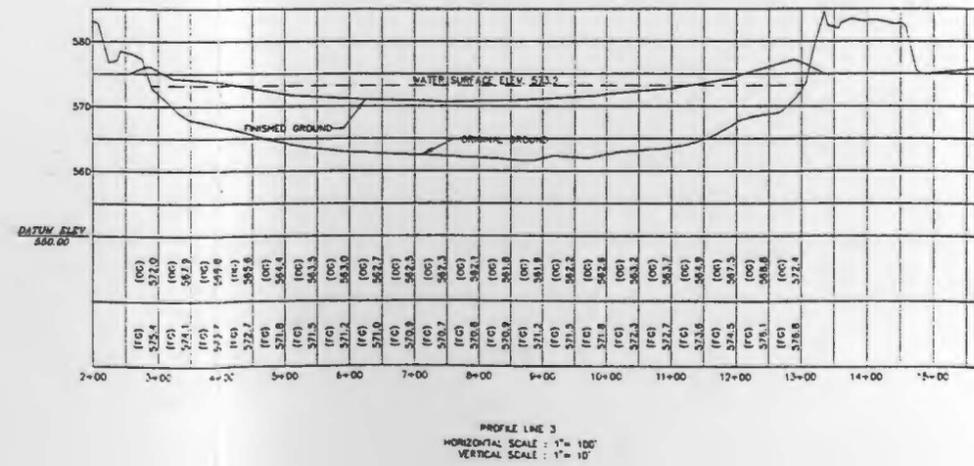
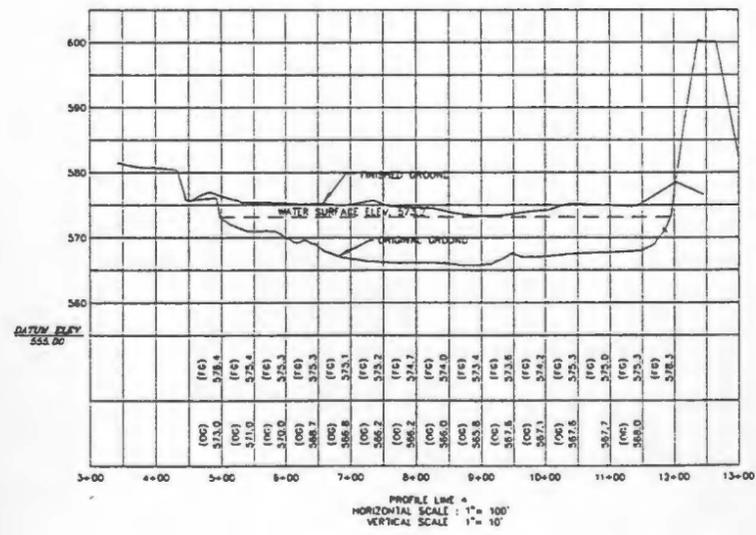
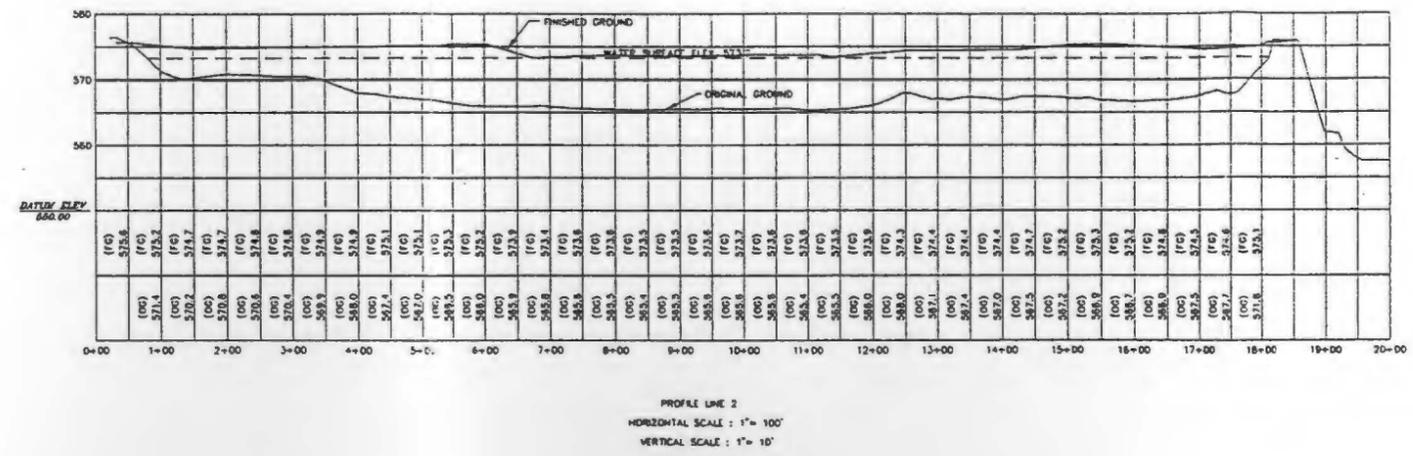
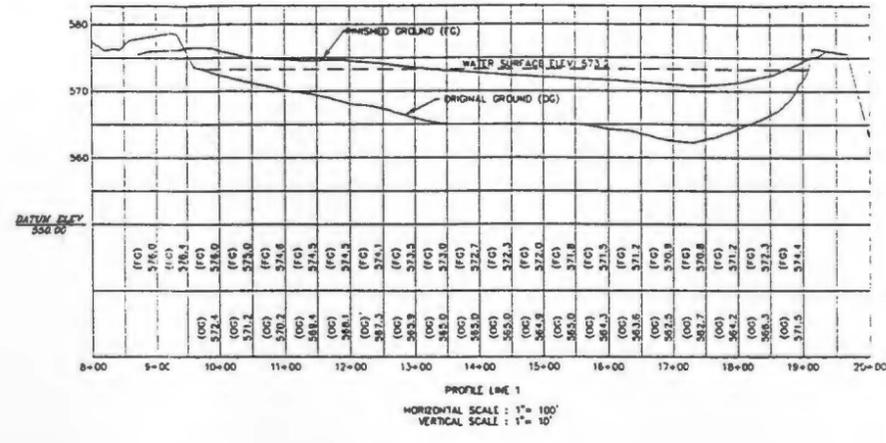
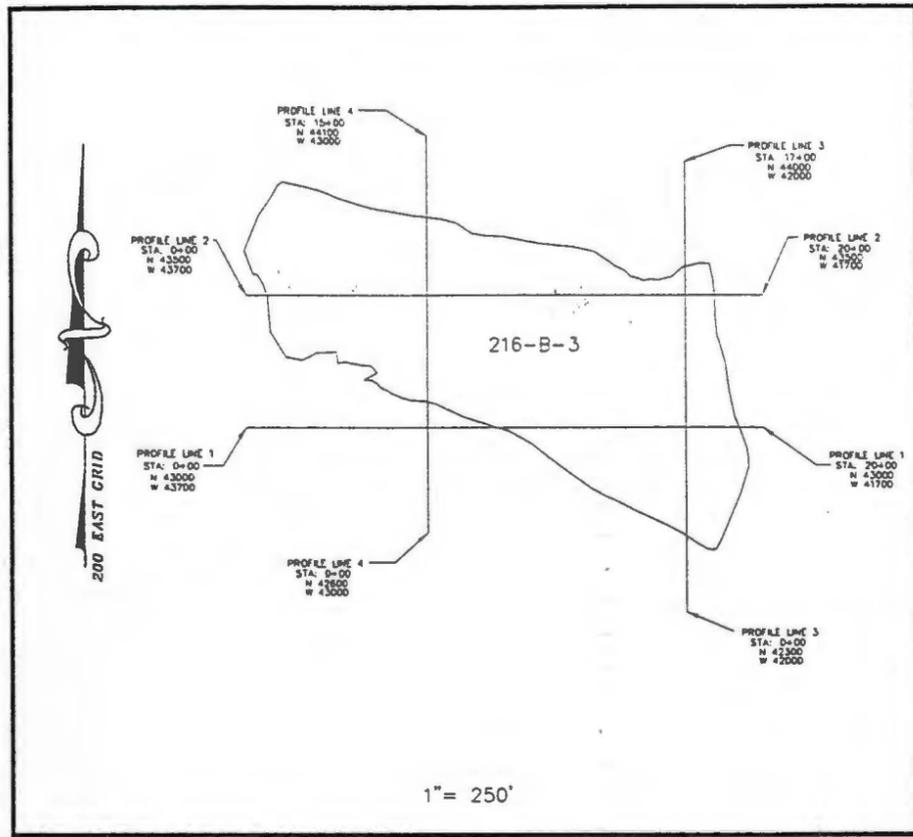
**TOPOGRAPHIC LEGEND**

- TEST WELL
- ☐ CONCRETE BURIAL GROUND MARKER POST
- SECONDARY ROAD EDGE LINE

- NOTES**
- 1) CONTOUR INTERVAL : 1 FOOT
  - 2) VERTICAL DATUM : NGVD'29 FEET
  - 3) HORIZONTAL DATUM : 200 EAST GRID (FEET)
  - 4) MAP RESULT OF FIELD SURVEY PERFORMED BY NEH SURVEY WEEK OF 11/7/94

| DRAWING TRACEABILITY LIST |       | REFERENCES |       | REVISIONS |      | CAD/PRE BR/NO/2P DRC |      | I/C/DATE |    |
|---------------------------|-------|------------|-------|-----------|------|----------------------|------|----------|----|
| DWG NO                    | TITLE | REF NUMBER | TITLE | REV       | DATE | BY                   | CHKD | DATE     | BY |
|                           |       |            |       |           |      |                      |      |          |    |
|                           |       |            |       |           |      |                      |      |          |    |

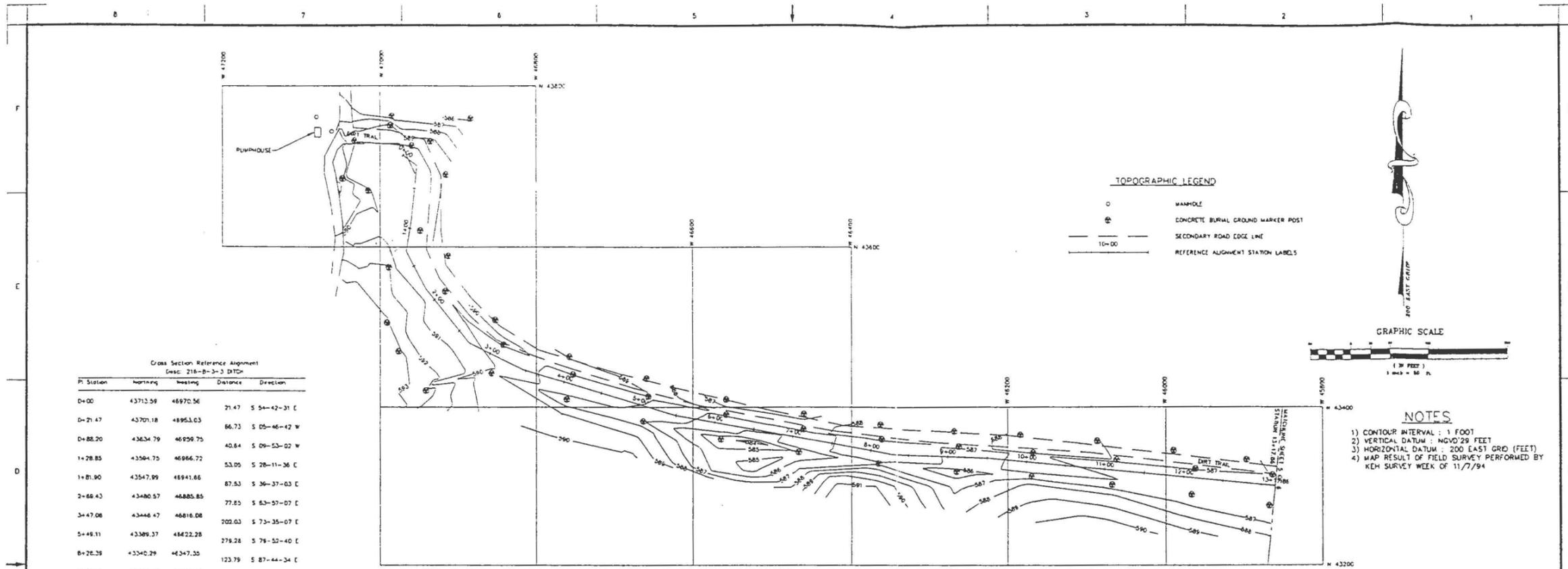
U.S. DEPARTMENT OF ENERGY  
 Richard C. Anderson, Director  
 Westinghouse Hanford Company  
**POST STABILIZATION  
 TOPOGRAPHIC SURVEY  
 216-B-3**



