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OPERABLE UNIT 5 RI/FS WORK PLAN ADDENDA PLANT 1 PAD, SOUTHEAST QUADRANT OF THE PRODUCTION AREA, FIRE TRAINING AREA, KC-2 WAREHOUSE AREA AND ELECTRICAL

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OPERABLE UNIT 5 RI/FS WORK PLAN ADDENDA

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PLANT 1 PAD

SOUTHEAST QUADRANT OF THE PRODUCTION AREA

FIRE TRAINING AREA

KC-2 WAREHOUSE AREA AND ELECTRICAL SUBSTATION

K-65 SLURRY LINE AND CLEARWELL LINE

October 1992

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

US DEPARTMENT OF ENERGY
FERNALD FIELD OFFICE

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INTRODUCTION TO THE OPERABLE UNIT 5 RI/FS WORK PLAN ADDENDA

The five work plans contained in this document are follow-up investigations to work completed under the Production and Additional Suspect Areas (PASA) Work Plan, October 1989. The intent of the PASA Work Plan was to determine the nature and extent of contamination in soils and groundwater within the production area and suspect areas. Contamination was documented as a result of this investigation; however, in some areas the lateral and vertical extent of contamination was not adequately defined by the sampling network. Other samples have been collected for full radiological and E.P. Toxicity parameters, for example Environmental Monitoring, Treatability, and Integrated Technology Demonstration. These data have not been collected according to RI/FS criteria and are not incorporated in this work plan. Based on the results of the PASA investigation, additional sampling is proposed to define the boundaries of contamination within specific areas. Preliminary Remediation Goals are presented in Appendix B; these tables were derived from the Site-Wide Characterization Report, Part III Feasibility Study Support dated August 1992.

Three of the five work plans contained in this package are required to investigate the vertical and lateral extent of contamination found during the original PASA investigation. These are:

Plant 1 Pad
Southeast Quadrant of the Production Area
Fire Training Area

In each of these areas, the original PASA investigation revealed the presence of contaminants, but it did not adequately define the vertical or lateral extent of contamination. Each work plan contains discussion of existing chemical data and local geological and hydrogeological characteristics to justify the scope of the investigation.

The work plan for the KC-2 Warehouse area and the Electrical Substation includes sampling activities for the substation that were originally included in the PASA Work Plan. However, the work was not completed due to health and safety concerns for workers in the substation. Sample collection procedures have been modified so that the work can now be completed in a safe manner.

The final work plan included in this document provides additional investigation of soils and groundwater in the vicinity of the pipeline system linking the Clearwell with the sewage treatment plant. Several lengths of this line were investigated under the PASA Work Plan. Additional wells and borings are required to further define the extent of contamination. Also, existing wells in this area will be sampled and analyzed for parameters not previously considered.

As data are collected during on-going field activities, they will be transmitted in the form of an interim report. This interim report will include raw data, preliminary analytical results, and a preliminary data summary. These data will be used to evaluate, and modify if necessary, planned follow up activities.

SECTION 1.0

WORK PLAN ADDENDUM FOR THE INVESTIGATION OF POTENTIAL SOIL AND GROUNDWATER CONTAMINATION IN THE PLANT 1 PAD AREA

1.1 INTRODUCTION

This work plan addendum presents a sampling and analysis plan for further investigation of the extent of contamination in the soils and perched groundwater underlying the Plant 1 Pad and associated areas. The purpose of this program is to define the down gradient limits of radiological contamination in perched groundwater under the pad and to determine if that groundwater is contaminated with nonradiological substances. The proposed area of investigation is shown in Figure 1. It consists of the Plant 1 Pad and the area immediately to the west.

Historically, Plant 1 was used for the sampling and analysis of large amounts of uranium metal process residues and waste materials. The Plant 1 concrete storage pad, which covers approximately eight acres near Plant 1, has been used since 1952 as a drum storage location for low-level wastes and recoverable uranium residues. The inventory of the pad in March 1991 was approximately 45,000 drums. The age of the pad varies due to additions and repairs that have been made over the years.

Materials containing varying amounts of uranium, thorium, and other hazardous substances are stored on the Plant 1 Pad. Some of the carbon steel drums used to store wastes have deteriorated due to extended exposure to the elements, thereby increasing the risk of release of hazardous material to the environment. Additionally, the pad has a number of cracks and control joints which may serve as migration routes to the underlying soils.

Historically, there are two areas of the pad where nonradiological or Resource Conservation and Recovery Act (RCRA) wastes have been stored. The first area is located along the east side of the pad extending from Building 56 south to Building 30A and from the east edge of the pad west to the first row of lightposts (Figure 1). This area is used to store drums prior to testing. If a drum is determined to contain RCRA waste and does not contain elevated levels of radiological substances, it is then moved to a RCRA storage facility in another area of the Fernald Environmental Management Project (FEMP). If the drum contains RCRA waste and has elevated levels of radiological substances, it is then stored on the pad in the second area which is northwest of Building 66 (Figure 1). According to site personnel, although these two areas are the most likely to contain RCRA wastes, this does not mean that RCRA wastes have never been stored on other areas of the pad.

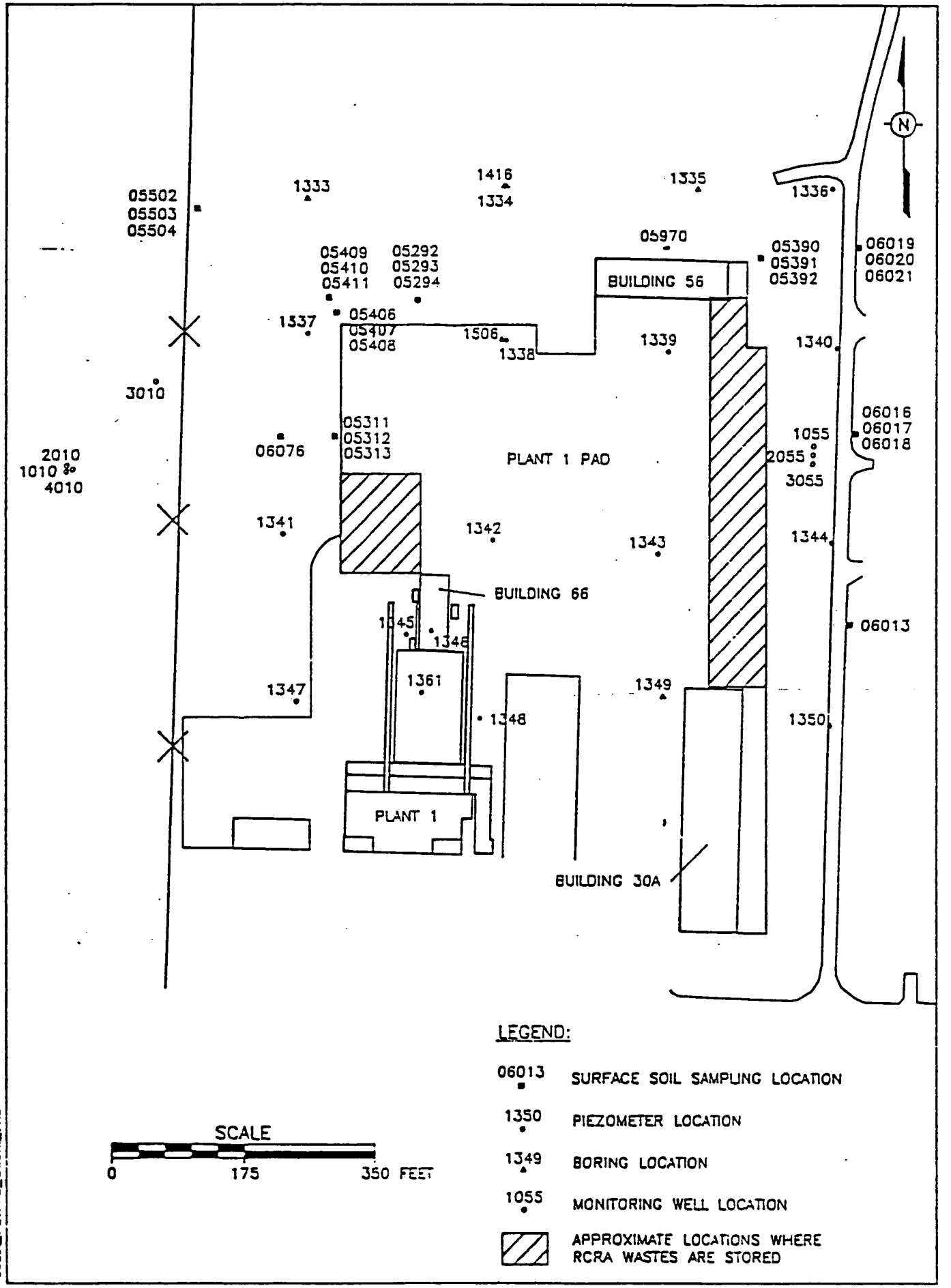

FIGURE 1. SAMPLING LOCATIONS IN THE PLANT 1 PAD AREA

1.2 PREVIOUS INVESTIGATIONS

Several investigations have been conducted in the vicinity of the Plant 1 Pad under the Remedial Investigation/Feasibility Study (RI/FS). The first was a surface soil sampling program conducted in 1988. The sample locations for this program are shown in Figure 1. All of the samples were collected within the upper 18 inches of soil and were analyzed for radiological parameters only. The analytical results are presented in Table 1. The dominant contaminant in the surface soil in this area is uranium. Elevated levels of thorium and radium are also present. The highest levels of contamination in the area were encountered off the northwest corner of the pad at the location of Sample Numbers 05292, 05293, and 05294. Surface drainage from the pad is to the west-northwest.

The second investigation under the RI/FS consisted of borings and piezometers completed under the Production and Additional Suspect Areas (PASA) Work Plan Addendum. The locations of the borings and piezometers are shown in Figure 1, and in Figure 5 Appendix C. Geologic cross-sections have been developed for the area and are presented in Figures 2 and 3, and in Appendix C, Figures 6 through 15. Appendix C also contains data on the perched water sampling results conducted by WEMCO. This data is located in Table A-11 in Appendix C.

The variations in color of the clay units are due to the weathering of the units rather than depositional differences. The gray clays represent unweathered material and a general lack of perched groundwater within the unit. The color change from gray to yellows and browns is the result of iron in soil being oxidized by infiltration of oxygenated surface water. The presence of yellow or brown clay below gray clay is direct evidence that perched water is moving laterally within the unit.

The Plant 1 Pad is underlain by a combination of unweathered gray clays and weathered yellow-brown clays with silt and sand lenses. The soils in this area are geologically more complex than in other areas within the Production Area. The typical sequence underlying much of the Production Area is 10 to 15 feet of weathered yellow-brown clay with silt and sand lenses overlying unweathered gray clay. As can be seen in Figures 2 and 3, the sediments underlying the Plant 1 Pad and surrounding area are alternating layers of weathered yellow-brown clay and unweathered gray clay. As stated above, this alternating sequence indicates that lateral as well as vertical migration of groundwater is occurring.

Soil samples collected from depths of 0.0 to 2.0 feet in Borings 1338, 1345, and 1347 in the Plant 1 Pad area were analyzed for full radiological parameters. These results are shown in Table 2. Boring 1347 had elevated concentrations of radium, technetium-99, thorium, and uranium. Boring 1338 had elevated concentrations of uranium.

TABLE 1
SURFACE SOIL - PLANT 1 PAD AREA

Results in picocuries per gram (pCi/g). Total uranium results reported in µg/g. Data presented by sample number and depth in inches. NA indicates not analyzed; a number preceded by a "less than" (<) symbol indicates that the compound was not present above the detection limit of the analytical instrument.

Radiological Parameters	05292 0-6	05293 6-12	05294 12-18	05311 0-6	05312 6-12	05313 12-18	05390 0-6	05391 6-12	05392 12-18
Cesium 137	<2.6	<2.8	<1.0	0.2	<0.2	<0.2	0.3	<0.2	<0.2
Radium 226	2720.0	2630.0	383.0	2.7	1.3	0.6	0.9	0.7	0.6
Radium 228	56.2	<13.1	<5.0	1.1	0.7	0.6	1.5	0.6	0.6
Strontium 90	3.1	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5
Technetium 99	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Thorium 228	6.4	19.5	1.2	8.4	0.9	0.8	1.7	1.4	<0.6
Thorium 230	2729.0	2749.0	272.0	4.4	5.9	1.4	6.3	2.5	0.8
Thorium 232	31.4	18.8	2.5	8.6	0.7	0.8	1.7	1.3	<0.6
Uranium 234	3857.0	758.0	211.0	42.9	13.4	5.8	306.0	60.4	47.2
Uranium 235/236	204.0	16.4	22.1	3.6	1.0	<0.6	7.3	2.4	2.5
Uranium 238	4108.0	1651.0	276.0	69.9	21.3	7.4	322.0	62.0	48.3
Total Uranium	NA	6140.0	1050.0	NA	58.0	19.0	NA	149.0	127.0

Radiological Parameters	05406 0-6	05407 6-12	05408 12-18	05409 0-6	05410 6-12	05411 12-18	05502 0-2	05503 2-4	05504 4-6
Cesium 137	0.2	<0.2	<0.2	0.8	<0.2	<0.2	0.7	<0.2	<0.2
Radium 226	25.7	2.3	1.8	58.2	12.4	0.9	1.3	0.8	0.8
Radium 228	1.2	6.2	0.9	9.6	2.7	<0.5	14.9	6.5	2.4
Strontium 90	<0.5	0.6	<0.5	<0.5	0.5	0.8	0.6	<0.5	<0.5
Technetium 99	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Thorium 228	1.2	<0.6	0.9	7.8	2.8	0.7	13.5	4.0	2.3
Thorium 230	11.2	1.7	1.8	343.0	118.0	4.5	6.8	2.3	1.8
Thorium 232	1.4	<0.6	0.9	25.6	3.1	<0.6	12.7	4.9	1.7
Uranium 234	101.0	33.4	30.3	71.5	54.7	14.9	41.8	15.6	12.3
Uranium 235/236	4.9	1.6	1.4	3.7	3.1	0.6	2.7	0.9	0.7
Uranium 238	169.0	60.6	56.3	118.0	59.6	16.2	54.7	18.2	12.5
Total Uranium	NA	167.0	154.0	NA	161.0	52.0	140.0	54.0	36.0

TABLE 1
SURFACE SOIL - PLANT 1 PAD AREA
(Continued)

Results in picocuries per gram (Pci/g). Total uranium results reported in µg/g. Data presented by sample number and depth in inches. NA indicates not analyzed; a number preceded by a "less than" (<) symbol indicates that the compound was not present above the detection limit of the analytical instrument.