|                           |      |            |       |           |      |                                                                                                                                                                             |       |
|---------------------------|------|------------|-------|-----------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| DRAWING TRACEABILITY LIST |      | REFERENCES |       | REVISIONS |      | U.S. DEPARTMENT OF ENERGY<br>Richland Operations Office<br>Westinghouse Electric Company<br><b>216-B-3</b><br><b>POST STABILIZATION</b><br><b>MULTIPLE SURFACE PROFILES</b> |       |
| NO.                       | DATE | BY         | CHKD. | NO.       | DATE | BY                                                                                                                                                                          | CHKD. |
|                           |      |            |       |           |      |                                                                                                                                                                             |       |

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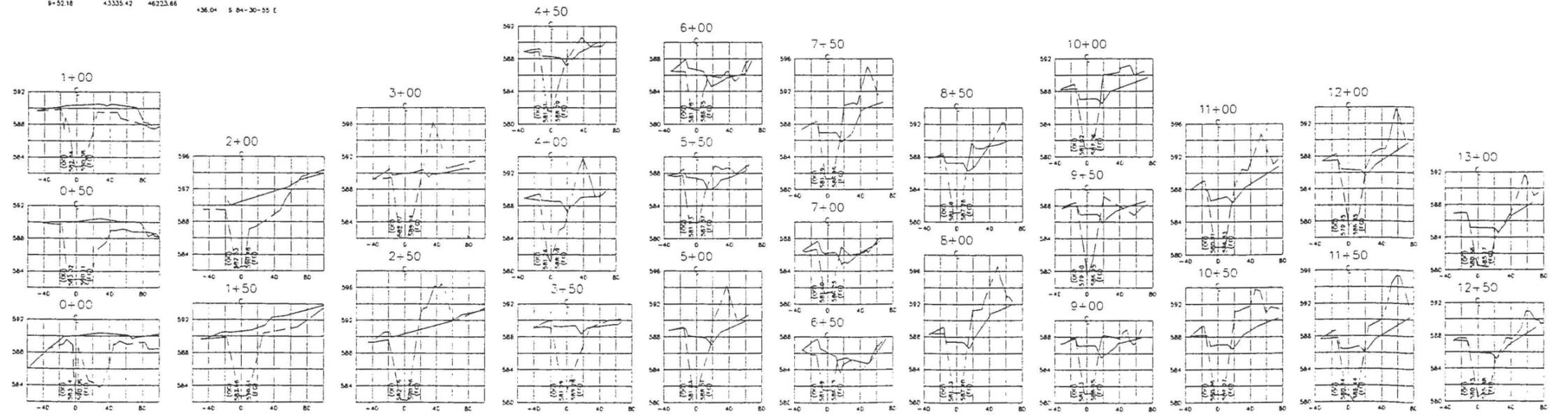
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Cross Section Reference Alignment  
Desc: 216-B-3-3 DTD

| PI Station | Northing | Westing  | Distance | Direction    |
|------------|----------|----------|----------|--------------|
| 0+00       | 43713.58 | 46970.56 | 71.47    | S 54-42-31 E |
| 0+21.47    | 43701.18 | 46953.03 | 66.73    | S 05-46-42 W |
| 0+88.20    | 43634.79 | 46959.75 | 40.84    | S 09-53-02 W |
| 1+28.85    | 43584.75 | 46966.72 | 53.05    | S 28-11-36 E |
| 1+81.90    | 43547.99 | 46941.66 | 67.53    | S 36-37-03 E |
| 2+49.43    | 43480.57 | 46885.85 | 77.85    | S 63-57-07 E |
| 3+27.08    | 43446.47 | 46816.08 | 202.03   | S 73-35-07 E |
| 5+48.11    | 43389.37 | 46422.28 | 278.28   | S 78-52-40 E |
| 6+26.38    | 43340.29 | 46247.35 | 123.79   | S 87-44-34 E |
| 9+52.18    | 43335.42 | 46223.66 | 436.04   | S 84-30-55 E |

- NOTES
- 1) CONTOUR INTERVAL : 1 FOOT
  - 2) VERTICAL DATUM : NGVD 29 FEET
  - 3) HORIZONTAL DATUM : 200 EAST GRID (FEET)
  - 4) MAP RESULT OF FIELD SURVEY PERFORMED BY KEH SURVEY WEEK OF 11/7/94



ALL CROSS-SECTIONS VERTICAL SCALE : 1" = 5'

|                                                                             |                 |
|-----------------------------------------------------------------------------|-----------------|
| U.S. DEPARTMENT OF ENERGY<br>Regional Operations Office<br>Washington, D.C. |                 |
| TOPOGRAPHIC MAP/CROSS SECTIONS<br>216-B-3-3<br>POST STABILIZATION           |                 |
| DATE: 11/7/94                                                               | SCALE: 1" = 50' |
| BY: AS                                                                      | CHECKED: AS     |

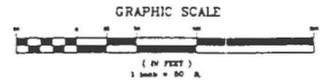
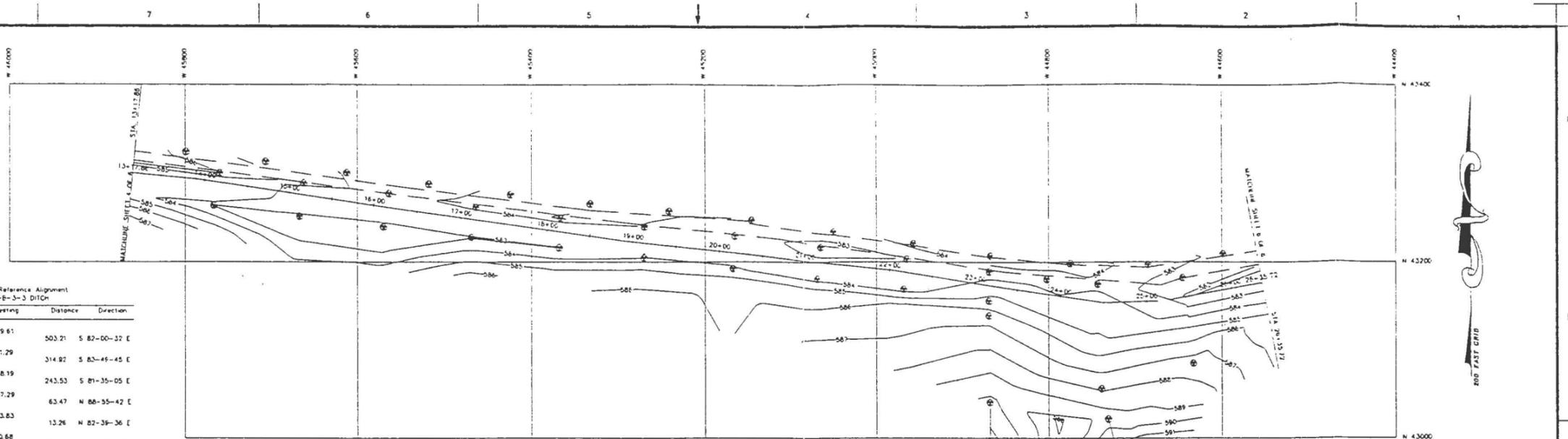
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|-----------|--------------------------------|-----------|--------------------|-----------|
| 216-B-3-3 | TOPOGRAPHIC MAP/CROSS SECTIONS | AS        | POST STABILIZATION | 1         |

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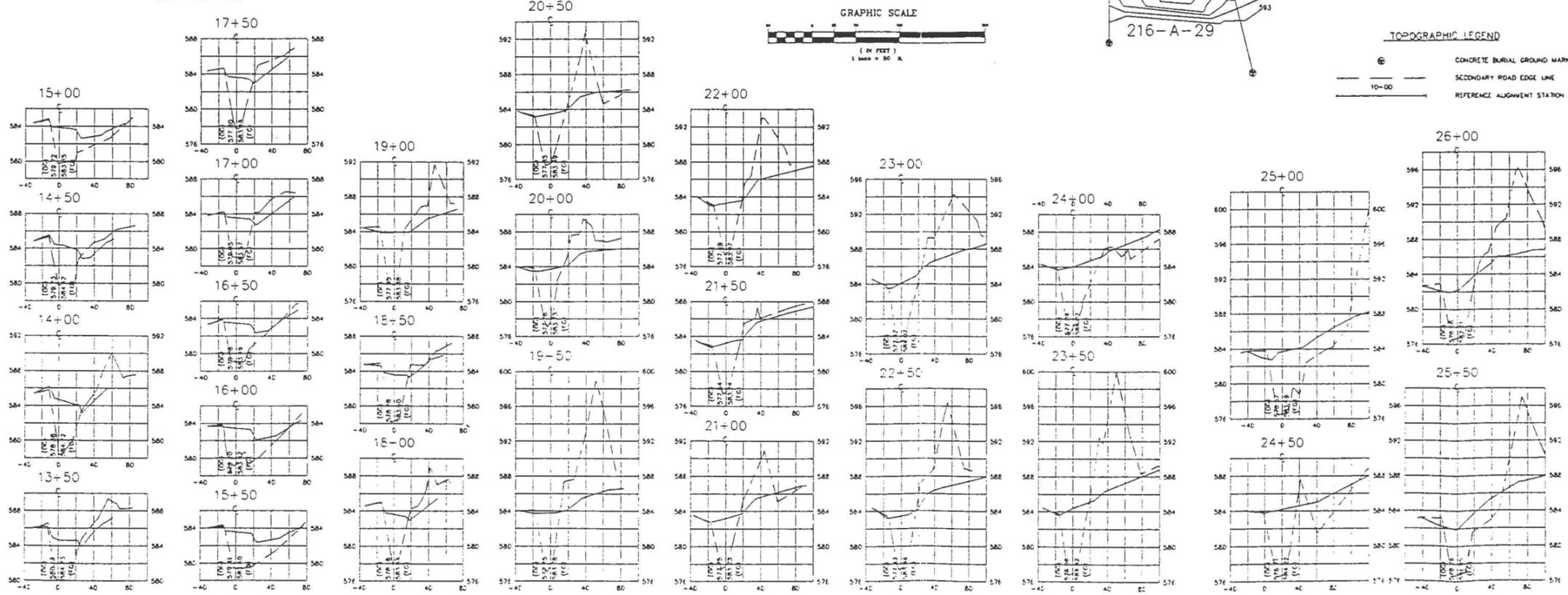
Cross Section Reference Alignment  
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| P. Station | Northing | Westing  | Distance | Direction    |
|------------|----------|----------|----------|--------------|
| 13+86.22   | 43293.74 | 45789.61 | 503.21   | S 82-00-32 E |
| 18+91.43   | 43223.78 | 45291.29 | 314.92   | S 83-49-45 E |
| 27+06.35   | 43189.92 | 44978.19 | 243.53   | S 81-35-05 E |
| 24+49.86   | 43154.29 | 44737.29 | 63.47    | N 86-55-42 E |
| 29+13.35   | 43150.48 | 44673.83 | 13.26    | N 82-38-36 E |
| 25+28.61   | 43157.17 | 44660.68 | 266.11   | N 79-44-18 E |



TOPOGRAPHIC LEGEND

- ⊕ CONCRETE BURIAL GROUND MARKER POST
- SECONDARY ROAD EDGE LINE
- REFERENCE ALIGNMENT STATION LABELS



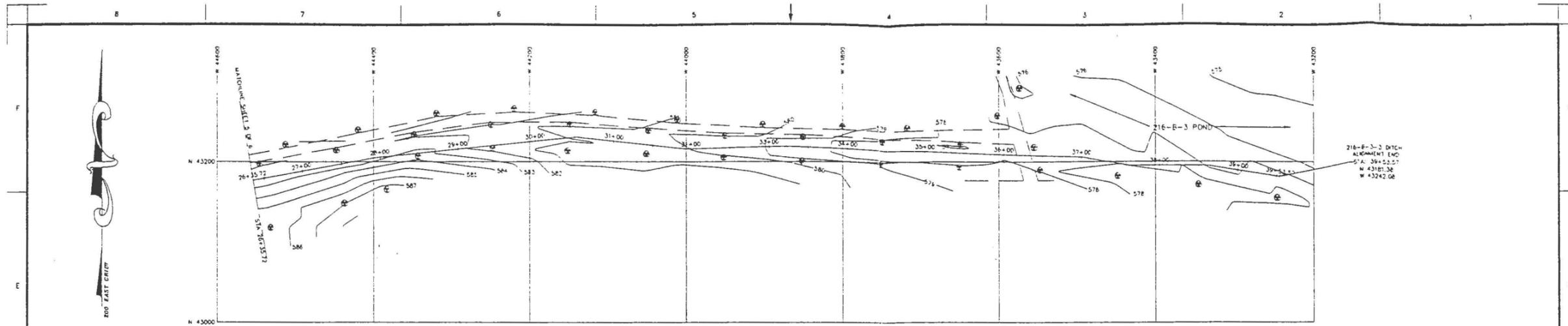
ALL X-SECTION VERTICAL SCALES: 1"=5'

- NOTES
- 1) CONTOUR INTERVAL: 1 FOOT
  - 2) VERTICAL DATUM: NGVD 29 FEET
  - 3) HORIZONTAL DATUM: 200 EAST GRID (FEET)
  - 4) MAP RESULT OF FIELD SURVEY PERFORMED BY KEH SURVEY WEEK OF 11/2/94

|                           |       |            |       |           |      |                                                                                                                                                                                 |      |
|---------------------------|-------|------------|-------|-----------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
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| DWG NO.                   | TITLE | REF NUMBER | TITLE | NO.       | DATE | BY                                                                                                                                                                              | CHKD |
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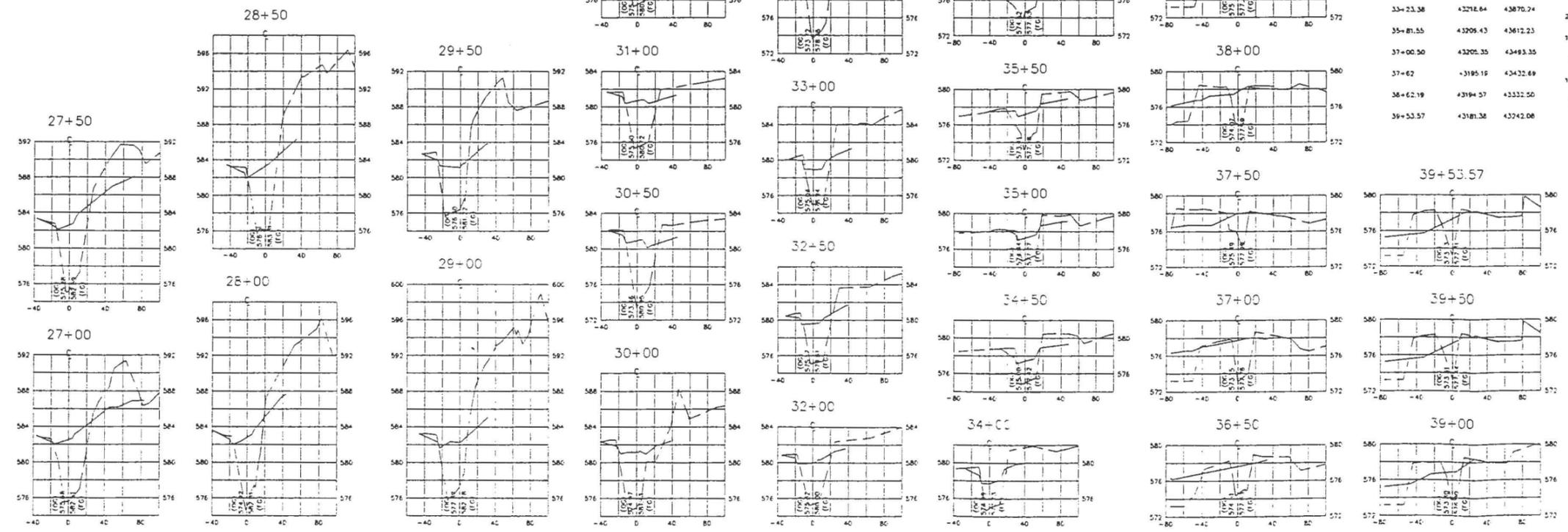


TOPOGRAPHIC LEGEND

- ⊙ CONCRETE BURIAL GROUND MARKER POST
- SECONDARY ROAD EDGE LINE
- 10+00 REFERENCE ALIGNMENT STATION LABELS

CROSS SECTION REFERENCE ALIGNMENT

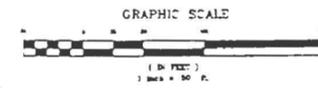
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| 30+52.70   | 43230.03 | 44140.09 | 140.78   | S 83-58-38 E |
| 31+93.48   | 43215.26 | 44000.09 | 129.90   | N 88-30-30 E |
| 33+23.38   | 43218.84 | 43870.24 | 258.17   | S 87-57-20 E |
| 35+81.55   | 43205.43 | 43612.23 | 118.94   | S 88-02-00 E |
| 37+00.50   | 43205.35 | 43493.35 | 81.51    | S 80-29-53 E |
| 37+62      | 43195.19 | 43432.69 | 100.19   | S 89-36-39 E |
| 38+62.19   | 43194.57 | 43332.50 | 91.32    | S 81-41-47 E |
| 39+53.57   | 43181.38 | 43242.08 |          |              |



ALL CROSS-SECTIONS VERTICAL SCALE : 1" = 5'

NOTES

- 1) CONTOUR INTERVAL : 1 FOOT
- 2) VERTICAL DATUM : NGVD 29 FEET
- 3) HORIZONTAL DATUM : 200 EAST GRID (FEET)
- 4) MAP RESULT OF FIELD SURVEY PERFORMED BY KEH SURVEY WEEK OF 11/7/94



| DWG NO | TITLE                     | REF NUMBER | REFERENCES |
|--------|---------------------------|------------|------------|
|        | DRAWING TRACEABILITY LIST |            |            |

| U.S. DEPARTMENT OF ENERGY      |    |
|--------------------------------|----|
| Nuclear Operations Office      |    |
| Westinghouse Monitor Company   |    |
| TOPOGRAPHIC MAP/CROSS SECTIONS |    |
| 216-B-3-3                      |    |
| POST STABILIZATION             |    |
| DATE                           | BY |
| SCALE                          | BY |