Radiological Parameters	05970 0-6	06013 0-6	06016 0-6	06017 6-12	06018 12-18	06019 0-6	06020 0-6	06021 0-6	06076 0-6
Cesium 137	<0.2	0.3	0.5	<0.2	<0.2	0.5	0.5	0.4	0.5
Radium 226	0.6	1.3	1.4	0.9	0.9	1.4	1.4	1.3	1.2
Radium 228	0.5	1.1	1.2	1.0	0.9	1.2	1.1	1.2	1.0
Strontium 90	<0.5	<0.5	<0.5	1.9	1.4	<0.5	<0.5	<0.5	<0.5
Technetium 99	<0.9	1.1	1.9	6.4	6.6	<0.9	<0.9	<0.9	<0.9
Thorium 228	0.7	1.0	1.2	0.8	0.6	1.0	1.4	1.5	0.7
Thorium 230	1.6	4.5	3.8	1.4	1.2	2.5	3.3	3.1	1.9
Thorium 232	<0.6	1.0	1.2	<0.6	<0.6	1.1	1.1	1.0	0.9
Uranium 234	6.9	19.1	38.4	6.9	4.7	17.0	19.4	17.8	8.5
Uranium 235/236	<0.6	1.2	2.6	<0.6	<0.6	1.0	1.2	1.0	<0.6
Uranium 238	9.1	22.6	42.1	7.2	4.8	17.9	20.7	19.1	16.1
Total Uranium	25.0	68.0	87.0	35.0	24.0	57.0	53.0	51.0	47.0

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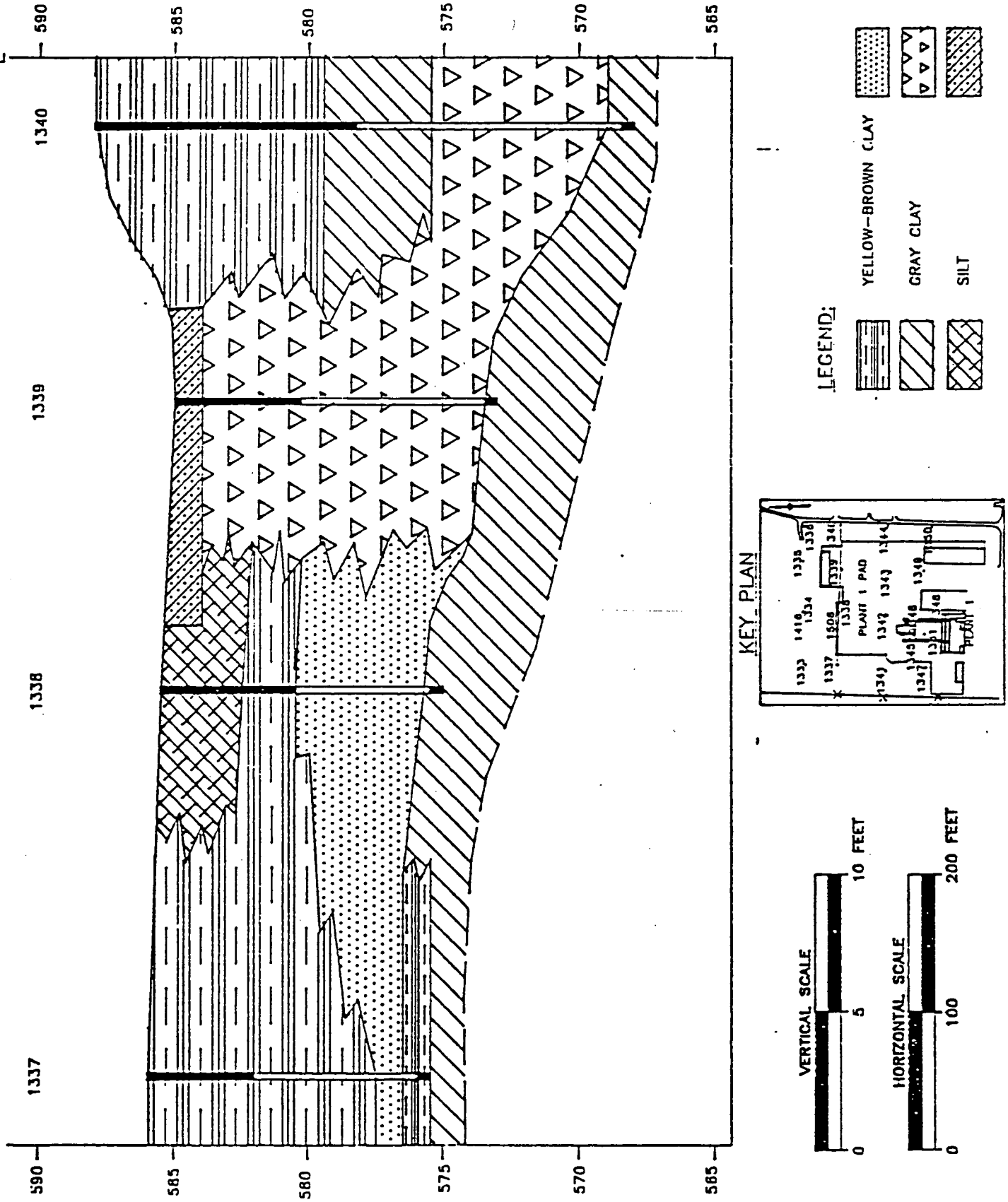

FIGURE 2. CROSS SECTION OF PLANT 1 PAD AREA - WEST TO EAST

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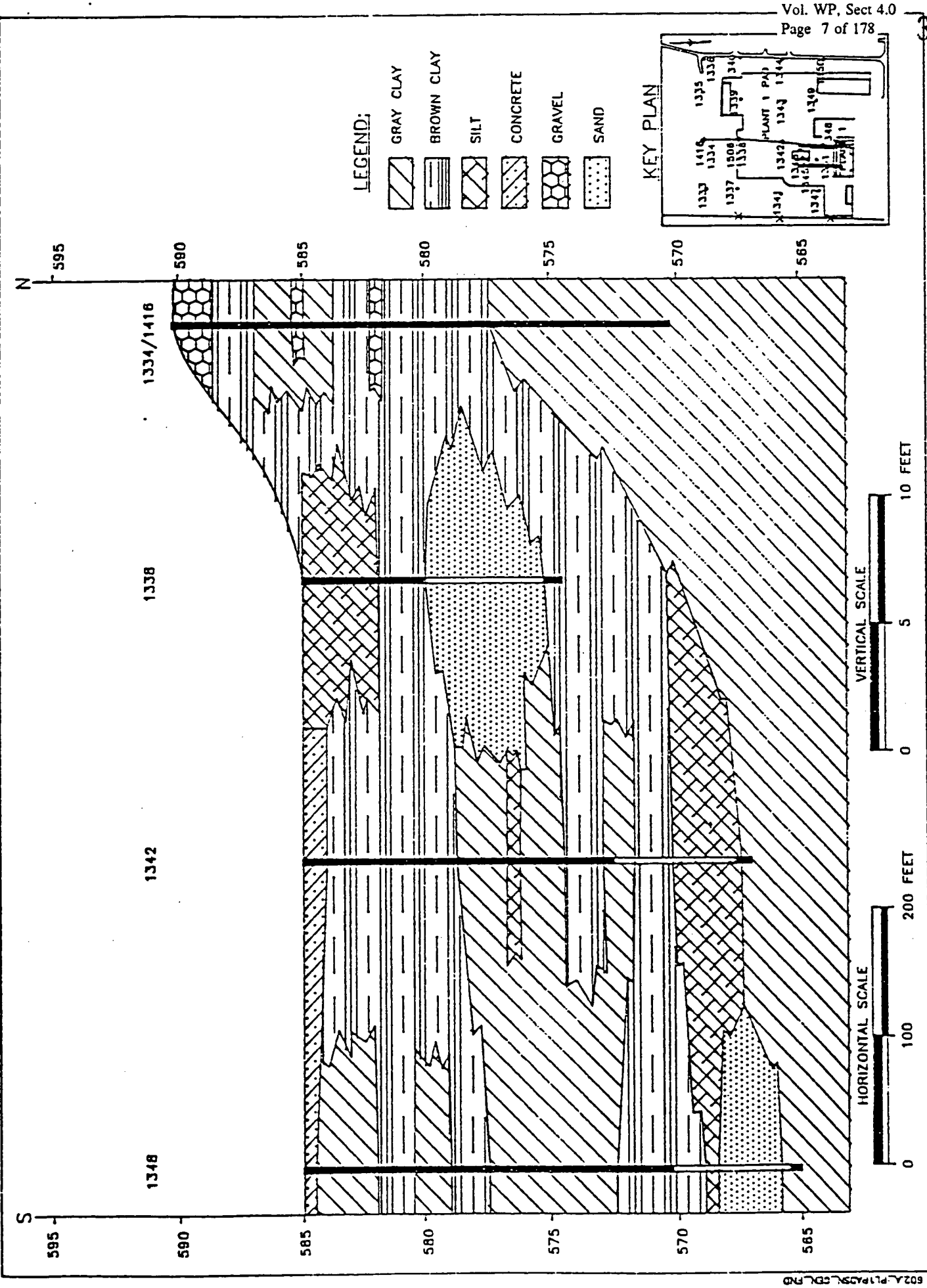

FIGURE 3. CROSS SECTION OF PLANT 1 PAD AREA–SOUTH TO NORTH

TABLE 2

FULL RADIOLOGICAL RESULTS FOR SUBSURFACE SOIL IN THE PLANT 1 PAD AREA

Results are presented in picocuries per gram (Pci/g). Data presented by boring, sample number, and depth in feet. NA indicates not analyzed; a number preceded by a "less than" symbol (<) indicates that the parameter was not present above the detection limit of the instrument.

Radiological Parameters	1338 50005 0.0 - 0.5	1345 50159 1.0 - 1.5	1345 50160 1.5 - 2.0	1347 50203 0.0 - 0.5
Cesium 137	<0.2	<0.2	<0.2	0.5
Radium 226	1.7	0.8	0.6	29.0
Radium 228	1.3	0.9	0.6	<0.7
Strontium 90	<1.4	0.7	0.8	<1.5
Technetium 99	<1.0	<1.2	1.4	36.5
Thorium 228	2.2	0.7	0.9	2.8
Thorium 230	4.3	1.1	1.3	59.5
Thorium 232	1.2	0.7	0.7	2.4
Total Thorium*	25.0	NA	NA	33.0
Uranium 234	29.4	8.3	0.8	217.0
Uranium 235/236	1.9	<0.6	<0.6	9.3
Uranium 238	41.5	9.2	0.9	205.0
Total Uranium*	219.0	28.3	3.7	459.0

*Results reported in µg/g

Subsurface soil samples from selected intervals were analyzed for total uranium and total thorium. These results are shown in Table 3, and Table A-7, Appendix C. In general, total uranium values decreased with depth. The highest uranium concentrations were detected in samples taken from 0.0 to 1.5 feet in Borings 1338, 1340, 1343, and 1347. Two anomalously high uranium values were detected at depths below 1.5 feet. These were 73.0 µg/g in Boring 1338 at 5.0 to 6.5 feet, and 68.0 µg/g in Boring 1347 at 15.0 to 16.0 feet. This deeper contamination is likely due to lateral migration.

Various groundwater samples have been collected from each piezometer installed and samples were analyzed for either full radiological, general groundwater quality and/or total uranium parameters. These results are shown in Table 4, and Tables A-9, and A-10 in Appendix C. The average total uranium concentration for each piezometer is shown in Figure 4, and Tables A-10 and A-11 in Appendix C. The highest uranium concentrations were reported in Piezometers 1337, 1338, and 1339 which are located at the northern end of the pad. Water level data indicate a southwest flow in the perched water system. Additional soil and perched groundwater analytical results from the Plant 1 Pad removal action can be found in Appendix C.

The third investigation was a maintenance action to repair deteriorated areas of concrete on the Plant 1 Pad. The work was completed in four areas (Figure 4 Appendix C), and consisted of removing approximately four inches of concrete down to the reinforcing bars, placing the removed concrete/rubble in drums for sampling, and replacing with new concrete. Soil samples were collected in the repaired areas immediately beneath the pad and at a depth of one foot.

The samples taken from immediately beneath the pad were analyzed for trace metals and radionuclides. The samples collected at a depth of one foot were analyzed for total uranium and total thorium. WEMCO data is presented in Table A-6, Appendix C and conclusions are reported in "Final Report - Plant 1 Pad Expedited Maintenance." These conclusions state that the metals concentrations were within the expected range of background concentrations and that the principle radiological contaminant found was uranium. All samples collected from immediately beneath the pad had above-background concentrations of uranium; however, only one sample from a depth of one foot had above-background concentrations of uranium.

The final investigation in May, 1991, supported the Plant 1 Pad Removal action and consisted of:

1) The collection and analyses of soil samples from 21 locations just off the western edge of the pad; soil samples beneath the concrete, at the western edge, were also collected at seven locations. (These locations can be seen in Figure 2 Appendix C). The samples were collected from three distinct increments within each location, as indicated in Table

A-1 Appendix C: surface (0 ft), 1 ft, and 2 ft depths. The samples were collected by FMPC personnel in accordance with FMPC Environmental Monitoring sampling protocols. Analyses of the samples are shown in Appendix C, and included Primary Total Metals (Table A-1 Appendix C), E.P. Toxicity Metals (Table A-2 Appendix C), Target Volatile Organic (Table A-3 Appendix C), and Radiochemical Metals (Table A-4 Appendix C). The Primary Total Metals, E.P. Toxicity Metals, Radiochemical Metals analysis were completed in the FMPC laboratory. The Target Volatile Organic analysis was completed at off-site laboratories.

2) The soil sampling program was supplemented with the collection of samples at 47 additional locations located in the grassy area west of the pad and 23 locations beneath the pad.

The 47 locations in the grassy area were collected at various depths. One type had two samples collected: at the surface and at a depth of one foot (Figure 3 Appendix C). The second type of location included only surface soil samples which were collected at 26 points; these points were located five feet west of the pad and every 20 feet along the edge of the pad. All samples were collected by FMPC personnel, utilizing FMPC Environmental Monitoring sampling protocols. The samples collected from this area were only tested for radionuclides, as reflected in Table A-5 Appendix C. The analysis for these samples were performed at the FMPC laboratory.

3) Finally, another 23 locations were sampled beneath the pad with the distribution noted in Figure 4 Appendix C. Samples were collected from the surface soil directly beneath the pad and at a depth of one foot.

The samples from one foot below the pad were analyzed at the FMPC for total thorium and total uranium only. No measurable thorium was noted, and the 16 of 20 samples with measurable uranium averaged 25 +/- 22 ppm; analytical sensitivity was 11 ppm. Table A-6 Appendix C displays the radiological results.

TABLE 3

RADIOLOGICAL RESULTS FOR SUBSURFACE SOIL IN THE PLANT 1 PAD AREA

Results are presented in µg/g. NA indicates not analyzed. A number preceded by a "less than" symbol (<) indicates that the parameter was not present above the detection limit of the instrument.

Parameter and Depth (Feet)	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350
Total Uranium														
0.0 - 1.5	33.0	219.0	26.2	98.0	30.8	15.0	75.1	28.0	28.3	28.4	459.0	27.7	6.9	15.0
2.0 - 3.5	<11.0	49.0	<3.1	<11.0	6.9	4.0	2.6	17.0	3.7	10.2	13.0	10.6	5.3	<11.0
5.0 - 6.5	<11.0	73.0	6.6	<11.0	5.0	3.0	2.8	<11.0	4.4	4.5	<11.0	2.5	4.0	<11.0
10.0 - 11.0	16.0	<11.0	2.4	<11.0	3.7	<4.0	2.3	<11.0	13.7	5.2	22.0	5.6	3.2	NA
15.0 - 16.0	NA	NA	NA	<11.0	6.9	4.0	NA	<11.0	NA	6.1	68.0	3.1	4.7	NA
Total Thorium														
0.0 - 1.5	<23.0	25.0	5.0	24.0	7.6	7.6	<4.6	<23.0	10.3	7.0	33.0	4.1	7.3	<23.0
2.0 - 3.5	<23.0	23.0	8.6	<23.0	8.0	<4.1	<5.4	<23.0	<3.5	6.7	<23.0	6.4	13.5	<23.0
5.0 - 6.5	<23.0	<23.0	<4.4	<23.0	9.9	12.0	<3.0	<23.0	10.8	8.7	<23.0	11.9	14.0	<23.0
10.0 - 11.0	<23.0	<23.0	<4.0	<23.0	11.8	7.4	3.7	<23.0	8.3	9.5	<23.0	9.3	3.9	NA
15.0 - 16.0	NA	NA	NA	<23.0	NA	NA	NA	<23.0	NA	6.6	25.0	NA	NA	NA

TABLE 4

RADIOLOGICAL RESULTS FOR GROUNDWATER IN THE PLANT 1 PAD AREA

Results presented µg/ℓ. Data presented by location. NA indicates not analyzed.

Parameter and Depth (feet)	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1350	1361
Sample Date	10/5/89	10/6/89	10/17/89	10/5/89	10/27/89	10/17/89	1/18/90	10/5/89	10/6/89	1/19/90	10/6/89	1/22/90	1/17/90	1/19/90
Total Uranium µg/ℓ	689.0	40.0	441.0	32.0	28.0	26.0	40.6	42.0	2.0	9.6	152.0	20.5	40.9	38.6
Sample Data	7/13/90	7/14/90	7/13/90	1/21/90	7/13/90	NA	7/13/90	2/3/90	7/13/90	NA	7/13/90	NA	2/5/90	NA
Total Uranium µg/ℓ	757.0	432.0	100.0	45.9	36.9	NA	10.9	65.7	9.4	NA	3.9	NA	34.7	NA
Average Concentration	723	236	327	39	32	26	26	54	6	10	78	21	38	39

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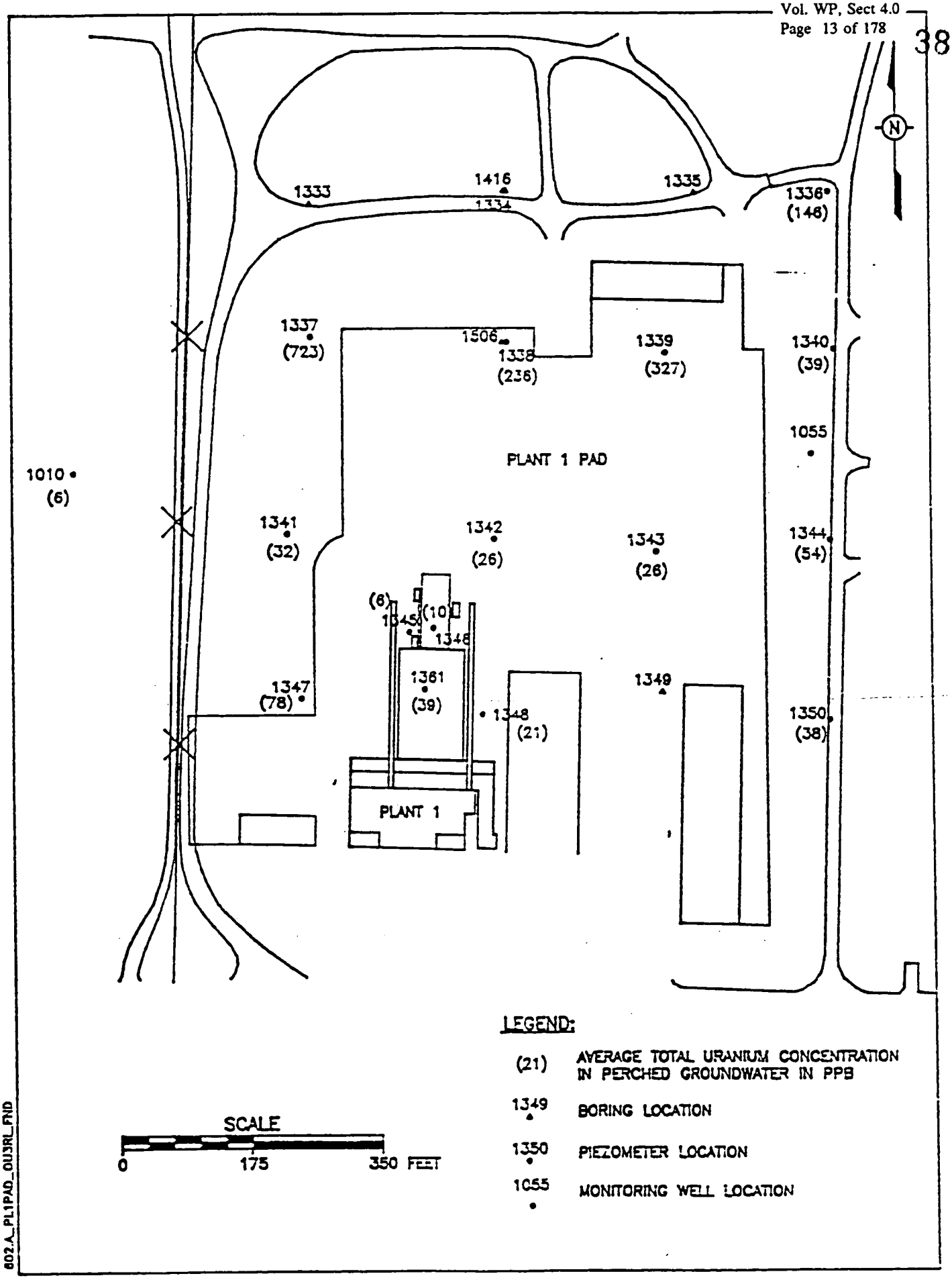

FIGURE 4. AVERAGE TOTAL URANIUM IN PERCHED GROUNDWATER

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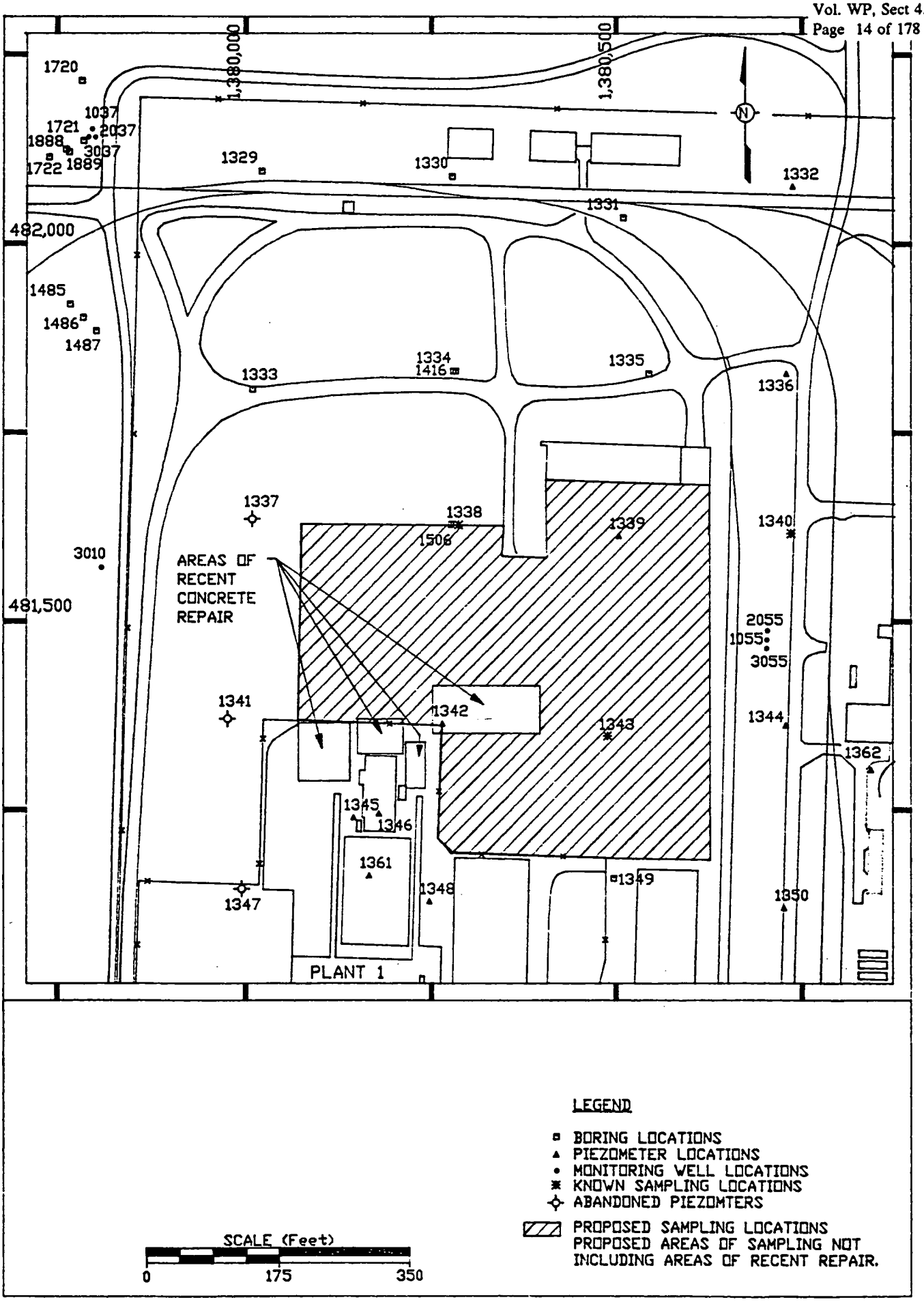

FIGURE 5. PROPOSED SAMPLING AREA

In summary, surface soil in the Plant 1 Pad area has elevated levels of uranium, thorium, radium, and full HSL constituents. In most of the area, radiological contamination does not extend beyond a depth of 1.5 feet. Perched groundwater in the area has elevated levels of uranium. Neither soil nor groundwater underlying the Plant 1 Pad was analyzed for HSL parameters. Preliminary analytical results for HSL samples collected west of the Plant 1 Pad show elevated levels of HSL metals, volatiles, semivolatiles, and the PCB aroclor-1254. The extent of nonradiological contamination beneath the Plant 1 Pad is unknown.

In early May 1991, an inspection of the Plant 1 Pad was conducted by Advanced Sciences, Inc./International Technology Corp. (ASI/IT) and WEMCO personnel. Areas of concrete deterioration and discoloration were marked and photographed by WEMCO personnel. The inspection and resulting photographs will aid in determining where additional sampling should occur.

1.3 PROPOSED INVESTIGATION

The following investigation will determine if nonradiological contamination exists below the Plant 1 Pad and further investigate the known radiological contamination. It consists of soil sampling at shallow depths beneath the pad and sampling of the perched groundwater from existing piezometers. All samples will be analyzed for full HSL and full radiological parameters. Table 5 summarizes the data quality objectives of the investigation presented here. The text that follows provides more detailed objectives for the investigation.

The first part of the investigation will focus on soil contamination. Soil samples will be collected from 14 locations at the following depths: immediately beneath gravel underlying the pad at 0.0 to 1.0 foot and at 2.0 to 3.0 feet. These depths were chosen because sampling from both the RI/FS and the WEMCO maintenance project indicated that uranium contamination levels decreased drastically in the first 2 feet of soil. This sampling interval will indicate if this attenuation process also occurs for organic contaminants.

The soil samples will be analyzed for full HSL and full radiological parameters as defined in Tables 4.1 and 4.3 of the RI/FS Quality Assurance Project Plan (QAPP). Four of the sampling locations will be near the piezometers that had the highest concentrations of total uranium in soil samples. These piezometers are 1338, 1340, 1343, and 1347. The other 10 sampling locations will be selected based on the most likely locations for storage of RCRA wastes and the May 1991 pad inspection and photographs. These locations will be near cracks and other visible signs of deterioration of the concrete Figure 5.

TABLE 5
DATA QUALITY OBJECTIVES FOR SAMPLING AND ANALYSIS OF THE PLANT 1 PAD

Activity	Collect and analyze soil samples from a depth of 0 to 2.0 and 2.0 to 3.0 feet in 14 borings at locations of suspected leaks in the Plant 1 Pad. Analyze for full HSL and full radiological parameters.	Collect and analyze water samples from existing piezometers completed in perched water units beneath and adjacent to the Plant 1 Pad. Analyze samples for full HSL and full radiological parameters.
Objectives	Determine the nature and extent of contamination of soils beneath the concrete pad. Sampling depths were chosen to investigate the attenuation of contaminant concentrations with depth.	The existing piezometers have been sampled only for total U. The present sampling program is needed to define the nature and extent of contamination in perched water in the Plant 1 Pad area.
Prioritized data uses	The priority data use is site characterization. Site characterization data is used for risk assessment and evaluation of alternatives.	
Appropriate analytical level*	HSL: Level IV Rad: Level V	
Constituents of concern	Full HSL and full radiological parameters. Full HSL and full radiological constituents are suspected because the pad has been used to store a wide variety of materials. Previous sampling west of and beneath the pad has identified HSL VOCs, semivolatiles, PCBs, inorganics, and uranium, thorium, radium, and technetium-99.	
Level of concern	See Appendix B	
Required detection limits	See Appendix B	
Critical samples**	No individual sample is considered critical; however, the aggregate of samples are required for site characterization. The study requires that at least 75 percent of the samples attain the intended analytical level specified above upon completion of data validation.	

* = If samples can not attain their respective level of validation the samples will not be considered valid.

** = Critical samples are defined in the U.S. EPA DQO guidance as:

"those for which valid data must be obtained to satisfy the objectives of the sampling and analysis task. An example of a critical data point may be an up gradient well in a groundwater contamination study or any other data point considered vital to the decision making process."

The soil samples will be collected using the sampling procedures outlined in the RI/FS Work Plan, March 1988, except as otherwise noted here. The samples will be collected by first drilling a 10-inch-diameter hole in the concrete. Once the concrete is removed, three-inch split spoons will be used to collect enough soil from each depth for the full HSL and full radiological analysis. All borings through the Plant 1 Pad will be abandoned by first filling the boring with bentonite pellets; second, hydrating the pellets with uncontaminated water; and, finally, capping the boring with concrete.

The second part of the investigation will focus on perched groundwater. Groundwater samples will be taken from four existing piezometers, 1338, 1339, 1343, and 1348, and analyzed for full HSL and full radiological parameters. Piezometers 1338, and 1339 monitor a sand and silt lens that runs beneath the northern edge of the pad (Figure 2). This zone is shallower than that monitored by other piezometers in the area. These three piezometers had the highest total uranium concentrations. Piezometer 1343 monitors a zone that is at the same stratigraphic interval as the zone monitored in Piezometers 1338, and 1339. Piezometers 1337, 1341, and 1347 located adjacent to the west side of the pad have been plugged and abandoned. This action was necessary due to OU3 general upgrading of the Plant 1 storage pad.

Piezometer 1348 will also be sampled because it is a down gradient location from the pad and is located near Building 66, the drum-reconditioning building which could be a source of organic contaminants.

Groundwater samples will be collected in accordance with the procedures outlined in the RI/FS Work Plan, March 1988. One round of samples will be collected and analyzed for full HSL and full radiological parameters. A second round of groundwater samples will be collected and analyzed for full HSL and full radiological parameters, and general groundwater quality parameters. This second round of groundwater sampling will be accomplished as confirmatory sampling of the first sampling round analysis results. The proposed sampling program is outlined in Table 6.

Previous drilling operations in the vicinity of the Plant 1 Pad encountered saturated soils at shallow depth. If saturated soils are encountered at shallow depth, groundwater samples for VOC analysis will be collected as soon as sufficient groundwater is present in the borehole; groundwater samples for other parameters will then be collected as recharge permits.

TABLE 6

SUMMARY OF PROPOSED DRILLING AND SAMPLING PROGRAM FOR THE PLANT 1 PAD AREA[a]

Location	Sample Depth (feet)	Boring Depth (feet)	Sample Type	Number of Samples per Boring[b,c]	Sample Parameters
Proposed Auger Rig Borings (14)	0-1.0 2.0-3.0	3	Soil	2	Full HSL, Full Radiological (TAL-50.03.07-D)[d]
Existing Piezometers 1338 1339 1334 1348	-	-	Water	2	Full HSL, Full Radiological, General Groundwater Quality (TAL-50.03.07-E)[d]

[a] Sampling to be conducted in compliance with Revision 3 of the Remedial Investigation and Feasibility Study Work Plan, Feed Materials Production Center Vol. I, Sampling Plan, Sections 3.0 and 4.0, and Vol. V, Quality Assurance Project Plan, Sections 5.0 and 6.0, March 1988; and Production and Additional Suspect Areas Work Plan, October 1989.

[b] The second round of groundwater samples will be analyzed for full radiological and HSL parameters, and general groundwater quality parameters.

[c] The following QA/QC samples will be collected: 1) a field duplicate is collected and analyzed every 10 samples for aqueous media, 2) a rinsate of sample collection equipment is collected and analyzed for every 20 analytical samples, and 3) an appropriate trip/field blank will accompany each sample from collection in the field to its destination at the lab. The lab will choose 1 in 20 general chemistry, volatiles, semi-volatiles, and pesticides/PCB, trip/field blanks for analyses.

[d] TAL: Target Analyte List. See Appendix A.

The water sample collected will be analyzed for full HSL and full radiological parameters. If sufficient water can be collected for these analytical parameters, a well will not be installed. If it is necessary to leave a boring open overnight, then measures will be taken to prevent the collection of rainwater or surface runoff in the boring. The nature of soils beneath the pad are such that DOE does not expect borings to collapse if left open overnight.

DOE will prevent collection of turbid samples by allowing turbid waters to settle before sampling. DOE will use a "gentle" method of sample collection to prevent the occurrence of turbidity, e.g., a ball syringe constructed of materials compatible with the RI/FS QAPP.

SECTION 2.0

WORK PLAN ADDENDUM FOR THE INVESTIGATION OF PERCHED GROUNDWATER CONTAMINATION IN THE SOUTHEAST QUADRANT OF THE PRODUCTION AREA

2.1 INTRODUCTION

This work plan addendum presents a sampling and analysis plan to further investigate the extent of soil and perched groundwater contamination in the southern portion of the southeast quadrant of the production area. The program will define the down gradient limits of the perched groundwater contamination south of the production area and determine if the subsurface soils and perched groundwater underlying the administration/service area are contaminated. The area of investigation, shown in Figure 1, comprises the area near the garage and heavy equipment building, the area around the administration and services buildings, and the Health and Safety building.

2.2 PREVIOUS INVESTIGATIONS

Two separate investigations have been completed in the southeast quadrant under the Remedial Investigation/Feasibility Study (RI/FS). The first was a surface soil sampling program conducted in 1988. The sample locations for this program are shown in Figure 1. All of the samples were collected within the upper 18 inches of soil and were analyzed for radiological parameters only. The analytical results are presented in Table 1.