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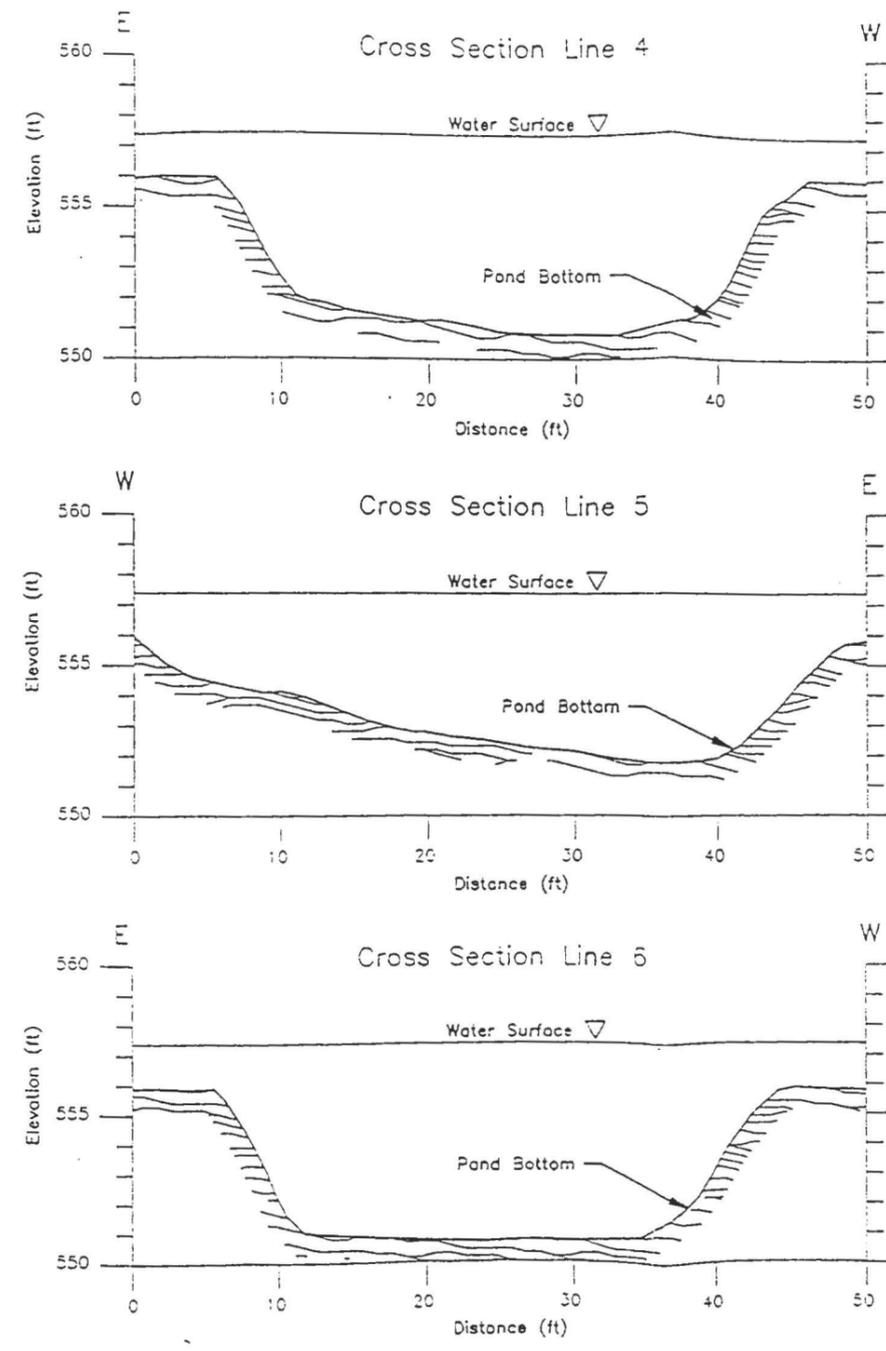
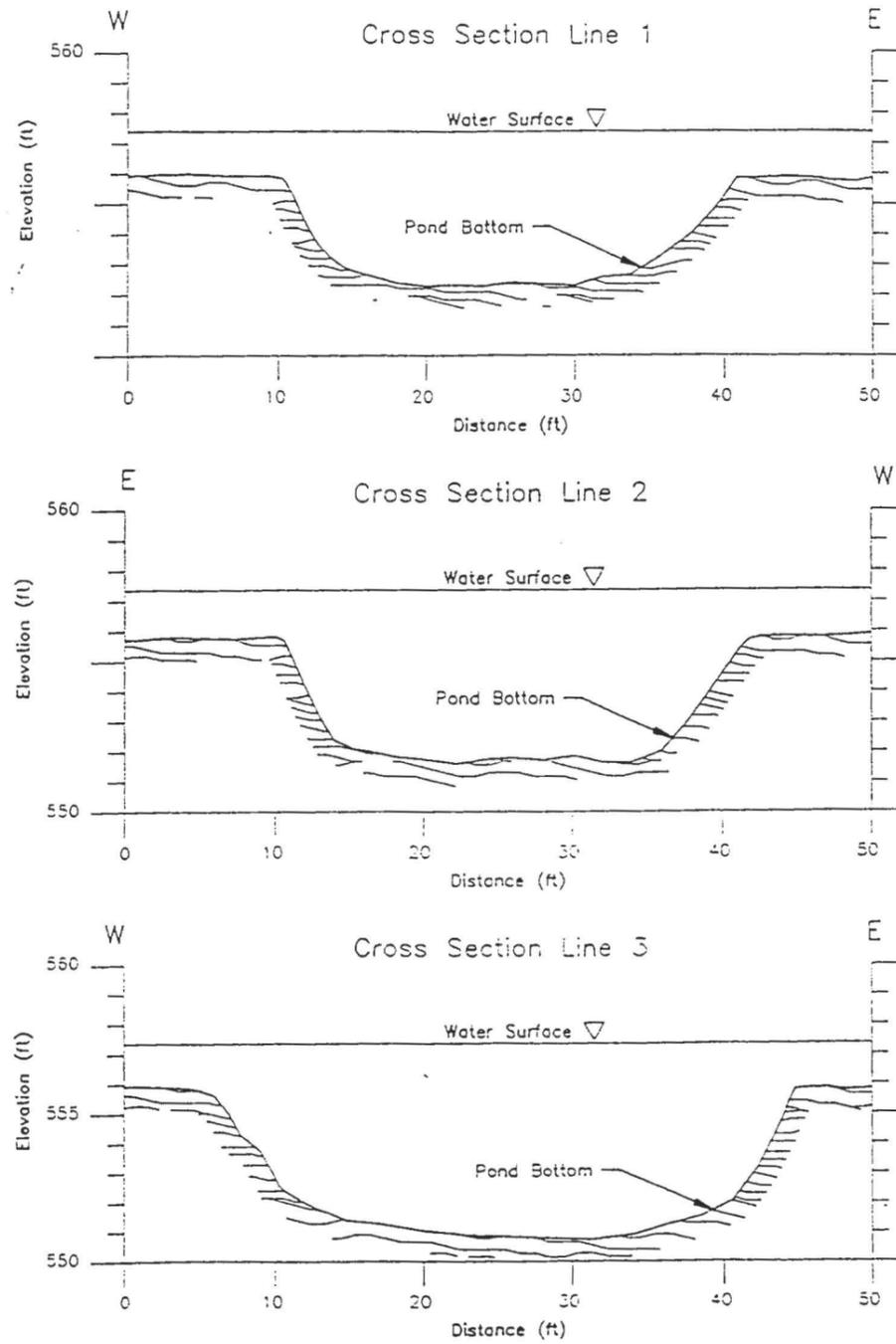
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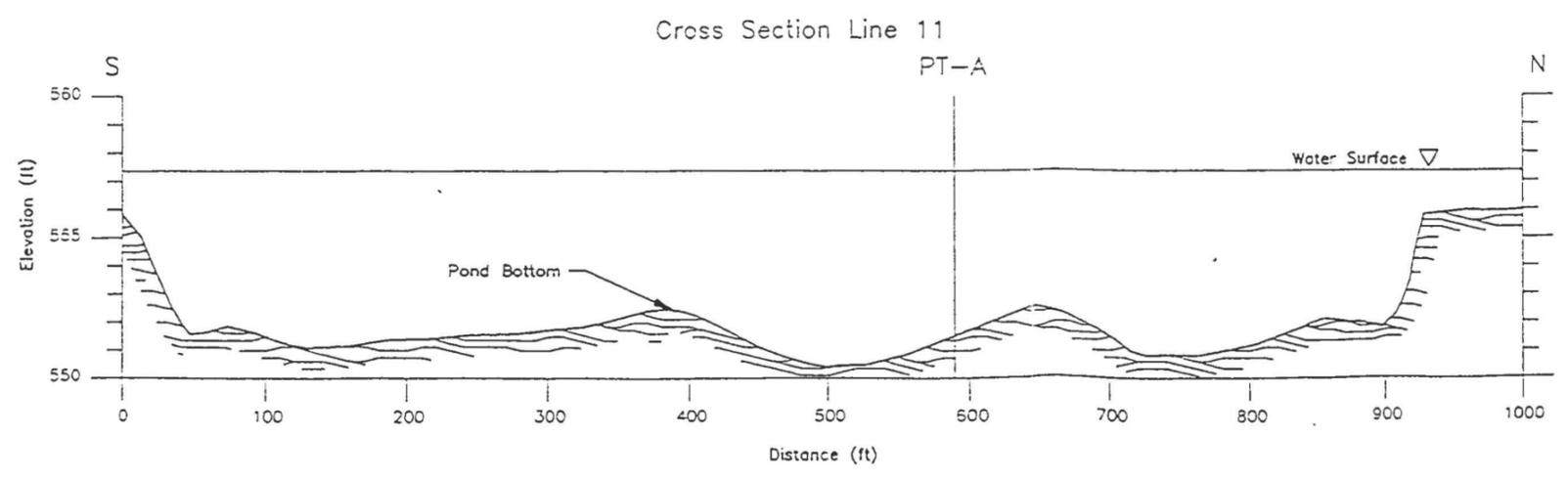
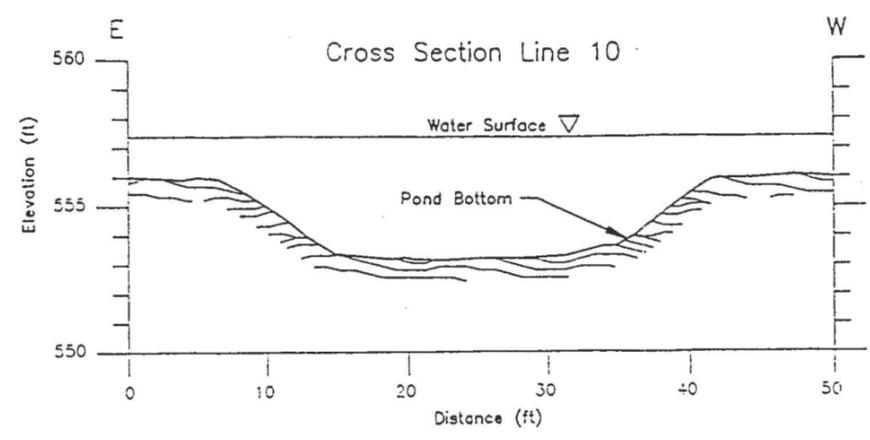
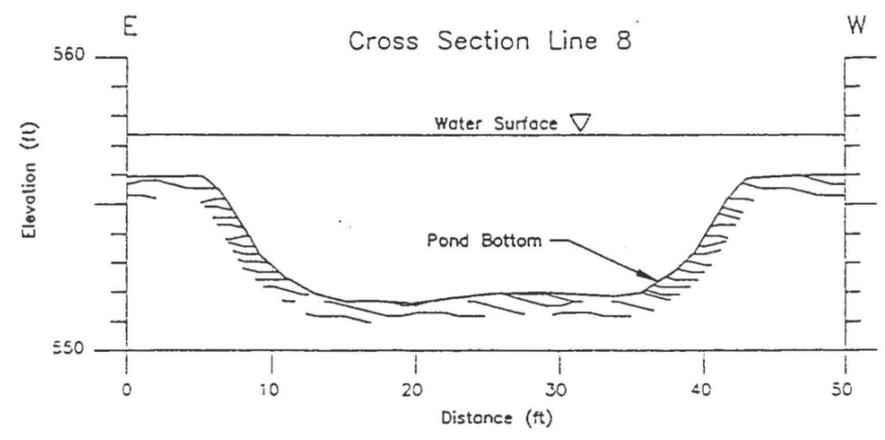
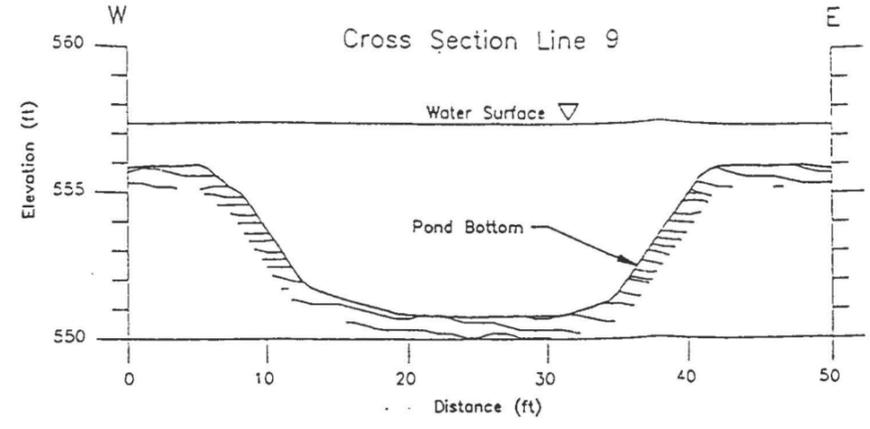
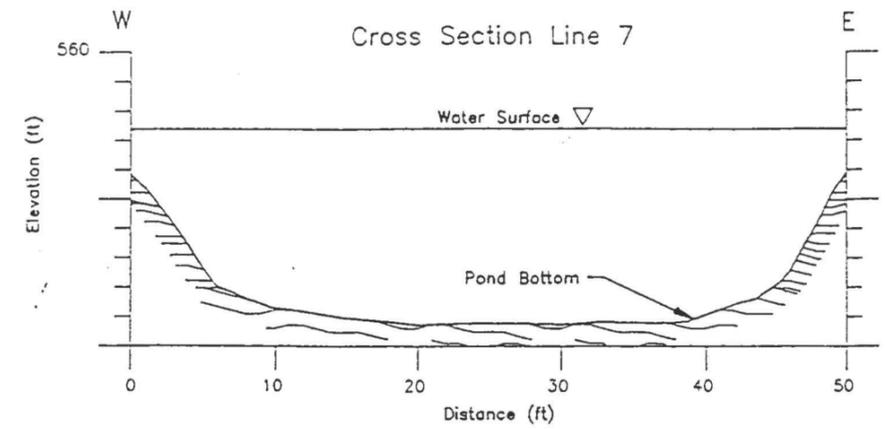
**Appendix A**

**A Lobe Bathymetric Maps**



NOTES:  
1. Water surface elevation = 557.38  
2. Vertical exaggeration 2:1 for cross-sections 1-6.