The dominant contaminant encountered in the surface soil was uranium. Elevated levels of thorium and radium were also detected. Sample Numbers 05546, 05455, and 05458 had the highest levels of contamination in the area. However, this soil was removed during the construction of the annex to the health and safety building. Ten additional points were sampled by WEMCO Site Media Sampling Group in October 1991. Samples were collected at the surface, 1 foot, and 2 foot. Analyses for total uranium and total thorium indicated levels to less than 35 Pci/g; buildover criteria were met and additional sampling is not required. WEMCO records were reviewed and it is evident that build over crietiera was met. Since buildover criteria was met there is no need to develope a sampling program.

The second investigation under the RI/FS consisted of borings and piezometers completed under the Production and Additional Suspect Areas (PASA) Work Plan Addendum. Geologic cross sections have been developed for the area and are presented in Figures 2 and 3.

The variations in color of the clay units are due to weathering of the unit rather than depositional differences. The gray clays represent unweathered material and a general lack of perched groundwater within the unit. The color change to yellows and browns is the result of iron in soil being oxidized by infiltration of oxygenated surface water. The presence of yellow or brown clay below gray clay is direct evidence that perched water is moving laterally within the unit.

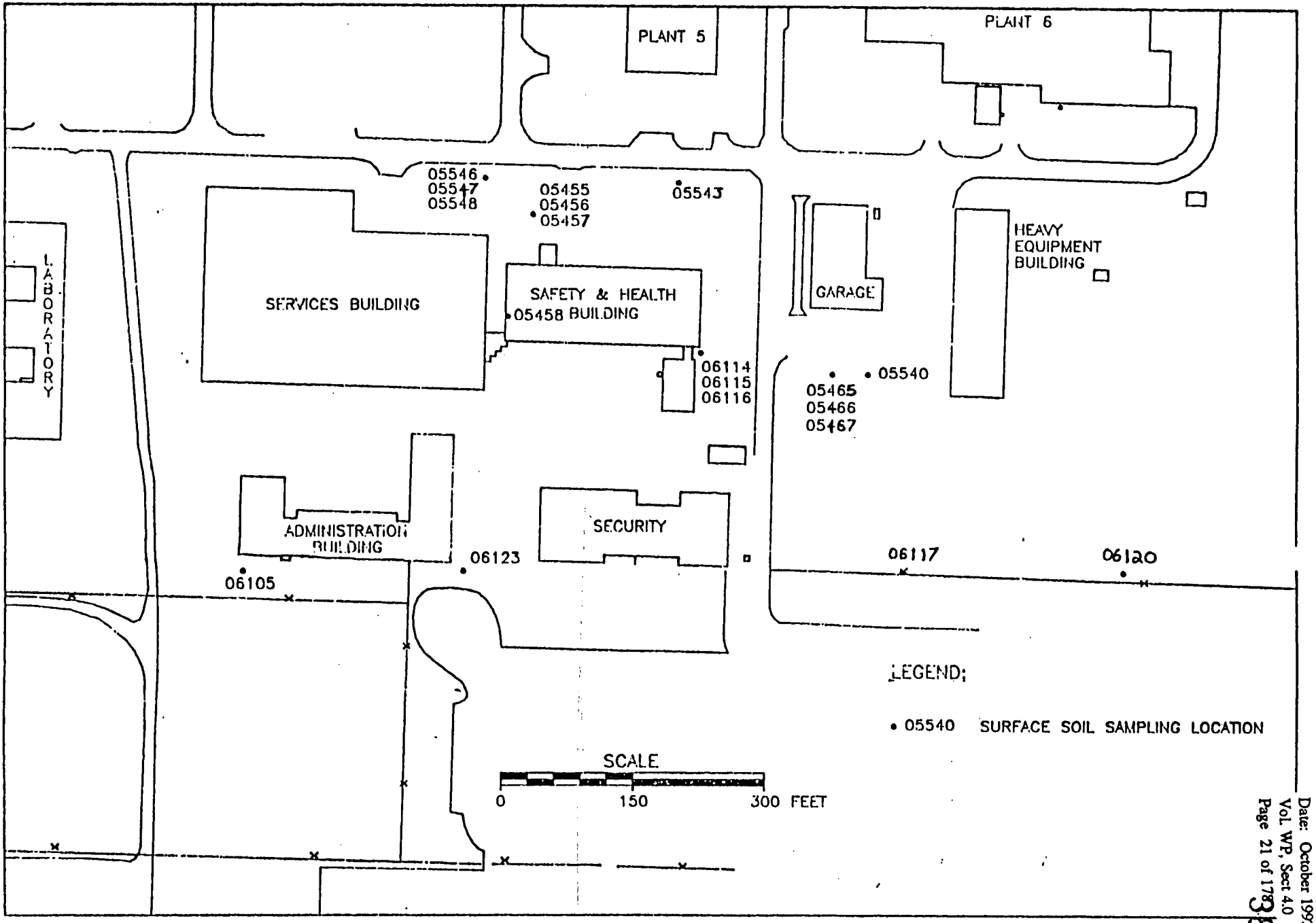

FIGURE 1. SOUTHERN PORTION OF SOUTHEAST QUADRANT AND SURFACE SOIL SAMPLING LOCATIONS

TABLE 1
SURFACE SOIL RADIOLOGICAL DATA - ADMINISTRATION AREA

Results in picocuries per gram (Pci/g). Data presented by sample number and depth in inches. NA indicates not analyzed; a number preceded by a "less than" (<) symbol indicates that the compound was not present above the detection limit of the analytical instrument.

Radiological Parameters	05455 0-6	05458 0-6	05465 0-6	05466 6-12	05467 12-18	05540 0-6	05543 0-6
Cesium 137	0.9	14.4	0.7	<0.2	<0.2	0.5	<0.2
Plutonium 239/240	1.1	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Radium 226	1.5	2.2	1.0	1.7	1.2	1.8	1.0
Radium 228	4.6	5.4	1.3	1.1	1.2	1.1	0.8
Strontium 90	<0.5	1.0	<0.5	<0.5	1.1	<0.5	<0.5
Technetium 99	2.0	1.7	1.0	<0.9	<0.9	<0.9	<0.9
Thorium 238	7.5	6.5	1.5	1.5	1.3	1.0	0.8
Thorium 230	19.6	40.3	6.3	3.0	3.5	4.1	3.3
Thorium 232	9.1	6.6	1.7	1.0	1.2	1.0	0.9
Uranium 234	589.0	970.0	41.5	20.0	12.4	25.1	21.8
Uranium 235/236	29.7	41.6	2.1	1.3	<0.6	1.4	2.2
Uranium 238	695.0	986.0	52.3	26.0	14.3	30.0	26.1
Total Uranium *	3150.0	2680.0	226.0	80.0	43.0	96.0	71.0

Radiological Parameters	05546 0-6	06105 0-6	06114 0-6	06115 6-12	06116 12-18	06117 0-6	06123 0-6
Cesium 137	1.2	0.4	0.4	<0.2	<0.2	<0.2	<0.2
Plutonium 239/240	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Radium 226	3.0	1.1	1.1	0.8	0.8	1.1	2.6
Radium 228	3.6	1.0	1.0	0.7	<0.8	1.0	0.7
Strontium 90	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5
Technetium 99	1.8	<0.9	<0.9	4.4	5.5	<0.9	<0.9
Thorium 238	3.9	0.8	0.8	0.8	<0.6	0.8	0.7
Thorium 230	22.7	2.2	3.0	1.5	1.2	1.1	1.0
Thorium 232	3.8	0.8	0.7	0.8	0.6	0.7	<0.6
Uranium 234	110.0	18.6	39.3	7.0	3.7	4.0	5.8
Uranium 235/236	7.8	0.9	3.3	<0.6	<0.6	<0.6	<0.6
Uranium 238	132.0	18.3	41.5	7.4	3.9	4.4	5.6
Total Uranium *	368.0	50.0	60.0	21.0	9.0	17.0	17.0

* Results reported in µg/g

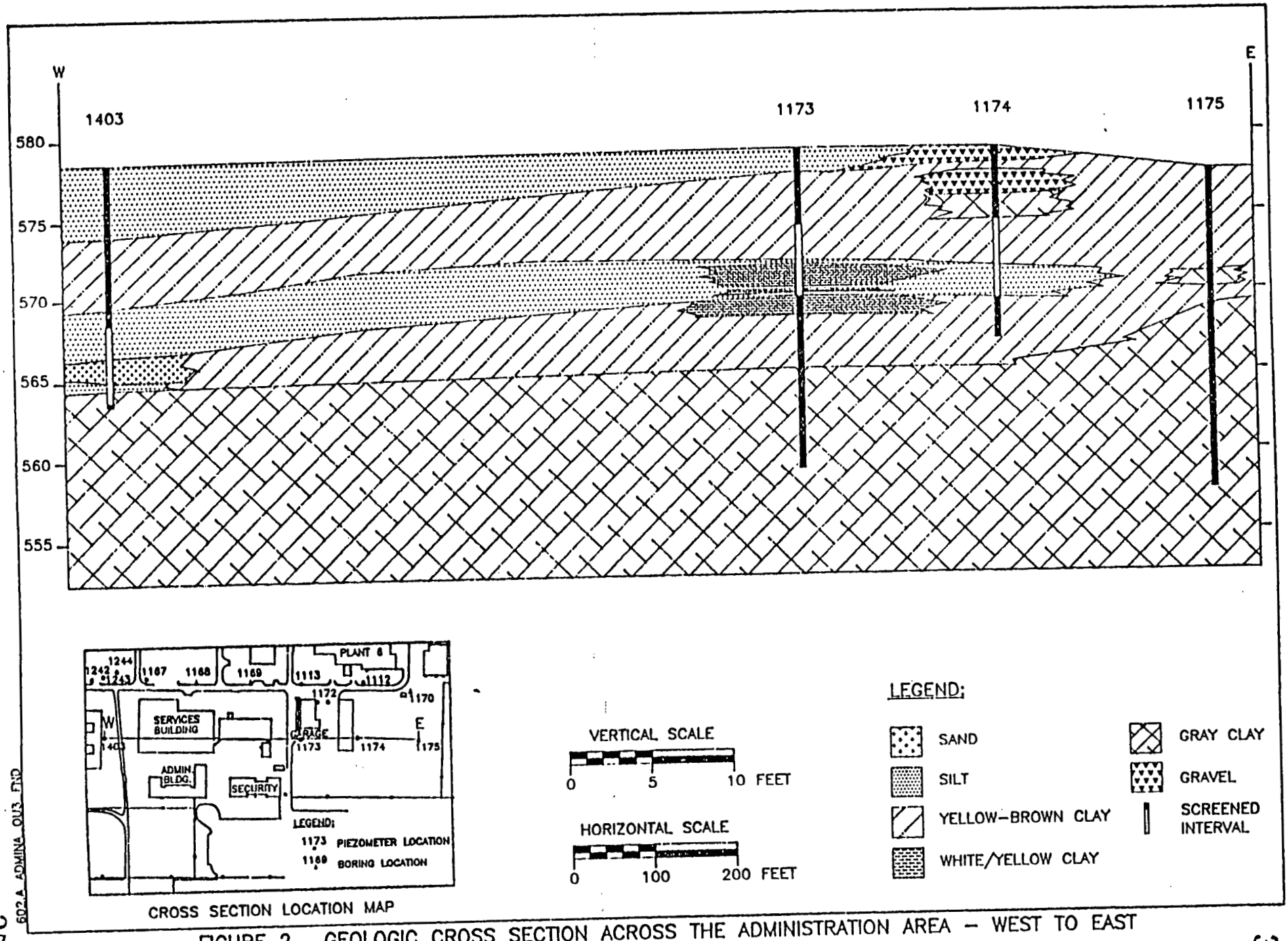

FIGURE 2. GEOLOGIC CROSS SECTION ACROSS THE ADMINISTRATION AREA – WEST TO EAST

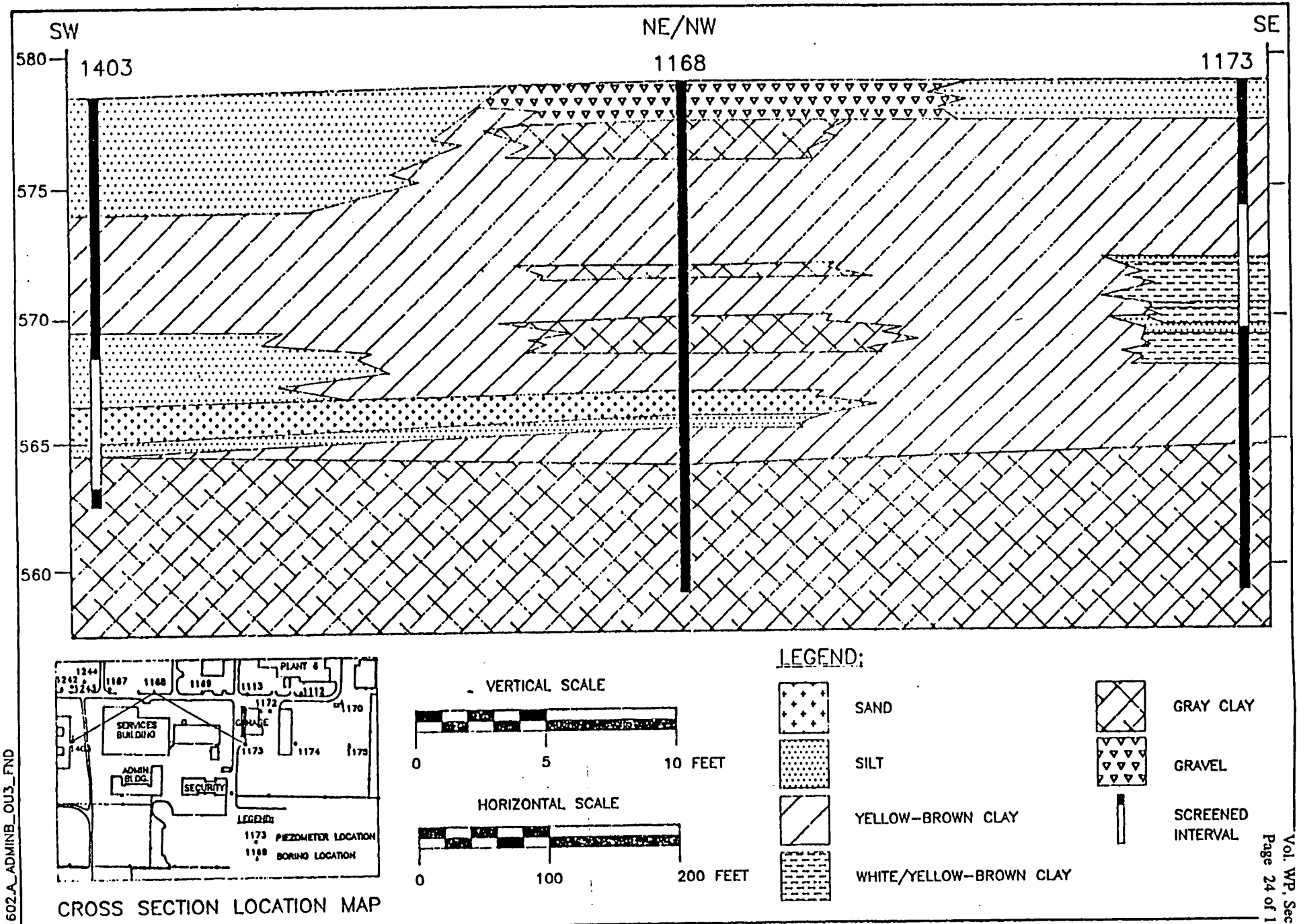

FIGURE 3. GEOLOGIC CROSS SECTION ACROSS ADMINISTRATION AREA

602-A_ADMINB_OU3_FND

The southern edge of the southeast quadrant is underlain by approximately 10 to 15 feet of weathered clay with silt and sand lenses. This unit, as a whole, is the water-bearing unit in the area. Two laterally extensive silt zones are present within the yellow-brown clay (Figure 2). In Boring 1173, the lower silt zone is interbedded with a white to brownish-yellow clay.

Soil samples collected from 0.0 to 0.5 feet in borings along the north and west sides of the administration/services area were analyzed for full radiological parameters (Table 2). Subsurface soil samples from selected intervals in all the borings in the area were analyzed for total uranium and total thorium; results are shown in Table 3. This sampling confirmed that uranium is the dominant contaminant in the soil in this portion of the southeast quadrant.