Figure 5.3 Cross-Sections for Lines 1-6, Hanford Pond 216-B-3A.



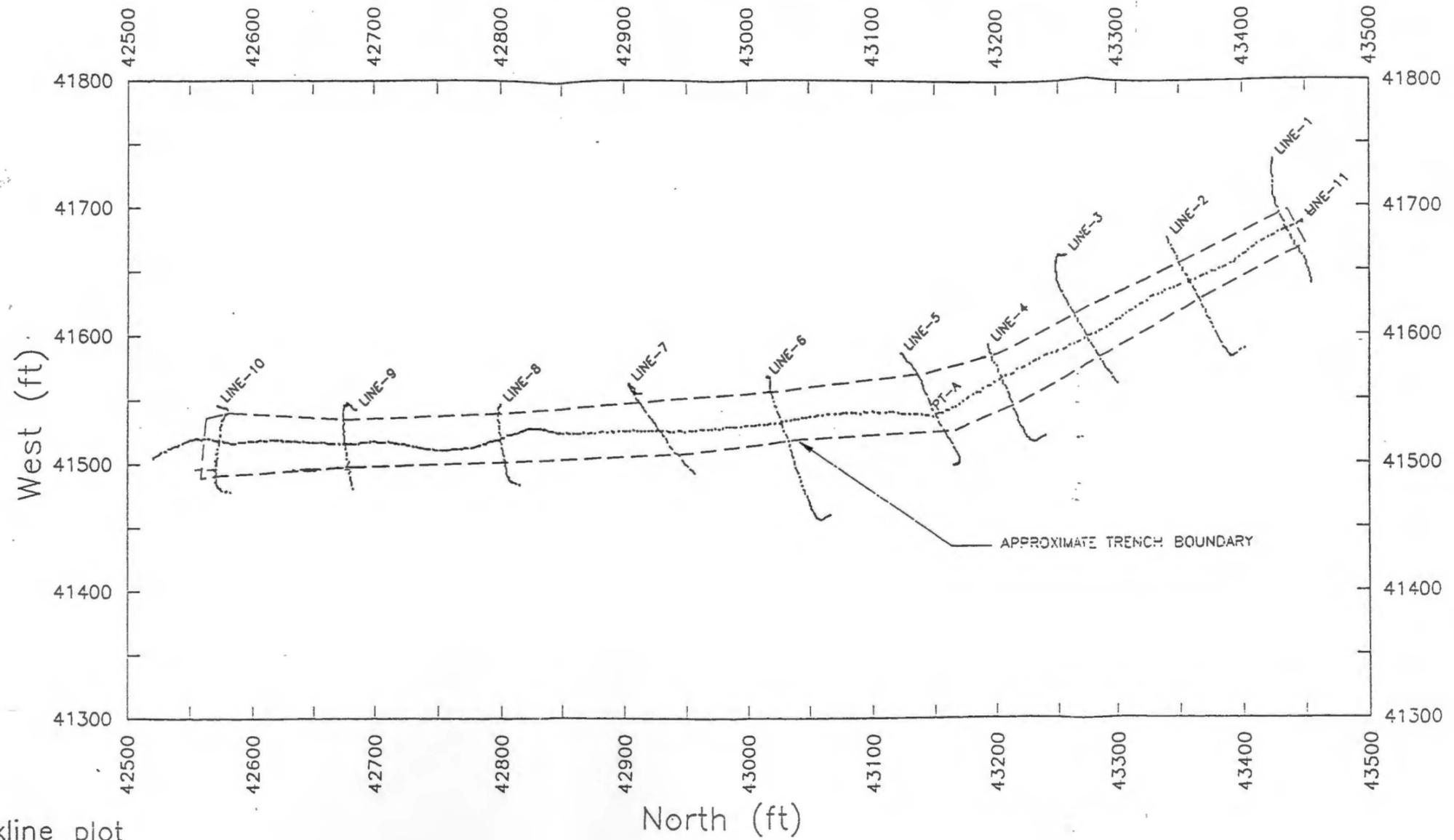
- NOTES:
- 1. Water surface elevation = 557.38 ft.
  - 2. Vertical exaggeration 2:1 for cross-sections 7-10.
  - 2. Vertical exaggeration 20:1 for cross-section 11.

Figure B.3 Cross-Sections for Lines 7-11, Hanford Pond 216-B-3A.

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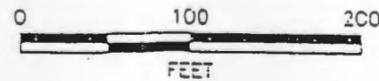
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Rev. 00

### POND 216-B-3A TRACKLINE PLOT



Golder Associates Inc.  
Redmond, Washington

Pond 216-B-3A Trackline plot  
Westinghouse/ Hanford Washington  
March 22 - March 25, 1993  
Coordinates in Hanford Plan



7-22-93 13:39 \CAD\2531457\31924

Figure 42 Trackline Plot Hanford Pond 216-B-3A.

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**Appendix B**

**Photographs**

Percolation Holes Excavation

94060130-87 to 102CN

Description

Series shows excavation in 216-B-3 pond bottom.

Contaminated Trees

94031085-29 to 31CN

Radiation survey of contaminated tree branches/roots.

94031085-65CN

Radiation tag documenting detectable contamination in tree leaves.

Pipe Isolation

94090862-205 and 206CN

Cap on the 30 inches corrugated metal pipeline.

94060281-12 and 13CN

Concrete placement in 24 inch vitrified clay pipe.

Vegetation (trees, stumps and reeds)

94031085-16 and 17CN

reeds

94031085-18CN

cut trees

94031085-20,21,22,23,24,32CN

reeds

94031085-27,28,55-64,66,67,70-79

cut trees/stumps

97,99,100,101,120,121

cut trees/stumps

94050111-15 and 16CN

reeds

Tree Cutting

94031085-83,84,89,90,91,92,94,95CN

tree cutting

94011214-72,76-86,91,93,94,96,99,103CN

tree cutting

Backfill Material

94031085-156, 157, 158CN

Examples of pitrun rock for backfill material.

Heavy Equipment Work

|                               |                                                             |
|-------------------------------|-------------------------------------------------------------|
| 94031085-25CN                 | Heavy equipment on top of north spoil pile.                 |
| 94031085-3 and 15CN           | Pushing backfill over vegetation.                           |
| 94090862-34, 78, 96, 98CN     | Loading scrapers and pushing backfill out over pond bottom. |
| 94031085-50CN                 | Pushing backfill over vegetation.                           |
| 94050111-34CN                 | Pushing backfill over pond bottom.                          |
| 94060281-4 and 6CN            | Pushing backfill over the pond bottom.                      |
| 94060130-15, 41, 80, and 81CN | Pushing backfill over the pond bottom.                      |

General Pond Photos

|                |                                                          |
|----------------|----------------------------------------------------------|
| 94090862-29CN  | Pond bottom after draining, muddy, east end of pond.     |
| 94090862-31CN  | Pond bottom after drying, east end of pond.              |
| 94090862-100CN | Example of post around old pond perimeter.               |
| 94060130-5CN   | Pond bottom after drying, west end of the pond.          |
| 94060130-65CN  | Pond bottom after draining, muddy, west end of the pond. |
| 9406028-7CN    | Very dry pond bottom with mud pushed up by backfill.     |
| 94050111-35CN  | West end of pond with only a small bottom area showing.  |

Aerial Photos

91102567-22CN

Pre-interim stabilization photo,  
looking east.

94040680-9CN

Interim stabilization photo, 25%  
complete, looking east.

94060600-7CN

Interim stabilization photo, 50%  
complete, looking east.

94080418-5CN

Interim stabilization photo, 75%  
complete, looking east.

94090396-2CN

Interim stabilization photo, 90%  
complete, looking east.Percolation Holes

94060130-88, 89, 94, 96CN

Survey and sample of bottom  
sediment.

94060130-92CN

Excavation of holes from earthen  
bridge across pond.

9513336.0488

BHI-00219

Rev. 00

## **Appendix C**

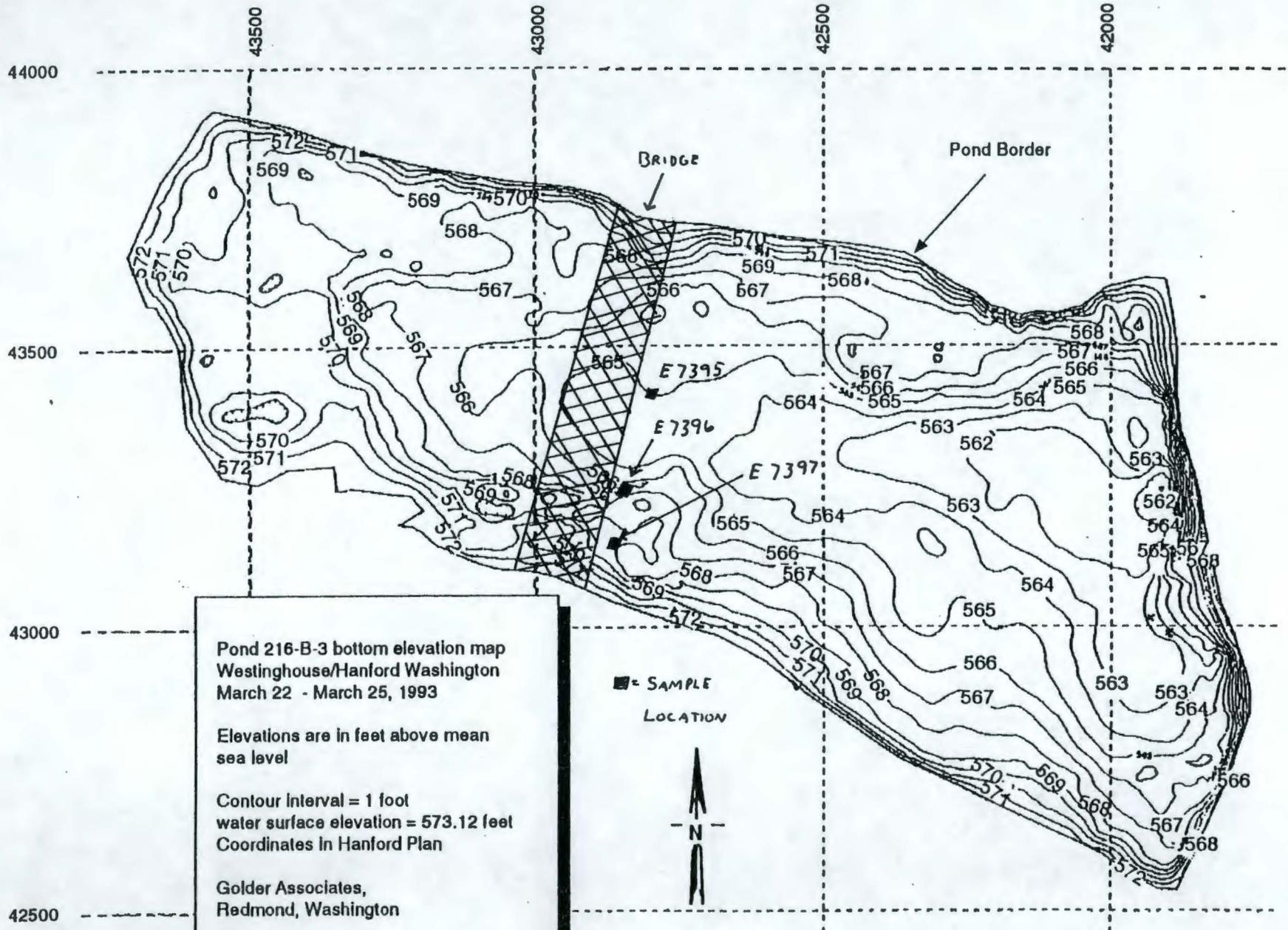
### **Percolation Hole Location and Sample Information**