Table 3 shows that total uranium concentrations vary with depth. The majority of contamination lies within the upper 6 inches of soil, being generally an order of magnitude greater than underlying intervals. This evidence suggests that the contamination is migrating laterally along discontinuous, permeable lenses of silt and fine sand, or along excavations, storm sewers and foundations situated in the variable glacial tills. For example, the total uranium values for Well 1169 at the 0.0-0.5 foot sample is 119.0 ug/l, the 2.0-3.5 feet sample is 35.0 ug/l, the 5.0-6.5 feet sample is <11.0 ug/l, and the 10.0-11.0 feet sample is 29.0 ug/l. If contamination were migrating vertically, uranium concentration would be more equally distributed. Figures 6 through 10 graphically display the total uranium concentrations and their aerial extent at different depths, and further support the observation that uranium is migrating laterally through the glacial overburden. These figures were compiled from data collected in the Plant 2/3 area. Figure 6 displays data from 0.0-1.5 feet below ground surface (bgs). It can be clearly seen that the contamination is wide spread and of relatively high levels. Figure 7 displays data from 1.5-3.0 feet bgs showing contamination with less aerial extent and lower concentrations. Figure 8 displays data from 3.0-3.5 feet bgs of greater aerial extent and higher concentrations than the 1.5-3.0 feet bgs values. Figure 9 shows data from 10.0-15.0 feet bgs to be of greater aerial extent than Figure 8, with additional areas of contamination present. Figure 10 displays data from 15.0-20.0 feet bgs showing contamination to be less wide spread; the new areas which were present in Figure 9 do not appear at this interval. Due to the existence of other similar examples across the site, lateral migration of uranium concentration appears to be a viable conclusion.

A soil sample was collected from Boring 1172 at a depth of 10.0 to 10.5 feet and analyzed for full HSL parameters. The analytical results that were above detection limits and/or above concentrations detected in blank samples are shown in Table 4. The elevated concentrations of benzene, toluene and xylenes indicate leakage from the fuel tanks. The fuel tanks have been removed and this soil contamination is being addressed by Westinghouse Environmental Management Company of Ohio (WEMCO) as part of the underground storage tank removal program.

A minimum of two perched groundwater samples were collected from each boring completed as a piezometer. These samples were analyzed for total uranium only. These results are shown in Table 5. The average total uranium concentration for each piezometer is shown in Figure 5. Elevated concentrations of uranium in the perched groundwater exist in the area of the garage and heavy equipment building and along the north side of the administration/services area. The southern boundary of this contamination has not been determined.

Two groundwater samples were collected from Piezometer 1172 and analyzed for full Hazardous Substance List (HSL) parameters. One was collected prior to purging the piezometer and the other was collected after purging. The analytical results that were above detection limits and blank concentrations are reported in Table 4. The samples contained benzene, toluene, and xylenes along with a variety of other hydrocarbons and chlorinated solvents. This contamination is being addressed by WEMCO as part of the underground storage tank removal program.

In summary, surface soil throughout the southern portion of the southeast quadrant has elevated levels of uranium. In some areas, this contamination appears to continue to a depth of approximately five feet. However, below the administration/services area, the extent of soil and perched groundwater contamination is unknown. Perched groundwater in the area of the garage and heavy equipment building has elevated levels of uranium. The southern and western extent of this contamination is unknown.

TABLE 2

FULL RADIOLOGICAL RESULTS FOR SAMPLES TAKEN FROM PRODUCTION AND ADDITIONAL SUSPECT AREAS BORINGS

Results presented in Pci/g. Data presented by boring number and depth in feet. A number preceded by a "less than" symbol (<) indicates that the parameter was not present above the detection limit of the instrument.

Radiological Parameters	1164 0.0-0.5	1165 0.0-0.5	1167 0.0-0.5	1168 0.0-0.5	1169 0.0-0.5	1174 0.0-0.5	1242 0.0-0.5	1243 0.0-0.5	1244 0.0-0.5	1403 0.0.0.5
Cesium 137	<0.2	<0.2	0.4	0.2	<0.2	<0.2	0.2	0.3	<0.2	0.3
Plutonium 238	<0.6	0.9	<0.6	1.0	<0.6	0.6	<0.6	<0.6	<0.6	<0.6
Radium 226	0.6	<0.3	2.1	0.7	0.7	1.2	<0.3	<0.3	0.4	<0.3
Radium 228	0.6	<0.5	3.9	1.0	0.8	0.8	1.2	4.6	1.7	<0.5
Strontium 90	1.1	1.2	<0.5	<1.0	1.9	<1.1	<0.5	<0.5	<0.5	3.3
Technetium 99	<0.9	<0.9	2.1	<0.9	<0.9	<0.9	<0.9	1.2	<0.9	<0.9
Thorium 238	NA	NA	NA	NA	1.0	NA	<0.6	<0.6	3.2	1.4
Thorium 230	5.1	4.9	7.1	20.9	2.9	9.9	2.5	4.1	5.4	3.3
Thorium 232	0.8	<1.0	1.3	2.7	0.7	0.9	<0.6	1.9	1.2	1.0
Total Thorium	7.6	<23.0	12.0	<23.0	<23.0	8.4	3.9	49.0	23.0	<23.0
Uranium 234	55.6	36.2	135.0	38.0	38.3	50.8	168.0	60.7	71.2	42.8
Uranium 235/236	3.7	2.8	13.8	1.5	2.3	3.5	15.2	5.6	5.5	1.8
Uranium 238	91.9	106.0	118.0	40.3	43.9	125.0	158.0	57.5	75.1	42.6
Total Uranium*	257.0	182.0	282.0	104.0	119.0	319.0	406.0	116.0	214.0	104.0

* Results in µg/g.

TABLE 3

RADIOLOGICAL RESULTS FOR SUBSURFACE SOIL IN THE ADMINISTRATION AREA

Results are presented in µg/g. Data presented by boring number. A number preceded by a "less than" symbol (<) indicates that the parameter was not present above the detection limit of the instrument. NA indicates not analyzed.

Parameter and Depth (Feet)	1112	1113	1164	1165	1167	1168	1169	1170	1172	1173	1174	1175	1242	1243	1244	1270	1403
Total Uranium																	
0.0-0.5	52.0	158.0	257.0	182.0	282.0	104.0	119.0	17.0	<11.0	91.0	319.0	14.0	406.0	116.0	214.0	64.0	104.0
2.0-3.5	26.0	82.0	20.0	79.0	<11.0	11.0	35.0	<11.0	<11.0	71.0	78.0	<11.0	<11.0	<11.0	<11.0	<11.0	11.0
5.0-6.5	32.0	85.0	<11.0	33.0	18.0	<11.0	<11.0	<11.0	<11.0	23.0	<11.0	<11.0	30.0	<11.0	<11.0	<11.0	11.0
10.0-11.0	12.0	28.0	66.0	NA	<11.0	<11.0	29.0	<11.0	NA	<11.0	15.0	<11.0	<11.0	<11.0	25.0	NA	<11.0
15.0-16.0	11.0	<11.0	62.0	NA	NA	<11.0	68.0	<11.0	NA	17.0	NA	<11.0	NA	NA	NA	NA	NA
Total Thorium																	
0.0-0.5	<23.0	<23.0	7.6	<23.0	12.0	<23.0	<23.0	<23.0	<23.0	<23.0	8.4	<23.0	3.9	49.0	23.0	<23.0	<23.0
2.0-3.5	<23.0	<23.0	<23.0	<23.0	<23.0	<23.0	<23.0	<23.0	<23.0	<23.0	<23.0	<23.0	<23.0	<23.0	<23.0	<23.0	<23.0
5.0-6.5	<23.0	<23.0	<23.0	<23.0	<23.0	23.0	<23.0	<23.0	<23.0	<23.0	23.0	<23.0	<23.0	<23.0	<23.0	<23.0	<23.0
10.0-11.0	<23.0	<23.0	<23.0	NA	<23.0	<23.0	<23.0	<23.0	NA	<23.0	<23.0	<23.0	<23.0	<23.0	24.0	NA	<23.0
15.0-16.0	<23.0	<23.0	<23.0	NA	NA	<23.0	<23.0	<23.0	NA	<23.0	NA	<23.0	NA	NA	NA	NA	NA

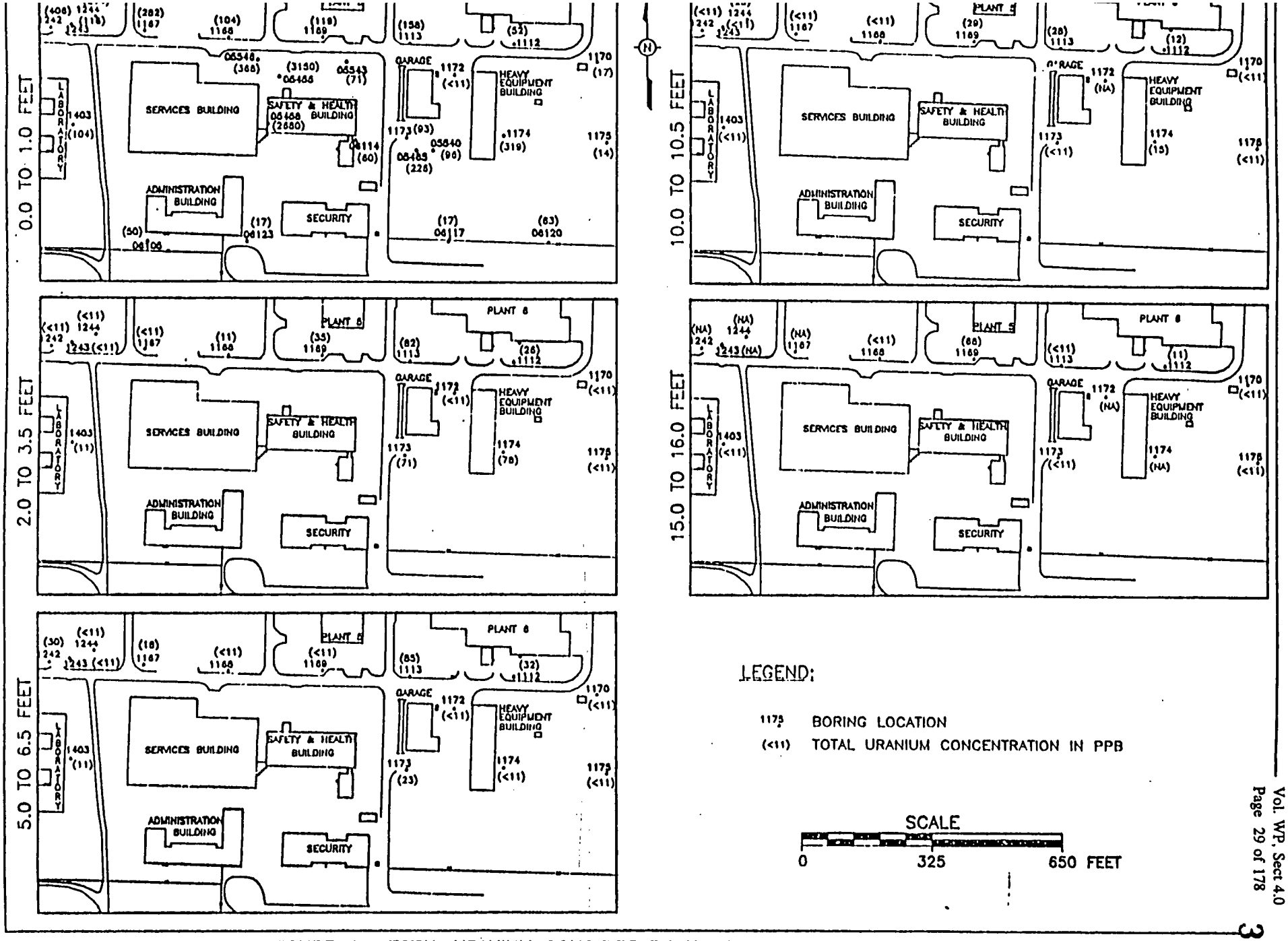

FIGURE 4. TOTAL URANIUM CONCENTRATIONS IN SOIL AT VARIOUS DEPTH INTERVALS

The pipelines now in service from the Clearwell to Manhole 175 consist of both old and new lines. Some sections of the old line have been partially evaluated by borings drilled during the Production and Additional Suspect Areas systematic drilling program, which utilized a 250-foot grid pattern. Additionally, pressure testing of new or replacement pipeline has been performed by WEMCO.

TABLE 4

CHEMICAL CONCENTRATIONS IN SOIL AND PERCHED GROUNDWATER - BORING 1172

Soil data is presented by boring number and depth in feet. Perched groundwater data is presented by boring number and sample date. Dashes indicate no detection.

Soil Parameters (µg/kg)	1172 10.0-10.5
Benzene	2.0
Ethylbenzene	18.0
Toluene	1.0
Total xylenes	82.0

Perched Groundwater Parameters (µg/ℓ)	1172 4/4/89 Before Purge	1172 4/4/89 After Purge
1,1-Dichloroethane	4	5
Toluene	-	6
1,2-Dichloroethene	-	1
Vinyl acetate	2	1
Benzene	4	14
Total xylenes	400	300
2-Methyl-butane	7.2	5
Cyclohexane	7.1	-
Methyl-cyclopentane	5.5	-
2,5-Heptadiene, (E,E)	6	-
2,4-Dimethyl-1,3-pentadiene	7.8	-
2.2.3.3-Tetramethyl-butane	20.1	16.1
2,3-Dimethyl-hexane	13	-
Tetramethylethylene-cyclopropane	5.4	-
Ethylbenzene	-	38
2,3,4-Trimethyle-pentane	-	12.7
3-Ethyl-pentane	-	6.4
Total petroleum hydrocarbon	-	1.5

TABLE 5

TOTAL URANIUM IN PERCHED GROUNDWATER

Data presented in µg/ℓ. Data presented by boring number. NA indicates not analyzed

	1112	1113	1167	1172	1173	1174	1242	1243	1244	1403
Sample Date	12/14/88	12/14/88	5/5/89	4/5/89	4/14/89	5/5/89	6/6/89	6/6/89	5/12/89	1/23/90
Total Uranium	835	2070	16	24[a]	355	329	1021	11	45	38
Sample Date	7/25/89	8/14/89	10/18/89	7/18/89	5/5/89	10/20/89	10/25/89	10/26/89	10/26/89	NA
Total Uranium	123	2070	373	37	395	782	992[b]	14	23	NA
Sample Date	10/18/89	10/18/89	NA	1/31/90	1/31/90	NA	NA	NA	NA	NA
Total Uranium	356	1422	NA	148	1210	NA	NA	NA	NA	NA
Average Concentration	438	1854	195	58	653	556	1001	13	34	38

[a] Duplicate samples were collected on 4/5/89 for Piezometer 1172. This number represents the average of these two samples. The actual results were 21 and 26 µg/ℓ.
[b] Duplicate samples were collected on 10/25/89 for Piezometers 1242. This number represents the average of these two samples. The actual results were 996 and 987 µg/ℓ.

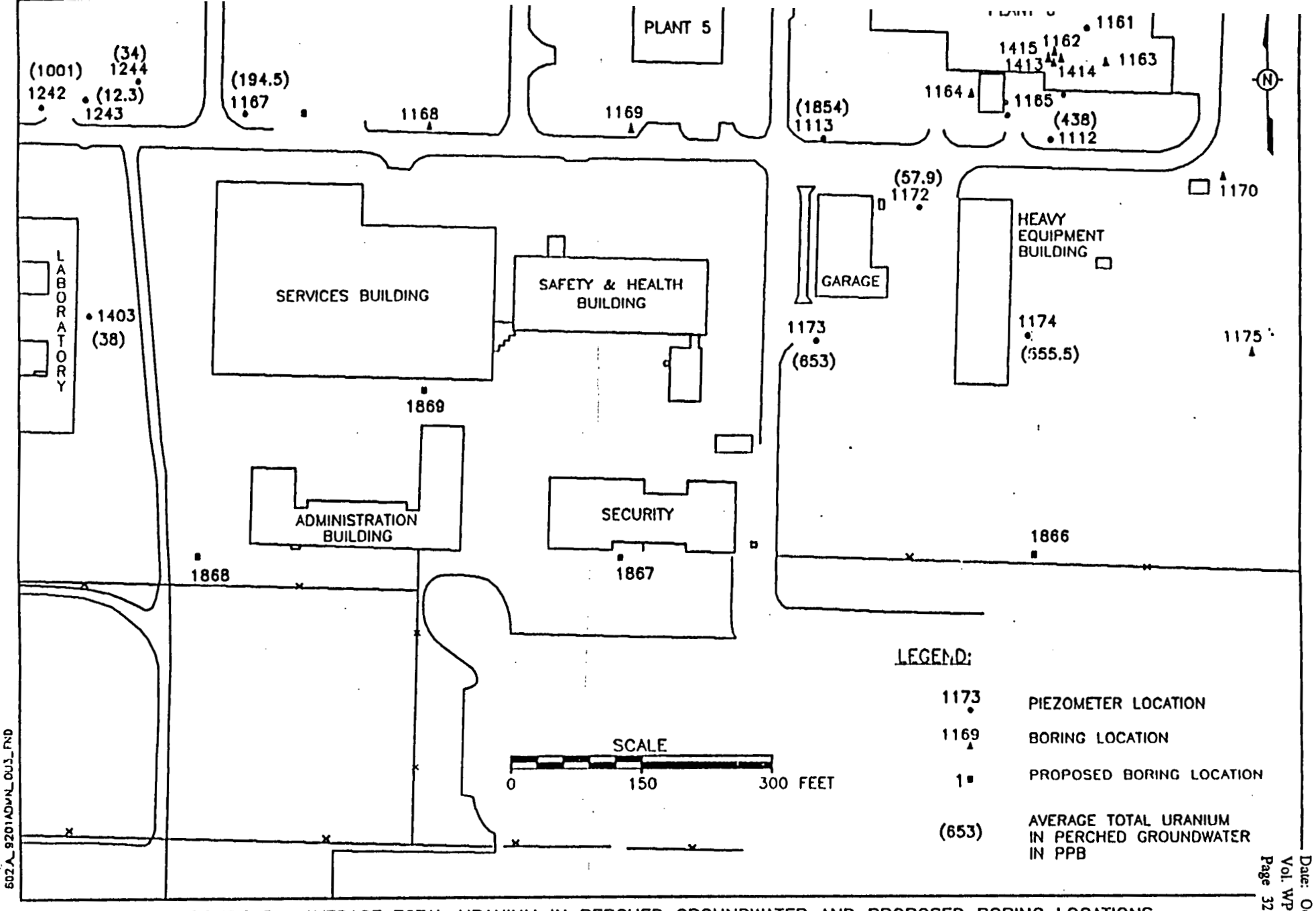

FIGURE 5. AVERAGE TOTAL URANIUM IN PERCHED GROUNDWATER AND PROPOSED BORING LOCATIONS

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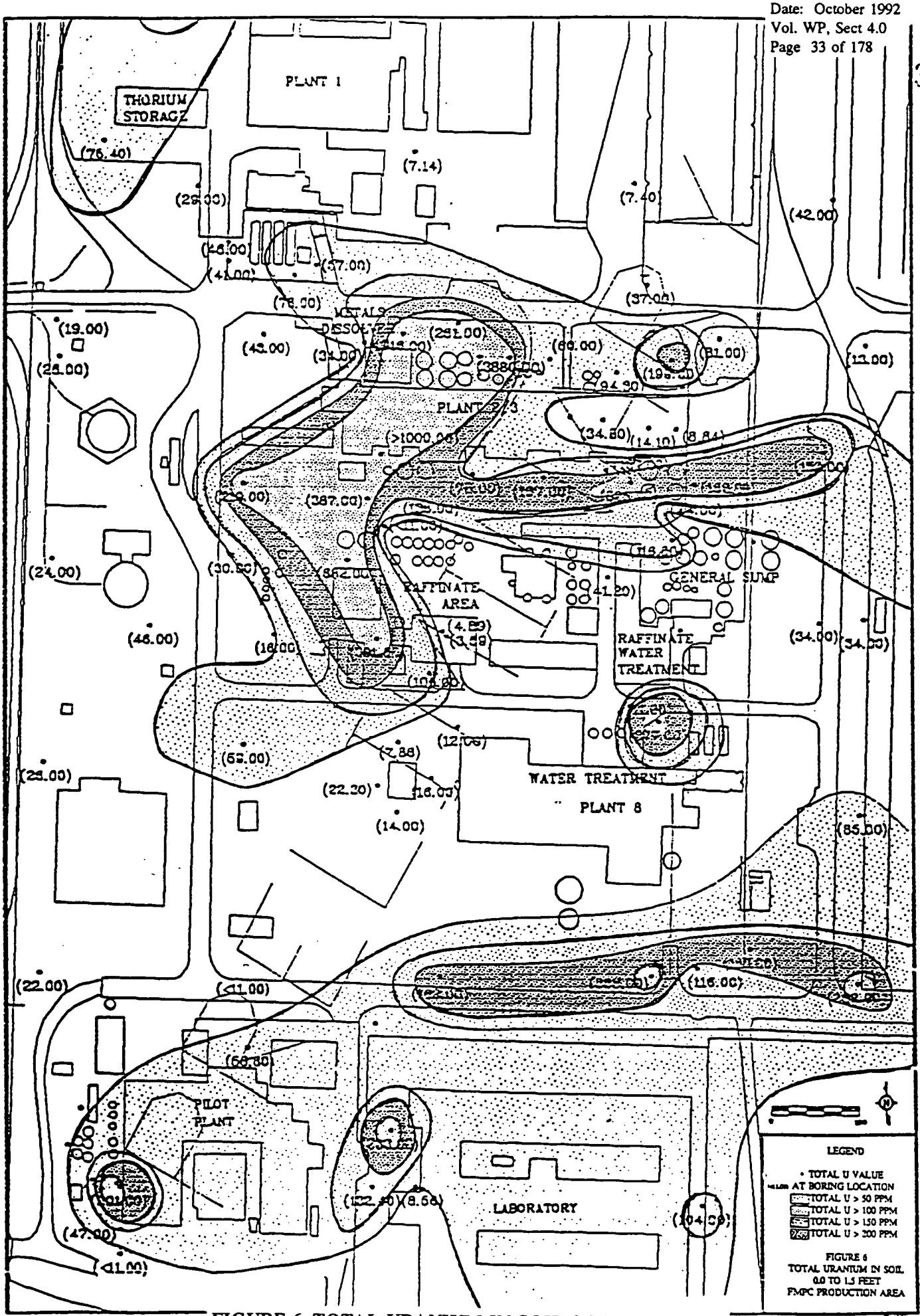

FIGURE 6. TOTAL URANIUM IN SOIL 0.0 TO 1.5 FEET

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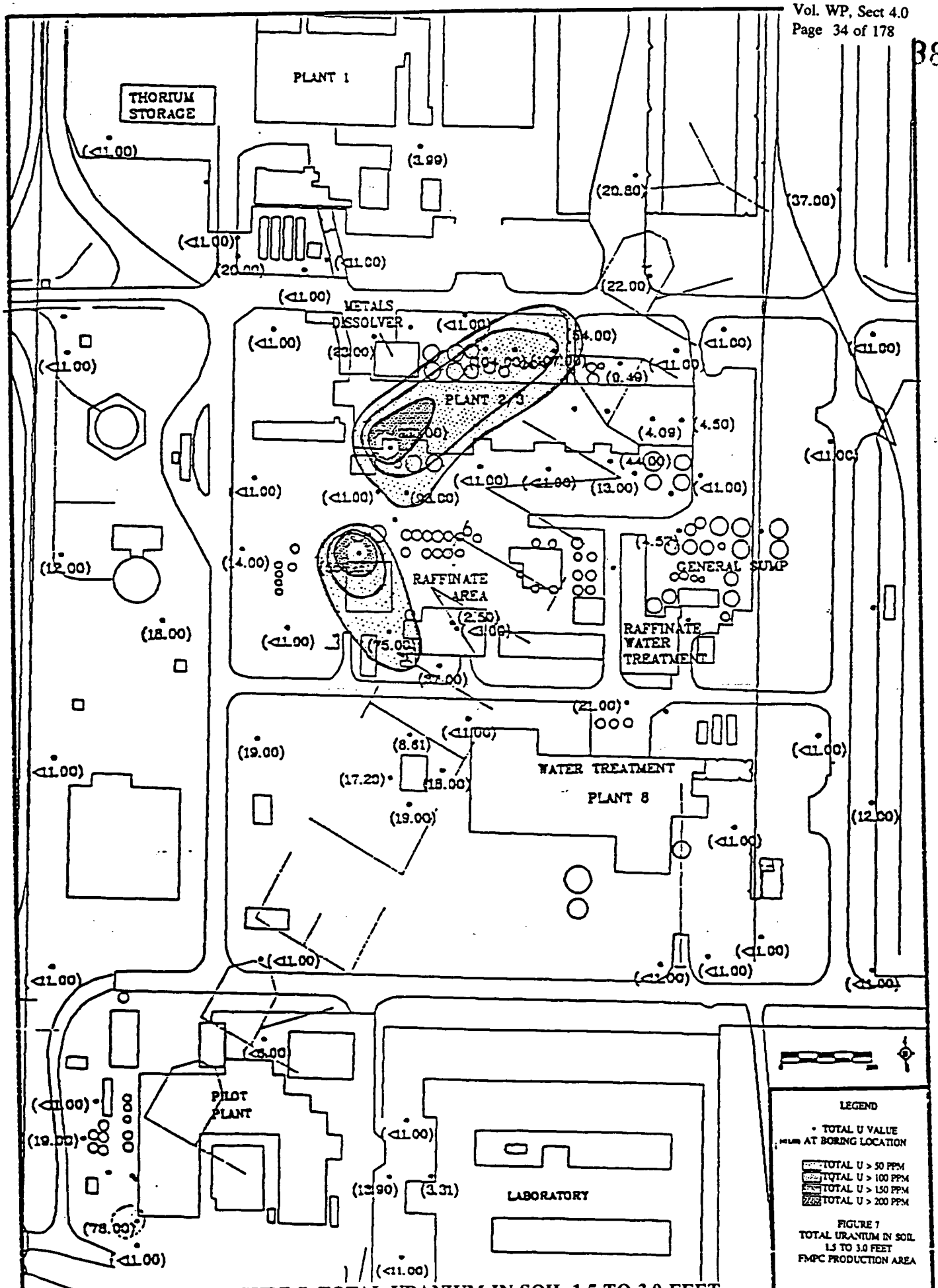

FIGURE 7. TOTAL URANIUM IN SOIL 1.5 TO 3.0 FEET

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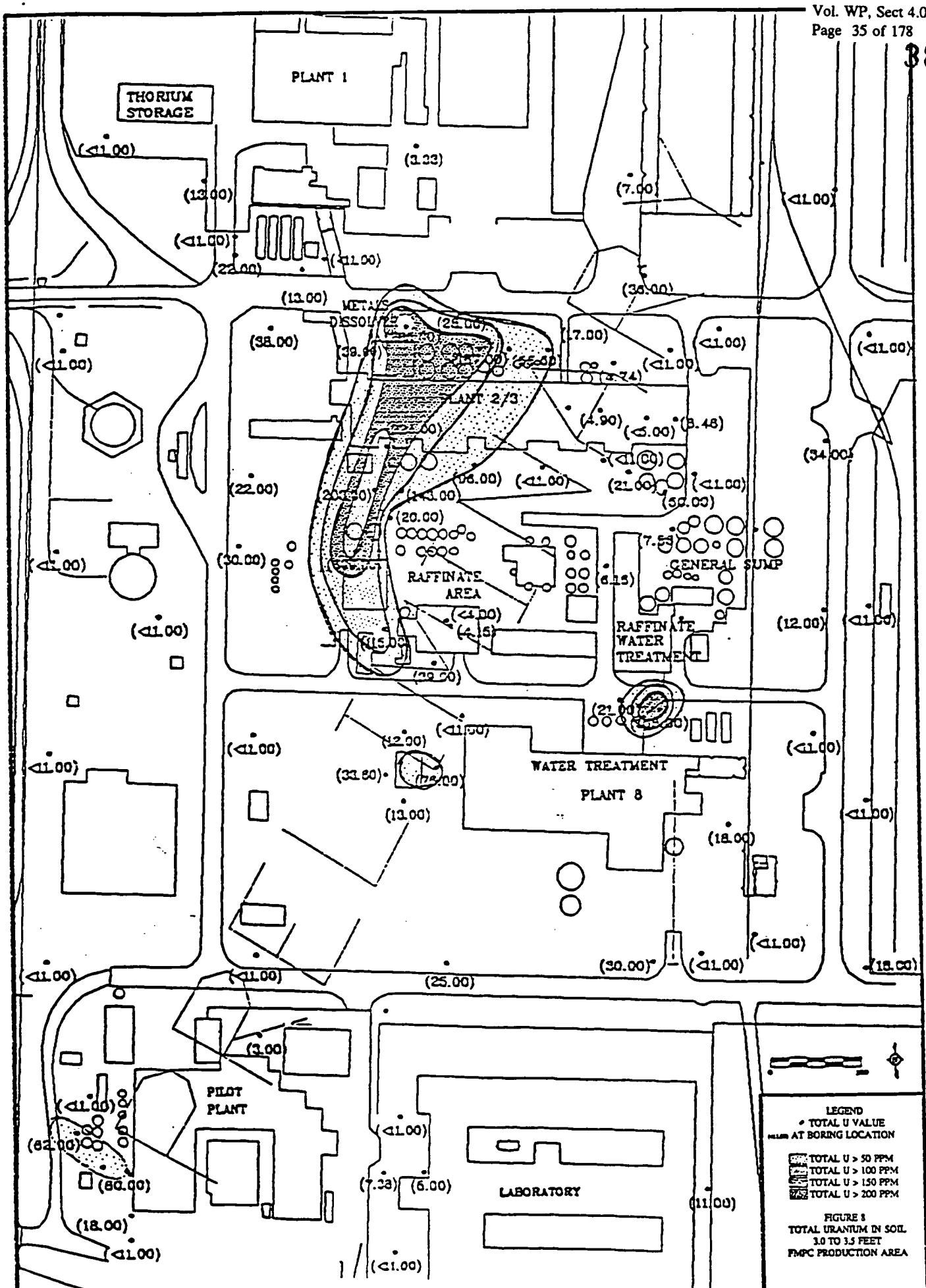

FIGURE 8. TOTAL URANIUM IN SOIL 3.0 TO 3.5 FEET

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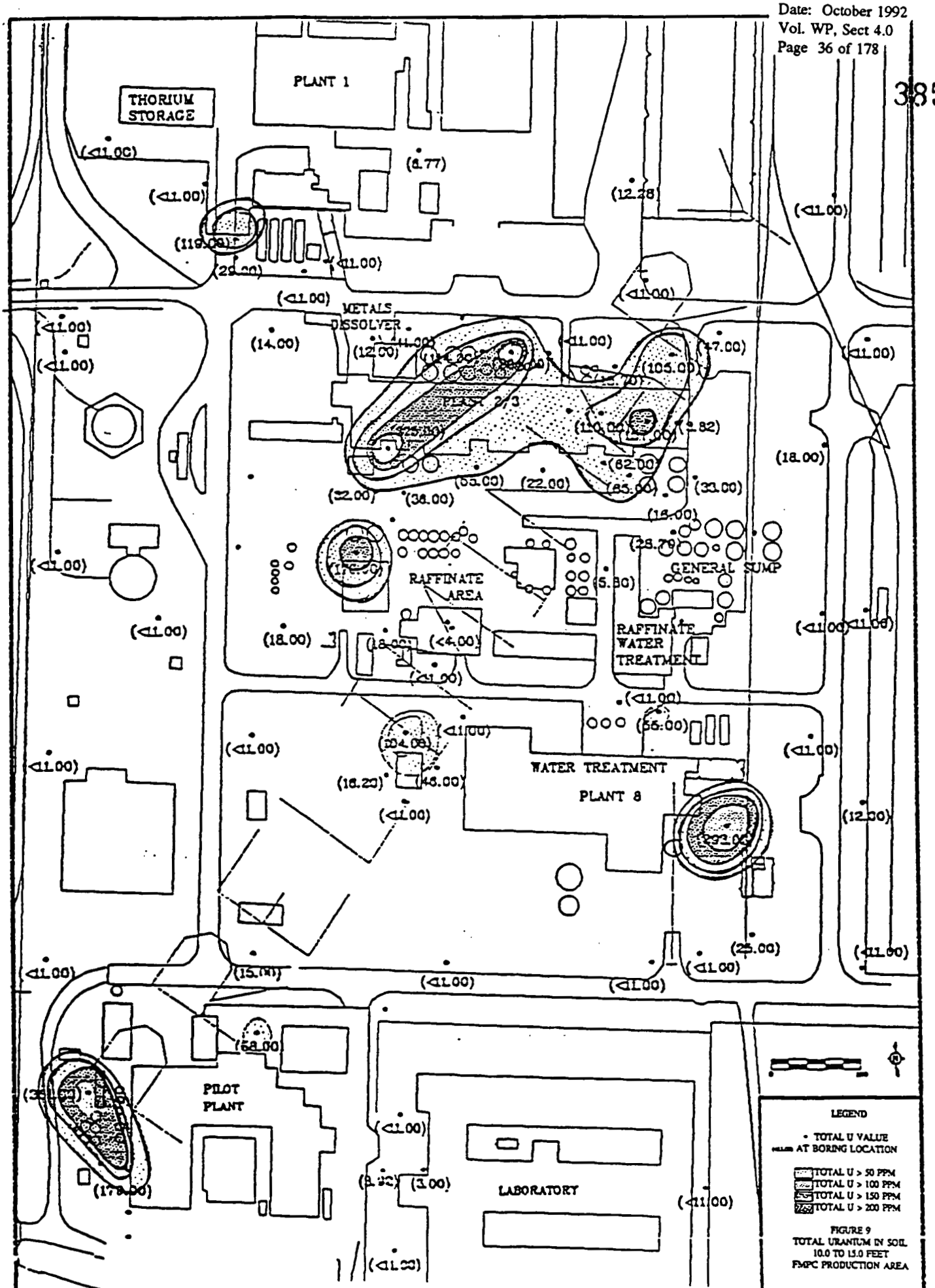