|                                               |  |                                            |                                          |                        |                    |  |
|-----------------------------------------------|--|--------------------------------------------|------------------------------------------|------------------------|--------------------|--|
| <b>KAISER ENGINEERS<br/>HANFORD</b>           |  | <b>SURVEY DATA REPORT</b>                  |                                          | Request No.<br>942-119 |                    |  |
| Project/W.O. No.                              |  | Title<br>216-B-3 POST STABILIZATION SURVEY |                                          | File No.<br>1226-072   |                    |  |
| KEH Job No.<br>ER5165                         |  | Prepared By<br>T.V. Coyne                  |                                          | Date<br>10/28/94       |                    |  |
|                                               |  |                                            |                                          | Reviewer<br>V.C.       |                    |  |
|                                               |  |                                            |                                          | 1   1                  |                    |  |
| DESCRIPTION OF WORK                           |  |                                            | ACCEPTABILITY<br>(Within Plan Tolerance) |                        | DISTRIBUTION       |  |
| Horizontal survey of Perk Holes 216-B-3 Pond. |  |                                            | Yes [ ]                                  |                        | Survey File        |  |
|                                               |  |                                            | No [ ]                                   |                        | Field Project File |  |
|                                               |  |                                            | NA [X]                                   |                        | D.L. Smith         |  |
|                                               |  |                                            | TBD by                                   |                        |                    |  |
|                                               |  |                                            | Requestor [ ]                            |                        |                    |  |
|                                               |  |                                            |                                          |                        |                    |  |

SURVEY RESULTS AND COMMENTS

| PERK HOLE NO. | COORDINATE 200E DATUM (FEET) |
|---------------|------------------------------|
| 1             | N:43,463                     |
|               | W:42,695                     |
| 2             | N:43,370                     |
|               | W:42,714                     |
| 3             | N:43,290                     |
|               | W:42,720                     |
| 4             | N:43,047                     |
|               | W:41,936                     |
| 5             | N:42,927                     |
|               | W:41,922                     |

C-3



Pond 216-B-3 bottom elevation map  
 Westinghouse/Hanford Washington  
 March 22 - March 25, 1993

Elevations are in feet above mean  
 sea level

Contour Interval = 1 foot  
 water surface elevation = 573.12 feet  
 Coordinates in Hanford Plan

Golder Associates,  
 Redmond, Washington

9513336.0490

BHI-00219  
Rev. 00

SAMPLE STATUS REPORT FOR E 7395. SCHMIDT 5478 TIME: 5/26/94 9:54  
 DISPATCHED: 5/12/94 11:12 SAMPLE HAS NOT BEEN SLURPED  
 RECEIVED: 5/13/94 7:44

| EXT. | DETER.   | RESULTS OR STATUS             | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|------|----------|-------------------------------|---------------|-----------|-------------|
| **** | *****    | *****                         | ***           | ***       | *****       |
| 2172 | GEA-SOIL | 7.68000E 01 pCi/gWETwt Cs-137 | N             | Y         | R4B5C       |
| 3461 | Pu-SOIL  | 1.96500E 01 pCi/gDRYwt        | N             | Y         | R4B5C       |
| 3872 | Sr-SOIL  | 5.15000E 00 pCi/gDRYwt        | N             | Y         | R4B5C       |
| 4461 | U-SOIL   | UNABLE TO ANALYZE             |               |           | R4B5C       |

END OF REPORT

SAMPLE STATUS REPORT FOR E 7396. SCHMIDT 5479 TIME: 5/26/94 9:54  
 DISPATCHED: 5/12/94 11:15 SAMPLE HAS NOT BEEN SLURPED  
 RECEIVED: 5/13/94 7:44

| EXT. | DETER.   | RESULTS OR STATUS             | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|------|----------|-------------------------------|---------------|-----------|-------------|
| **** | *****    | *****                         | ***           | ***       | *****       |
| 2172 | GEA-SOIL | 8.34000E 01 pCi/gWETwt Cs-137 | N             | Y         | R4B5C       |
| 3461 | Pu-SOIL  | 1.01300E 01 pCi/gDRYwt        | N             | Y         | R4B5C       |
| 3872 | Sr-SOIL  | 1.71000E 01 pCi/gDRYwt        | N             | Y         | R4B5C       |
| 4461 | U-SOIL   | 1.19000E-06 G/G               | N             | Y         | R4B5C       |

END OF REPORT

SAMPLE STATUS REPORT FOR E 7397. SCHMIDT 5480 TIME: 5/26/94 9:54  
 DISPATCHED: 5/12/94 11:15 SAMPLE HAS NOT BEEN SLURPED  
 RECEIVED: 5/13/94 7:45

| EXT. | DETER.   | RESULTS OR STATUS              | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|------|----------|--------------------------------|---------------|-----------|-------------|
| **** | *****    | *****                          | ***           | ***       | *****       |
| 2172 | GEA-SOIL | 5.85000E 00 pCi/gWETwt Cs-137  | N             | Y         | R4B5C       |
| 2172 | GEA-SOIL | 8.21E-5 PB-212 PCI/G 31% ERROR |               |           | R4B5C       |
| 2172 | GEA-SOIL | 7.91E-1 PB-214 PCI/G 50% ERROR |               |           | R4B5C       |
| 3461 | Pu-SOIL  | < 8.50000E-01 pCi/gDRYwt       | N             | Y         | R4B5C       |
| 3872 | Sr-SOIL  | 1.76000E 00 pCi/gDRYwt         | N             | Y         | R4B5C       |
| 4461 | U-SOIL   | 4.49000E-07 G/G                | N             | Y         | R4B5C       |

END OF REPORT

**Appendix D**

**216-B-3A Sample Information**

**RADIATION SURVEY REPORT**

Bldg NA Area 600- Room NA

Description of Job  
Coverage for collection of soil sediment samples

RWP No. N-014 Location 216-B-3A Pond  
 Check if appropriate. When checked, do not place unrelated information on this record.  
 Personnel Contamination       High Radiation Level Work  
 CAM/Radiation Alarm             "Special Survey"  
 Establish Dose Rates                Property Release  
 Radiation/Contamination Incident    RAM Shipment

| Item No. | P E R (1) | Description of Work Performed, Radiation Controls, and Measurements | Meter Deflection |     | Dist. | C.F. | DOSE RATE              |                   |                 | CONTAMINATION LEVELS |         |                           |    |    |   |
|----------|-----------|---------------------------------------------------------------------|------------------|-----|-------|------|------------------------|-------------------|-----------------|----------------------|---------|---------------------------|----|----|---|
|          |           |                                                                     | W/O              | W/C |       |      | beta (non pen) mrad/hr | gamma (pen) mR/hr | neutron mrem/hr | Direct (dpm)         |         | Smear 100 cm <sup>2</sup> |    |    |   |
|          |           |                                                                     |                  |     |       |      | beta                   | alpha             | beta (d/m)      | alpha (d/m)          | mrad/hr |                           |    |    |   |
| 1.       |           | Survey of soil surface samples (6 each)                             | /                | /   | /     | /    | /                      | /                 | /               | /                    | NO      | NO                        | NO | NO | 7 |
| 2.       |           | Survey of core sediment samples                                     | /                | /   | /     | /    | /                      | /                 | /               | /                    | NO      | NO                        | NO | NO |   |
| 3.       |           | Personnel equip surveyed                                            | /                | /   | /     | /    | /                      | /                 | /               | /                    | NO      | NO                        | NO | NO |   |

1 Check for personnel dose rate  continued on supplemental report form.

|                    |                             |                                                 |                                         |                          |                          |                          |
|--------------------|-----------------------------|-------------------------------------------------|-----------------------------------------|--------------------------|--------------------------|--------------------------|
| Instrument(s) Used | <input type="checkbox"/> CP | <input checked="" type="checkbox"/> G-M/Pancake | <input checked="" type="checkbox"/> PAM | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Serial No.(s)      | /                           | 1602 06                                         | 2043                                    | /                        | /                        | /                        |

Respiratory Protection Worn

- Supplied Air
- Filter
- Other \_\_\_\_\_
- None

ESTIMATED PERSONNEL DOSE RATES

| Phase of Work | Based on Measurement(s) | Average Dose Rate | Limit Applying |   |   |
|---------------|-------------------------|-------------------|----------------|---|---|
| /             | /                       | /                 | WBP            | S | E |
| /             | /                       | /                 | WBP            | S | E |
| /             | /                       | /                 | WBP            | S | E |

RPT Exposure NA Work Location Code NA Signed Chedda PR No. 03020

Did you increase or reduce RWP requirements for this work?  No  Yes Explain on reverse side.  
 Did you attend a pre-job meeting for this work?  N/A  No  Yes  
 Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

D-2

951335-1493

Scalebar



RADIATION SURVEY

REPORT # 16511.9  
PAGE 3 OF     

\* 5436 SURFACE  
5436 18 INCHES

+ 5437 SURFACE  
5431 18 INCHES

\* 5438 SURFACE  
" 5432 18 INCHES

5439 SURFACE  
5433 18 INCHES

\* 5440 SURFACE  
5434 18 INCHES →

5441 SURFACE  
5435 18 INCHES \*

216-B-3A POND



[5] From: Sue E Hogan at -WHC167 4/21/94 11:15AM (1380 bytes: 22 ln)  
 To: Stephen M McKinney at -WHC171  
 Receipt Requested  
 Subject: E Numbers for 216-B-3A Pond Sediment Samples

## ----- Message Contents -----

Sue, I need "E" numbers for the following samples:

Requester: J. W. Schmidt 372-3086 H6-30  
 Charge Code: R4322  
 Determination: GEA, Sr, Pu, & U Iso

| Customer ID | Lab. ID | Sample Type/Location           |
|-------------|---------|--------------------------------|
| 5430        | E6956   | core 216-B-3A pond sediment    |
| 5431        | E6957   | ditto                          |
| 5432        | E6958   | ditto                          |
| 5433        | E6960   | ditto                          |
| 5434        | E6961   | ditto                          |
| 5435        | E6964   | ditto                          |
| 5436        | E6965   | surface sediment 216-B-3A Pond |
| 5437        | E6967   | ditto                          |
| 5438        | E6968   | ditto                          |
| 5439        | E6970   | ditto                          |
| 5440        | E6971   | ditto                          |
| 5441        | E6972   | ditto                          |

If you have any questions or need additional information  
 please call me at 373-3703.