FIGURE 9. TOTAL URANIUM IN SOIL 10.0 TO 15.0 FEET

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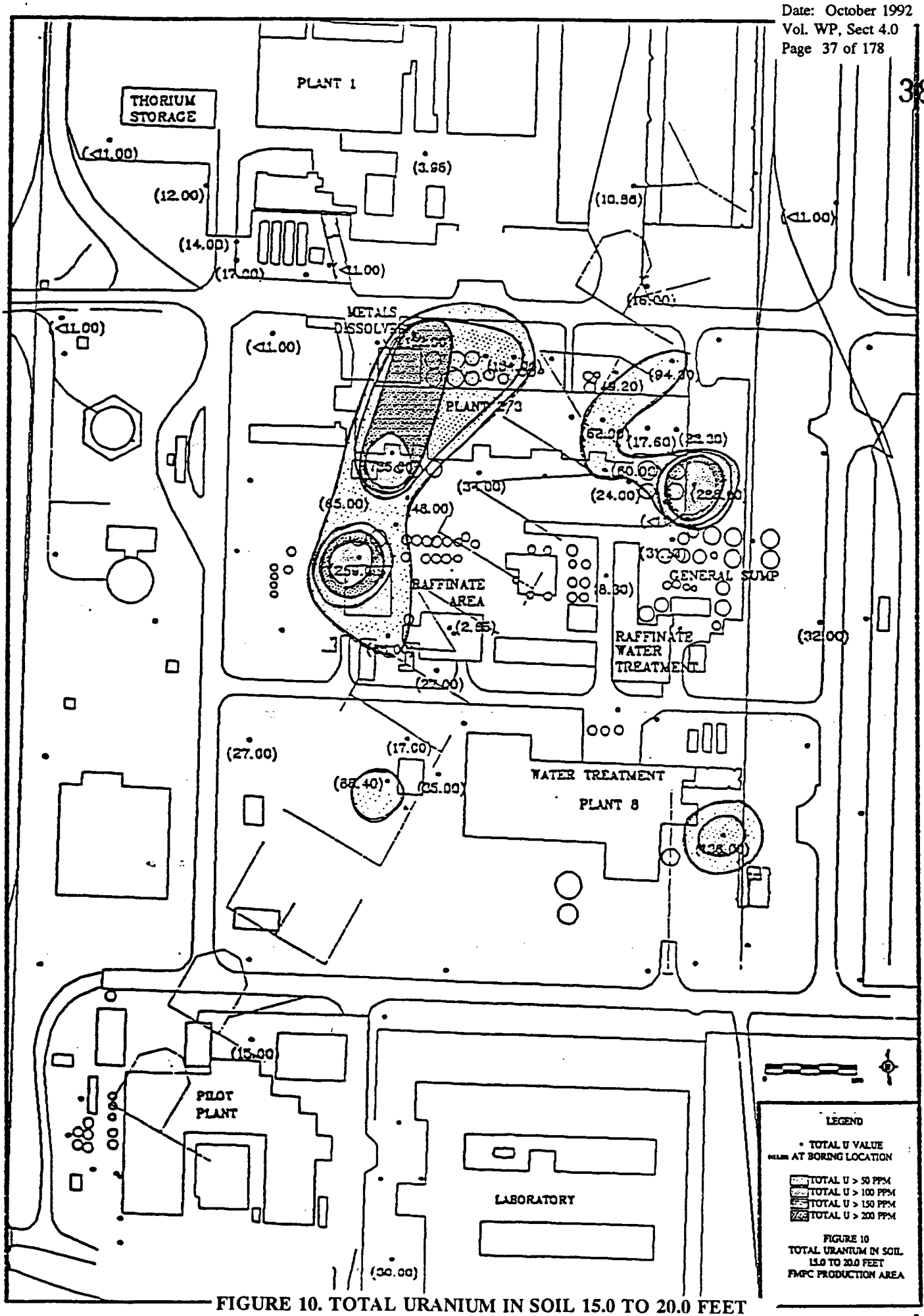

FIGURE 10. TOTAL URANIUM IN SOIL 15.0 TO 20.0 FEET

2.3 PROPOSED INVESTIGATION

To determine the extent of contamination in the southern portion of the southeast quadrant, four borings/piezometers will be completed in the administration/services area and to the south of the garage and heavy equipment building. The locations of these borings are shown in Figure 5. These borings will be used to determine the southern and western extent of the contamination found in Piezometers 1173, 1174, and 1113. Existing boring/piezometer data collected from the PASA investigation are used to determine the extent of contamination detected in piezometer 1242. These data are sufficient for the RI; therefore, no further investigation is required in the southwest direction of piezometer 1242. Table 6 summarizes the data objectives of the investigation presented here.

Additional characterization of the northern portion of the administration/services area is being conducted within the investigation for the Clearwell Line (Figure 11). Borings within the Clearwell Line investigation will be used to investigate the interaction of the perched groundwater and the Clearwell Line and to investigate the southern extent of the contamination found in Piezometers 1242, 1167, and 1113.

In each boring, soil samples will be collected for full radiological parameters from 0.0 to 0.5 feet. Additional samples will be collected for total uranium and total thorium at the following intervals: 2.0 to 2.5, 5.0 to 5.5, 10.0 to 10.5, and 15.0 to 15.5 feet to provide consistency with other Production and Additional Suspect Areas sampling. Additional samples will be collected for full radiological and HSL analysis if elevated readings are detected with field screening equipment, as outlined in the Production and Additional Suspect Areas Work Plan.

Due to the fact that buildover criteria was met before the building of the health and safety annex were built. No further sampling is required in this area.

All borings will be advanced to a maximum depth of 20 feet, or if water is encountered, the boring will be advanced to the first clay layer beneath the water-bearing zone. Two-inch PVC piezometers will be installed in any boring if water is encountered or the boring accumulates water after standing open overnight.

Groundwater samples will be collected from each boring completed as a piezometer. Two rounds of samples will be collected and analyzed for total uranium. In addition to the proposed piezometers, two existing piezometers will also be sampled. Groundwater samples from Piezometer 1172 had a variety of solvent and hydrocarbon compounds. The hydrocarbon compounds were likely due to the underground fuel tanks, as described earlier. However, the solvent compounds may be due to the

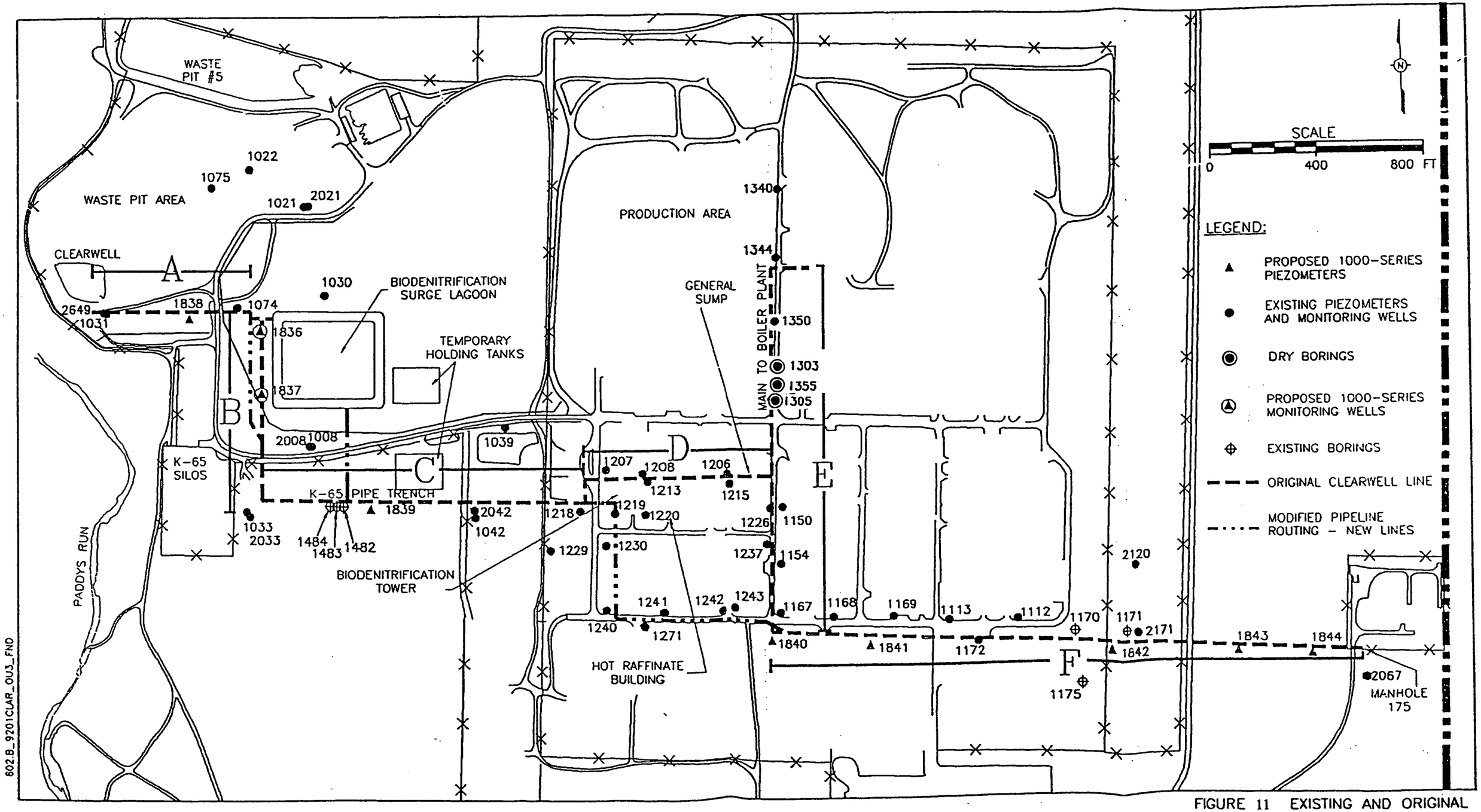

FIGURE 11 EXISTING AND ORIGINAL PIPELINES FROM CLEARWELL TO MANHOLE 175 AND PIPELINES IN K-65 PIPE TRENCH

TABLE 6
DATA QUALITY OBJECTIVES FOR SAMPLING AND ANALYSIS IN THE SOUTHEAST QUADRANT OF THE PRODUCTION AREA

Activity	Collect and analyze soil samples during the drilling of four 20-foot-deep borings. Analyze surface soil for full radiological and subsurface soil for total U and total Th.	Install and sample piezometers in the four borings if water is encountered. Analyze water samples for total U and total Th.	Collect and analyze water samples from existing Piezometers 1173 and 1174 near the garage and heavy equipment building. Analyze for HSL parameters.
Objectives	To further define the vertical and lateral extent of radiological contaminants in surface and subsurface soils.	Determine the southern extent of uranium and thorium contamination of perched water in the administration/services area.	Determine if solvent compounds detected in Piezometer 1172 are due to USTs or another (as yet unidentified) source.
Prioritized data uses	The priority data use is site characterization. Site characterization data is used for risk assessment and evaluation of alternatives.		
Appropriate analytical level*	HSL: Level IV Rad: Level V		
Constituents of concern	Uranium and thorium are present at elevated levels in surface soils and perched groundwater.		Solvents are present in perched groundwater at Piezometer 1172.
Level of concern	See Appendix B.		
Required detection limits	See Appendix B.		
Critical samples**	No individual sample is considered critical; however, the aggregate of samples is required for site characterization. The study requires that 75 percent of the samples attain the intended analytical level specified above upon completion of data validation.		

* = If samples can not attain their respective level of validation the samples will not be considered valid.

** = Critical samples are defined in the U.S. EPA DQO guidance as:

"those for which valid data must be obtained to satisfy the objectives of the sampling and analysis task. An example of a critical data point may be an up gradient well in a groundwater contamination study or any other data point considered vital to the decision making process."

maintenance activities that are carried out in the garage and heavy equipment building. Piezometers 1173 and 1174 are also near these buildings. Therefore, groundwater from these two piezometers will be sampled for HSL parameters. If the HSL analysis shows the presence of chemical contaminants, another sample will be collected from the piezometer to confirm the initial results. The second sample analysis will be limited to the group of contaminants found in the first sample; e.g., if only volatiles are found in the first sample, the second sample will be analyzed for HSL volatiles alone. The proposed drilling and sampling program is outlined in Table 7.

All drilling, sampling, and well installation procedures outlined in the Production and Additional Suspect Areas Work Plan Addendum, October 1989, and the RI/FS Work Plan, March 1988, will be followed.

The work in the production area is to be conducted in a manner that will allow comparison with data collected earlier. Consequently, sampling depths, analytical methods and well construction details must be in conformance with the Production and Additional Suspect Areas Work Plan /Addendum. DOE does not expect the new Site-Wide QAPP to conflict with the investigation outlined in this Work Plan.

TABLE 7
SUMMARY OF PROPOSED DRILLING AND SAMPLING PROGRAM FOR THE SOUTHEAST QUADRANT OF THE PRODUCTION AREA[a]

Borings/Piezometers	Sample Depth (feet)	Boring Depth[b] (feet)	Sample Type	Number of Samples per Boring[c, d]	Sample Parameters
Proposed Piezometers[b]		20 max.	Soil		
1866 1867	0-0.5			1	Full Rad (TAL-50.03.07-F)[f]
1868 1869					
	2-2.5 5-5.5		Soil	4	Total U, Total Th
	10-10.5				
	15-15.5				
			Water	2	Total U, Total Th
Existing Piezometers			Water	2	HSL[e] (TAL-50.03.07-H)[f]
1173 1174					

[a] Sampling to be conducted in compliance with Revision 3 of the Remedial Investigation and Feasibility Study Work Plan, Feed Materials Production Center Vol. I, Sampling Plan, Sections 3.0 and 4.0, and Vol. V, Quality Assurance Project Plan, Sections 5.0 and 6.0, March 1988; and Production and Additional Suspect Areas Work Plan, October 1989.

[b] A 2-inch PVC piezometer will be installed in each boring if water is encountered.

[c] The drill cuttings will be drummed, sampled for parameters specified by WEMCO or FERMCO, and transferred to an interim onsite storage facility.

[d] The following QA/QC samples will be collected: 1) a field duplicate is collected and analyzed every 10 samples for aqueous media, 2) a rinsate of sample collection equipment is collected and analyzed for every 20 analytical samples, and 3) an appropriate trip/field blank will accompany each sample from collection in the field to its destination at the lab. The lab will choose 1 in 20 general chemistry, volatiles, semivolatile, and pesticides/PCB trip/field blanks for analyses.

[e] The second sample will be analyzed only for analytical groups identified in the first round of sampling.

[f] TAL: Target Analyte List. See Appendix A.