9513336.0496

BHI-00219  
Rev. 00  
5/10/94 15:14

SAMPLE STATUS REPORT FOR E 6956. SCHMIDT 5430  
DISPATCHED: 4/21/94 10:21 SAMPLE HAS NOT BEEN SLURPED  
RECEIVED: 4/28/94 14:19

| EXT. | DETER.   | RESULTS OR STATUS               | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|------|----------|---------------------------------|---------------|-----------|-------------|
| **** | *****    | *****                           | ***           | ***       | *****       |
| 2172 | GEA-SOIL | < 1.04000E-01 pCi/gWETwt Cs-137 | N             | Y         | R4B5C       |
| 3461 | Pu-SOIL  | < 4.70000E-01 pCi/gDRYwt        | N             | Y         | R4B5C       |
| 3872 | Sr-SOIL  | 4.68000E-01 pCi/gDRYwt          | N             | Y         | R4B5C       |
| 4461 | U-SOIL   | 6.40000E-07 G/G                 | N             | Y         | R4B5C       |

END OF REPORT

SAMPLE STATUS REPORT FOR E 6957. SCHMIDT 5431  
DISPATCHED: 4/21/94 10:23 SAMPLE HAS NOT BEEN SLURPED  
RECEIVED: 4/28/94 14:20

| EXT. | DETER.   | RESULTS OR STATUS                  | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|------|----------|------------------------------------|---------------|-----------|-------------|
| **** | *****    | *****                              | ***           | ***       | *****       |
| 2172 | GEA-SOIL | < 2.11000E-01 pCi/gWETwt Cs-137    | N             | Y         | R4B5C       |
| 2172 | GEA-SOIL | 9.91E-1 pCi/gWETwt PB-212 (40.84%) |               |           | R4B5C       |
| 2172 | GEA-SOIL | 1.72 pCi/gWETwt AC-228 (34.21%)    |               |           | R4B5C       |
| 3461 | Pu-SOIL  | < 4.90000E-01 pCi/gDRYwt           | N             | Y         | R4B5C       |
| 3872 | Sr-SOIL  | 1.21000E 00 pCi/gDRYwt             | N             | Y         | R4B5C       |
| 4461 | U-SOIL   | 6.10000E-07 G/G                    | N             | Y         | R4B5C       |

END OF REPORT

SAMPLE STATUS REPORT FOR E 6958. SCHMIDT 5432  
DISPATCHED: 4/21/94 10:25 SAMPLE HAS NOT BEEN SLURPED  
RECEIVED: 4/28/94 14:20

| EXT. | DETER.   | RESULTS OR STATUS                  | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|------|----------|------------------------------------|---------------|-----------|-------------|
| **** | *****    | *****                              | ***           | ***       | *****       |
| 2172 | GEA-SOIL | < 1.15000E-01 pCi/gWETwt Cs-137    | N             | Y         | R4B5C       |
| 2172 | GEA-SOIL | 4.79E-1 pCi/gWETwt PB-212 (37.41%) |               |           | R4B5C       |
| 3461 | Pu-SOIL  | < 4.80000E-01 pCi/gDRYwt           | N             | Y         | R4B5C       |
| 3872 | Sr-SOIL  | 5.21000E-01 pCi/gDRYwt             | N             | Y         | R4B5C       |
| 4461 | U-SOIL   | 6.82000E-07 G/G                    | N             | Y         | R4B5C       |

END OF REPORT

SAMPLE STATUS REPORT FOR E 6960. SCHMIDT 5433  
DISPATCHED: 4/21/94 10:26 SAMPLE HAS NOT BEEN SLURPED  
RECEIVED: 4/28/94 14:20

| EXT. | DETER.   | RESULTS OR STATUS                  | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|------|----------|------------------------------------|---------------|-----------|-------------|
| **** | *****    | *****                              | ***           | ***       | *****       |
| 2172 | GEA-SOIL | 1.43 pCi/gWETwt CS-137 (27.88%)    |               |           | R4B5C       |
| 2172 | GEA-SOIL | 3.51E-1 pCi/gWETwt TL-208 (38.97%) |               |           | R4B5C       |
| 2172 | GEA-SOIL | 8.19E-1 pCi/gWETwt PB-212 (43.23%) |               |           | R4B5C       |
| 2172 | GEA-SOIL | 1.18 pCi/gWETwt PB-214 (42.11%)    |               |           | R4B5C       |
| 3461 | Pu-SOIL  | < 4.60000E-01 pCi/gDRYwt           | N             | Y         | R4B5C       |
| 3872 | Sr-SOIL  | 1.15000E 00 pCi/gDRYwt             | N             | Y         | R4B5C       |
| 4461 | U-SOIL   | 4.56000E-07 G/G                    | N             | Y         | R4B5C       |

END OF REPORT

SAMPLE STATUS REPORT FOR E 6961. SCHMIDT 9513336 0497 5434 TIME: 5/10/94 15:13  
 DISPATCHED: 4/21/94 10:26 SAMPLE HAS NOT BEEN SLURPED  
 RECEIVED: 4/28/94 14:21 BHI-00219

| EXT. | DETER.   | RESULTS OR STATUS               | Rev. 00<br>OUT OF GOOD<br>RANGE? ANS? | CHARGE<br>CODE |
|------|----------|---------------------------------|---------------------------------------|----------------|
| **** | *****    | *****                           | ***                                   | *****          |
| 2172 | GEA-SOIL | < 8.92999E-02 pCi/gWETwt Cs-137 | N                                     | Y R4B5C        |
| 3461 | Pu-SOIL  | < 4.70000E-01 pCi/gDRYwt        | N                                     | Y R4B5C        |
| 3872 | Sr-SOIL  | < 6.60000E-01 pCi/gDRYwt        | N                                     | Y R4B5C        |
| 4461 | U-SOIL   | 4.01000E-07 G/G                 | N                                     | Y R4B5C        |

END OF REPORT

SAMPLE STATUS REPORT FOR E 6964. SCHMIDT 5435 TIME: 5/10/94 10:42  
 DISPATCHED: 4/21/94 10:27 SAMPLE HAS NOT BEEN SLURPED  
 RECEIVED: 4/28/94 14:23

| EXT. | DETER.   | RESULTS OR STATUS                  | OUT OF GOOD<br>RANGE? ANS? | CHARGE<br>CODE |
|------|----------|------------------------------------|----------------------------|----------------|
| **** | *****    | *****                              | ***                        | *****          |
| 2172 | GEA-SOIL | < 1.10000E-01 pCi/gWETwt Cs-137    | N                          | Y R4B5C        |
| 2172 | GEA-SOIL | 3.05E-1 pCi/gWETwt TL-208 (35.48%) |                            | R4B5C          |
| 2172 | GEA-SOIL | 6.96E-1 pCi/gWETwt PB-212 (31.47%) |                            | R4B5C          |
| 2172 | GEA-SOIL | 6.51E-1 pCi/gWETwt BI-214 (32.91%) |                            | R4B5C          |
| 2172 | GEA-SOIL | 5.82E-1 pCi/gWETwt PB-214 (46.97%) |                            | R4B5C          |
| 3461 | Pu-SOIL  | < 5.10000E-01 pCi/gDRYwt           | N                          | Y R4B5C        |
| 3872 | Sr-SOIL  | 7.65000E-01 pCi/gDRYwt             | N                          | Y R4B5C        |
| 4461 | U-SOIL   | 6.88000E-07 G/G                    | N                          | Y R4B5C        |

END OF REPORT

SAMPLE STATUS REPORT FOR E 6965. SCHMIDT 5436 TIME: 5/10/94 10:42  
 DISPATCHED: 4/21/94 10:27 SAMPLE HAS NOT BEEN SLURPED  
 RECEIVED: 4/28/94 14:24

| EXT. | DETER.   | RESULTS OR STATUS               | OUT OF GOOD<br>RANGE? ANS? | CHARGE<br>CODE |
|------|----------|---------------------------------|----------------------------|----------------|
| **** | *****    | *****                           | ***                        | *****          |
| 2172 | GEA-SOIL | < 6.48000E-01 pCi/gWETwt Cs-137 | N                          | Y R4B5C        |
| 2172 | GEA-SOIL | 8.57E-1 pCi/g PB-212 (48.53%)   |                            | R4B5C          |
| 2172 | GEA-SOIL | 1.34 pCi/g PB-214 (39.52%)      |                            | R4B5C          |
| 3461 | Pu-SOIL  | < 4.50000E-01 pCi/gDRYwt        | N                          | Y R4B5C        |
| 3872 | Sr-SOIL  | 9.15000E-01 pCi/gDRYwt          | N                          | Y R4B5C        |
| 4461 | U-SOIL   | 6.14000E-07 G/G                 | N                          | Y R4B5C        |

END OF REPORT

SAMPLE STATUS REPORT FOR E 6967. SCHMIDT 5437 TIME: 5/11/94 8:12  
 DISPATCHED: 5/21/94 10:27 SAMPLE HAS NOT BEEN SLURPED  
 RECEIVED: 5/28/94 14:24

| EXT. | DETER.   | RESULTS OR STATUS             | OUT OF GOOD<br>RANGE? ANS? | CHARGE<br>CODE |
|------|----------|-------------------------------|----------------------------|----------------|
| **** | *****    | *****                         | ***                        | *****          |
| 2172 | GEA-SOIL | 1.43000E 01 pCi/gWETwt Cs-137 | N                          | Y R4B5C        |
| 2172 | GEA-SOIL | 3.11E-1 pCi/g TL-208 (46.58%) |                            | R4B5C          |
| 2172 | GEA-SOIL | 8.93E-1 pCi/g PB-212 (36.27%) |                            | R4B5C          |
| 3461 | Pu-SOIL  | 2.74000E 00 pCi/gDRYwt        | N                          | Y R4B5C        |
| 3872 | Sr-SOIL  | 1.45000E 00 pCi/gDRYwt        | N                          | Y R4B5C        |
| 4461 | U-SOIL   | 1.10000E-06 G/G               | N                          | Y R4B5C        |

END OF REPORT

SAMPLE STATUS REPORT FOR E 6968. SCHMIDT 5438 TIME: 5/11/94 8:11  
DISPATCHED: 5/21/94 10:27 SAMPLE HAS NOT BEEN SLURPED  
RECEIVED: 5/28/94 14:25

| DEPT.   | RESULTS OR STATUS             | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|---------|-------------------------------|---------------|-----------|-------------|
| GE-SOIL | 1.11000E 01 pCi/gWETwt Cs-137 | N             | Y         | R4B5C       |
| PU-SOIL |                               |               |           | R4B5C       |
| SE-SOIL | 1.24000E 01 pCi/gDRYwt        | N             | Y         | R4B5C       |
| U-SOIL  | 1.20000E 00 G/G               | N             | Y         | R4B5C       |

END OF REPORT

SAMPLE STATUS REPORT FOR E 6970. SCHMIDT 5439 TIME: 5/11/94 8:12  
DISPATCHED: 5/21/94 10:28 SAMPLE HAS NOT BEEN SLURPED  
RECEIVED: 5/28/94 14:27

| DEPT.   | RESULTS OR STATUS                | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|---------|----------------------------------|---------------|-----------|-------------|
| GE-SOIL | 6.50000E 00 pCi/gWETwt Cs-137    | N             | Y         | R4B5C       |
| GE-SOIL | 1.18 pCi/G PB-212 (31.56% ERROR) |               |           | R4B5C       |
| PU-SOIL | 8.30000E-01 pCi/gDRYwt           | N             | Y         | R4B5C       |
| SE-SOIL | 1.17000E 00 pCi/gDRYwt           | N             | Y         | R4B5C       |
| U-SOIL  | 2.98000E-07 G/G                  | N             | Y         | R4B5C       |

END OF REPORT

SAMPLE STATUS REPORT FOR E 6971. SCHMIDT 5440 TIME: 5/16/94 10:13  
DISPATCHED: 5/21/94 10:28 SAMPLE HAS NOT BEEN SLURPED  
RECEIVED: 5/28/94 14:27

| DEPT.   | RESULTS OR STATUS                   | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|---------|-------------------------------------|---------------|-----------|-------------|
| GE-SOIL | 1.44E+1 pCi/G K-40 (30.44% ERROR)   |               |           | R4B5C       |
| GE-SOIL | 6.06000E 00 pCi/gWETwt Cs-137       | N             | Y         | R4B5C       |
| GE-SOIL | 5.23E-1 pCi/G TL-208 (40.60% ERROR) |               |           | R4B5C       |
| GE-SOIL | 7.94E-1 pCi/G PB-212 (47.78% ERROR) |               |           | R4B5C       |
| PU-SOIL | 1.84000E 00 pCi/gDRYwt              | N             | Y         | R4B5C       |
| SE-SOIL | 6.56000E-01 pCi/gDRYwt              | N             | Y         | R4B5C       |
| U-SOIL  | 7.68000E-07 G/G                     | N             | Y         | R4B5C       |

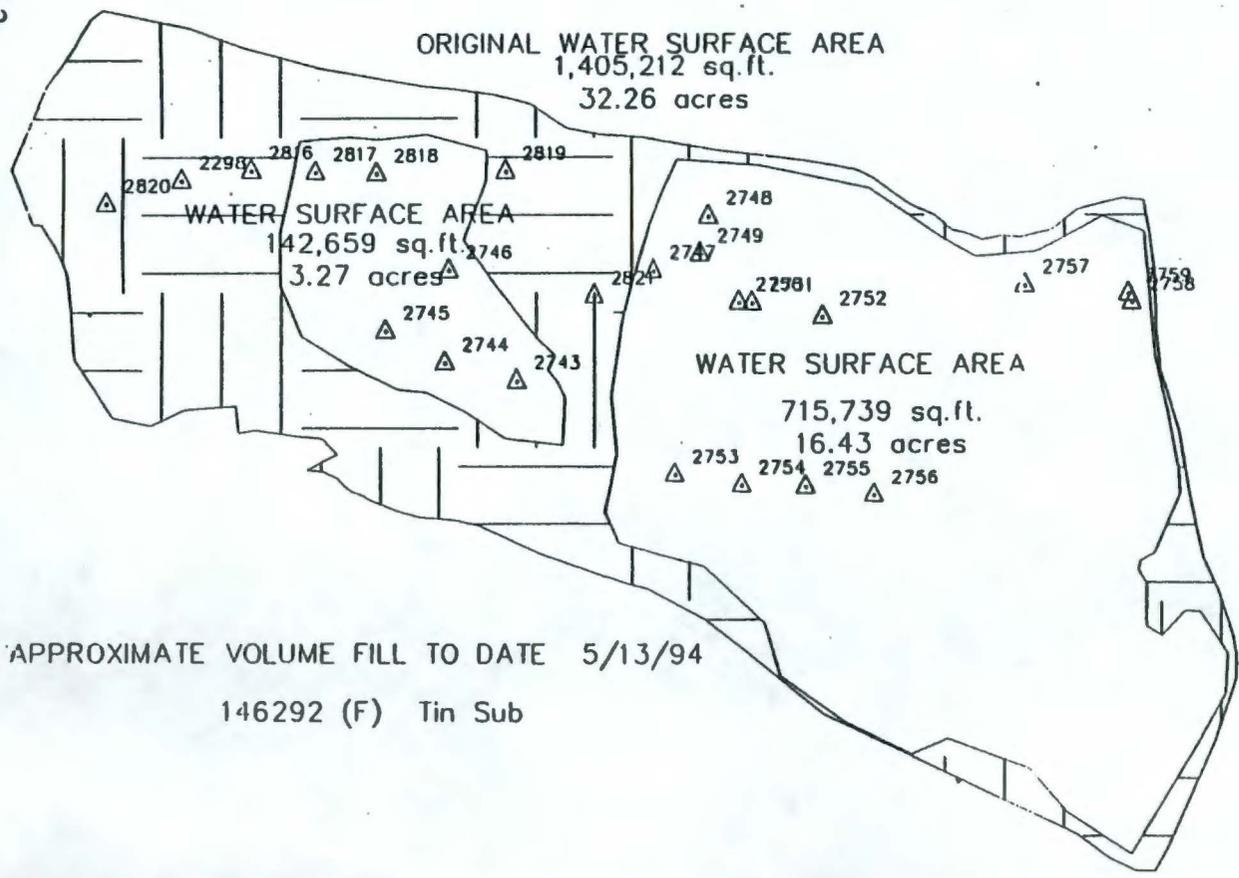
END OF REPORT

**Appendix E**

**Old Pond Perimeter Post**

# B-POND STATUS REPORT

E-2

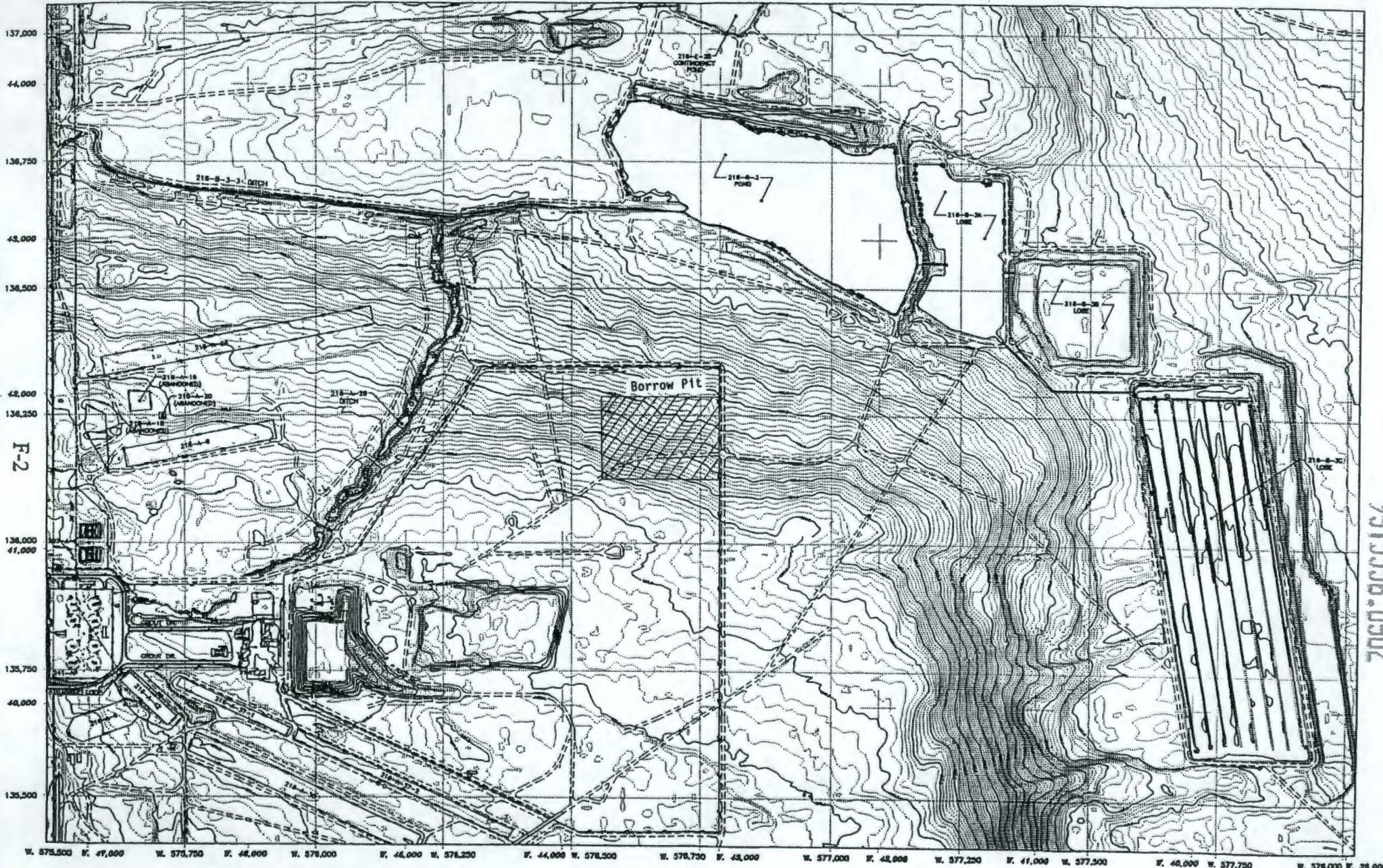


## INTERSECTED POST LOCATIONS Current Coordinate Listing (All)

| Point | Northing | Easting  | Description |
|-------|----------|----------|-------------|
| 2298  | 43648.9  | -43437.2 | POST        |
| 2743  | 43325.8  | -42905.6 | POST        |
| 2744  | 43354.3  | -43020.6 | POST        |
| 2745  | 43405.4  | -43115.4 | POST        |
| 2746  | 43503.5  | -43014.1 | SIGN POST   |
| 2747  | 43503.2  | -42683.6 | POST        |
| 2748  | 43590.6  | -42593.8 | SIGN POST   |
| 2749  | 43530.2  | -42607.4 | POST        |
| 2750  | 43452.1  | -42545.7 | POST        |
| 2751  | 43451.3  | -42524.4 | POST        |
| 2752  | 43429.4  | -42412.9 | POST        |
| 2753  | 43173.7  | -42648.0 | POST        |
| 2754  | 43156.3  | -42541.3 | POST        |
| 2755  | 43154.3  | -42438.8 | POST        |
| 2756  | 43140.4  | -42330.5 | POST        |
| 2757  | 43480.4  | -42093.0 | POST        |
| 2758  | 43453.0  | -41923.7 | POST        |
| 2759  | 43466.9  | -41929.4 | POST        |
| 2816  | 43664.8  | -43327.4 | POST        |
| 2817  | 43661.8  | -43226.0 | POST        |
| 2818  | 43659.7  | -43123.5 | POST        |
| 2819  | 43663.3  | -42922.9 | POST        |
| 2820  | 43611.3  | -43555.1 | POST        |
| 2821  | 43462.6  | -42780.6 | POST        |

**Appendix F**

**Borrow Pit Location**



137,000  
 44,000  
 136,750  
 43,000  
 136,500  
 42,000  
 136,250  
 F-2  
 136,000  
 41,000  
 135,750  
 40,000  
 135,500

W. 575,500 E. 47,000 W. 575,750 E. 48,000 W. 576,000 E. 49,000 W. 576,250 E. 50,000 W. 576,500 E. 51,000 W. 576,750 E. 52,000 W. 577,000 E. 53,000 W. 577,250 E. 54,000 W. 577,500 E. 55,000 W. 578,000 E. 56,000

9513336.0502

BHI-00219  
 Rev. 00

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