3.1 INTRODUCTION

The fire training area is located immediately beyond the security fence that runs along the north side of the production area (Figure 1). This area contains the burn house, an oil-fire pond, a metal trough containing water and oil, and a sump that was used to dispose of waste fluids from the oil-fire pond. Interviews with former fire personnel provided the following information:

- Fire training was once conducted monthly; fire departments from Butler County participated. Training involved smoke practice in the burn house, burning of waste solvents/oils in the trough to train personnel in fire extinguisher use, and burning of waste oils and waste solvents in the oil-fire pond to practice foam application. Waste solvents were reportedly supplied by visiting fire departments. Waste oil was reportedly obtained from operations at the FEMP. Reportedly, 30 to 40 drums of waste oil/solvent were expended during a typical day of training.

- The oil-fire pond was routinely drained when the pond filled. Originally, a pump was used to drain the pond to a sump southeast of the pond. Later, a pipe was installed that allowed the pond to drain to the sump by gravity feed when the fluid level rose above a particular point. The sump was reportedly an unlined hole with no connections to storm drains.

Today, the sump is filled with scrap lumber and silt from surface runoff.

Surface drainage in the fire training area flows south toward the production area. All surface drainage in the field between the fire training area and the KC-2 warehouse flows into a concrete drainage box located immediately adjacent to the warehouse. A pipe, several feet below the surface, exits the drainage box and appears to drain to the northwest (Figure 4).

Through fire training activities, a variety of oils and solvents containing radionuclides and inorganic constituents were burned or spilled in the area. Surface drainage likely transported waste from the fire training area to drainage ditches on the north side of the production area. Previous investigations of the immediate fire training area have confirmed that soils and perched groundwater are contaminated.

This work plan addendum presents a sampling and analysis plan to investigate the extent of surface soil contamination due to past fire training activities. This investigation is required to adequately characterize soils in the drainages where potentially contaminated runoff would have been channeled away from the site.

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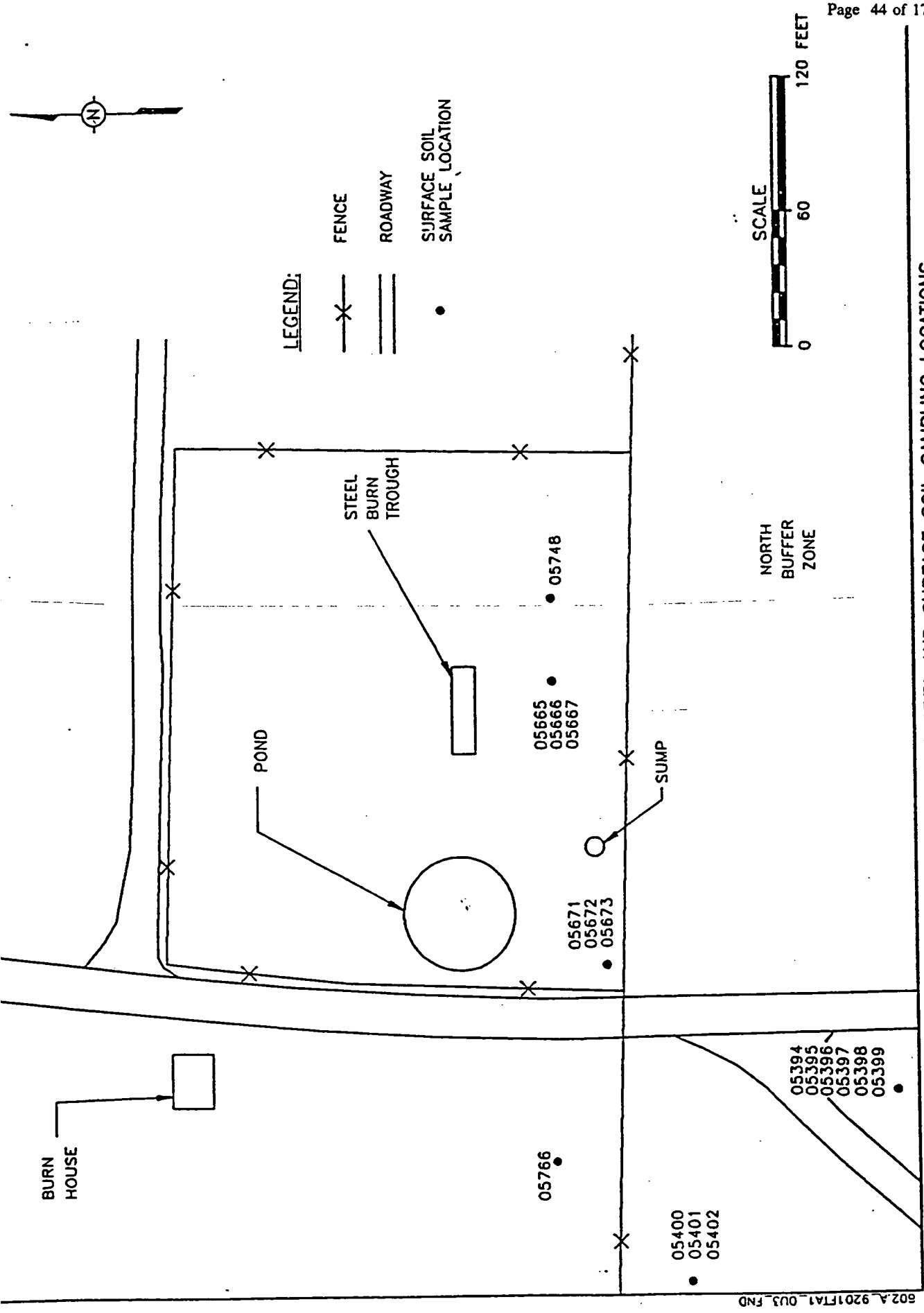

FIGURE 1. FIRE TRAINING AREA AND SURFACE SOIL SAMPLING LOCATIONS

3.2 RESULTS OF PREVIOUS INVESTIGATIONS

Two separate investigations were conducted in the fire training area. The first was the surface soil sampling program conducted in 1988. The sample locations for this program are shown in Figure 1. All of the samples were analyzed for radiological parameters only. Additional sampling will be conducted under the PASA Work Plan Addendum if necessary and results incorporated into evaluations of the fire training area. The analytical results are presented in Table 1. These data show that in the upper 18 inches of soil, the dominant contaminant is uranium. Radium and thorium are also present in samples taken in the buffer zone southwest of the fire training area. Plutonium-238, strontium-90, and technetium-99 were detected in isolated samples.

The second investigation consisted of the drilling and installation of eight piezometers under the PASA Work Plan Addendum. A cross section has been developed for the area and is presented in Figure 2; the location of the piezometers is shown in Figure 3. The color variations in the clay units are due to weathering of the unit rather than depositional differences. The gray clays represent unweathered material and a general lack of perched groundwater, although water may be present in sand and silt lens within the unit. The color change to yellows and browns is the result of iron being oxidized by infiltration of oxygenated surface water. The presence of yellow or brown clay below gray clay is direct evidence that perched water is moving laterally within the unit.

The cross section shows an upper and lower zone underlying the fire training area. The upper zone consists mainly of yellow-brown weathered clay and silts and represents a water-bearing unit. Gray clay is present in this upper zone above brown clay which suggests, as stated above, that lateral migration is occurring. The lower zone consists mainly of unweathered gray clay. Boring 1513 encountered water-bearing silt lens in the lower zone. Water levels taken in the piezometers suggest a relatively minor gradient in the area with the potential for flow to the southwest.

Subsurface soil samples from selected intervals were analyzed for total uranium and total thorium. These results are presented in Table 2. In general, total uranium values decreased with depth except in Boring 1513. An anomalous thorium result was detected in Boring 1512 at approximately two feet. Soil samples were also collected from 2.0 to 2.5 feet in each boring and analyzed for full Hazardous Substance List (HSL) parameters. Only parameters detected above background concentration or above concentrations detected in blank samples are presented in Table 3. In general, these results show elevated levels of heavy metals as well as isolated hits of volatile organics, semivolatile organics, and Aroclor 1260. The source of the organic chemicals is likely the oils and solvents used in the fire fighting exercises.

RADIOLOGICAL RESULTS FOR SURFACE SOIL IN THE FIRE TRAINING AREA

Results in picocuries per gram (Pci/g). Data presented by sample number and depth in inches. NA indicates not analyzed; a number preceded by a "less than" (<) symbol indicates that the compound was not present above the detection limit of the analytical instrument.

Radiological Parameters	Sample ID Depth (in.)	05394 0-6	Duplicate 05395 0-6	05396 6-12	Duplicate 05397 6-12	05398 12-18	Duplicate 05399 12-18	05400 0-6	05401 6-12	05402 12-18
Cesium 137		0.4	0.3	<0.2	<0.2	0.2	<0.2	1.0	<0.2	<0.2
Plutonium 238		2.2	0.9	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Plutonium 239/240		<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Radium 226		2.3	1.9	0.9	1.3	1.6	1.0	0.7	0.4	0.5
Radium 228		30.5	22.6	8.2	12.3	16.4	10.1	<0.5	<0.5	<0.5
Strontium 90		<0.5	<0.5	2.1	0.9	1.0	0.6	<0.5	0.5	<0.5
Technetium 99		<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Thorium 238		38.9	21.9	10.2	14.2	24.0	12.2	0.7	<0.6	<0.6
Thorium 230		15.1	13.6	5.4	6.8	9.2	5.8	2.5	1.3	1.1
Thorium 232		11.4	8.4	1.8	2.5	3.8	1.7	<0.6	<0.6	<0.6
Uranium 234		87.9	73.8	17.4	29.1	47.7	21.5	30.3	3.9	5.9
Uranium 235/236		7.1	4.3	1.6	2.6	4.3	1.7	1.4	<0.6	<0.6
Uranium 238		387.0	350.0	94.8	154.0	270.0	110.0	131.0	12.8	21.3
Total Uranium *		NA	NA	308.0	410.0	413.0	324.0	NA	32.0	59.0

Radiological Parameters	Sample ID Depth (in.)	05665 0-2	05666 2-4	05667 4-6	05671 0-2	05672 2-4	05673 4-6	05748 0-6	05766 0-6
Cesium 137		NA	<0.2	<0.2	1.4	0.7	0.9	0.7	<0.2
Plutonium 238		NA	<0.6	<0.6	1.3	<0.6	<0.6	<0.6	<0.6
Plutonium 239/240		NA	<0.6	<0.6	<0.6	2.9	1.9	<0.6	<0.6
Radium 226		NA	0.4	0.5	1.2	0.7	1.0	1.2	0.4
Radium 228		NA	<0.5	0.5	5.8	2.3	2.0	1.1	<0.5
Strontium 90		NA	<0.5	<0.5	<0.5	<0.5	<0.5	5.0	0.5
Technetium 99		NA	10.5	8.7	11.9	18.4	27.3	0.9	<0.9
Thorium 238		NA	<0.6	0.6	6.2	2.4	1.3	0.9	<0.6
Thorium 230		NA	1.0	1.7	13.5	4.3	5.4	1.6	1.2
Thorium 232		NA	<0.6	0.7	5.2	1.3	1.2	0.8	<0.6
Uranium 234		361.0	38.3	44.5	251.0	250.0	74.2	9.9	1.5
Uranium 235/236		19.1	2.1	1.9	17.0	12.0	5.4	0.7	<0.6
Uranium 238		348.0	37.4	45.4	334.0	295.0	80.9	10.0	2.1
Total Uranium *		NA	78.0	100.0	1170.0	835.0	213.0	36.0	5.0

* Results reported in ug/g

TABLE 2

RADIOLOGICAL RESULTS FOR SUBSURFACE SOIL IN THE FIRE TRAINING AREA

Results are presented in µg/g. Data presented by boring number.
A number preceded by a "less than" symbol (<) indicates that the parameter was not present above the detection limit of the instrument.

Parameter and Depth (feet)	1508	1509	1510	1511	1512	1513	1514	1515
Total Uranium								
0.0-0.5	16.4	67.8	17.2	23.2	38.4	22.8	28.3	42.3
2.0-3.5	8.3	14.3	6.4	10.1	8.5	7.1	10.2	3.6
5.0-6.5	10.6	13.6	8.5	6.5	<5.1	<4.5	2.9	6.7
10.0-10.5	<3.5	<4.6	NA	6.4	3.4	20.7	3.5	<5.6
15.0-15.5	NA	8.3	NA	NA	NA	13.8	NA	NA
Total Thorium								
0.0-0.5	5.0	4.0	6.0	82.0	3.0	6.0	6.0	5.0
2.0-3.5	14.0	10.0	10.0	48.0	136.0	8.0	7.0	10.0
5.0-10.5	10.0	10.0	7.0	78.0	7.0	5.0	7.0	6.0
10.0-10.5	6.0	16.0	NA	17.0	<4.0	3.0	7.0	9.0
15.0-15.5	NA	10.0	NA	NA	NA	11.0	NA	NA

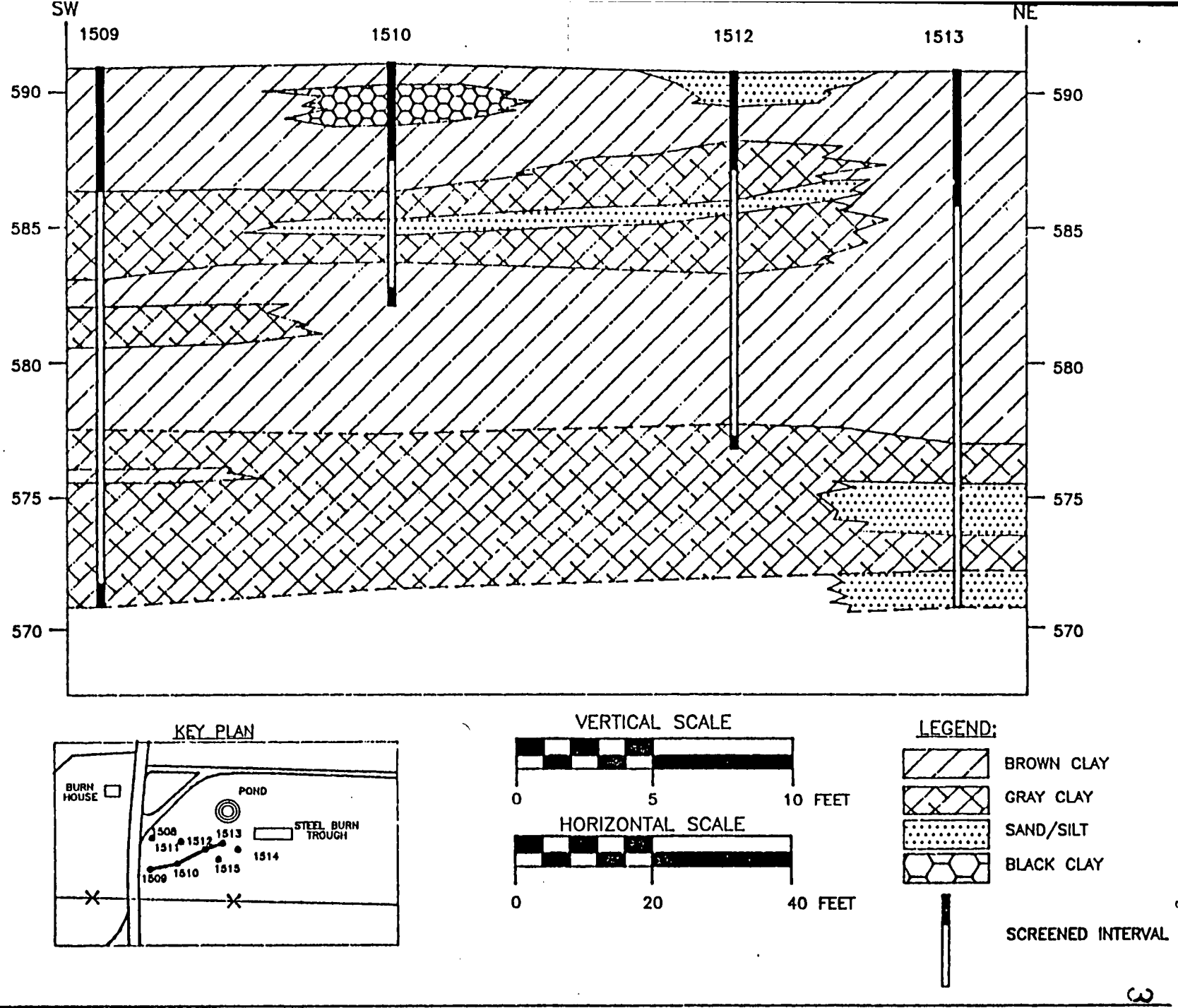

FIGURE 2. CROSS-SECTION OF FIRE TRAINING AREA

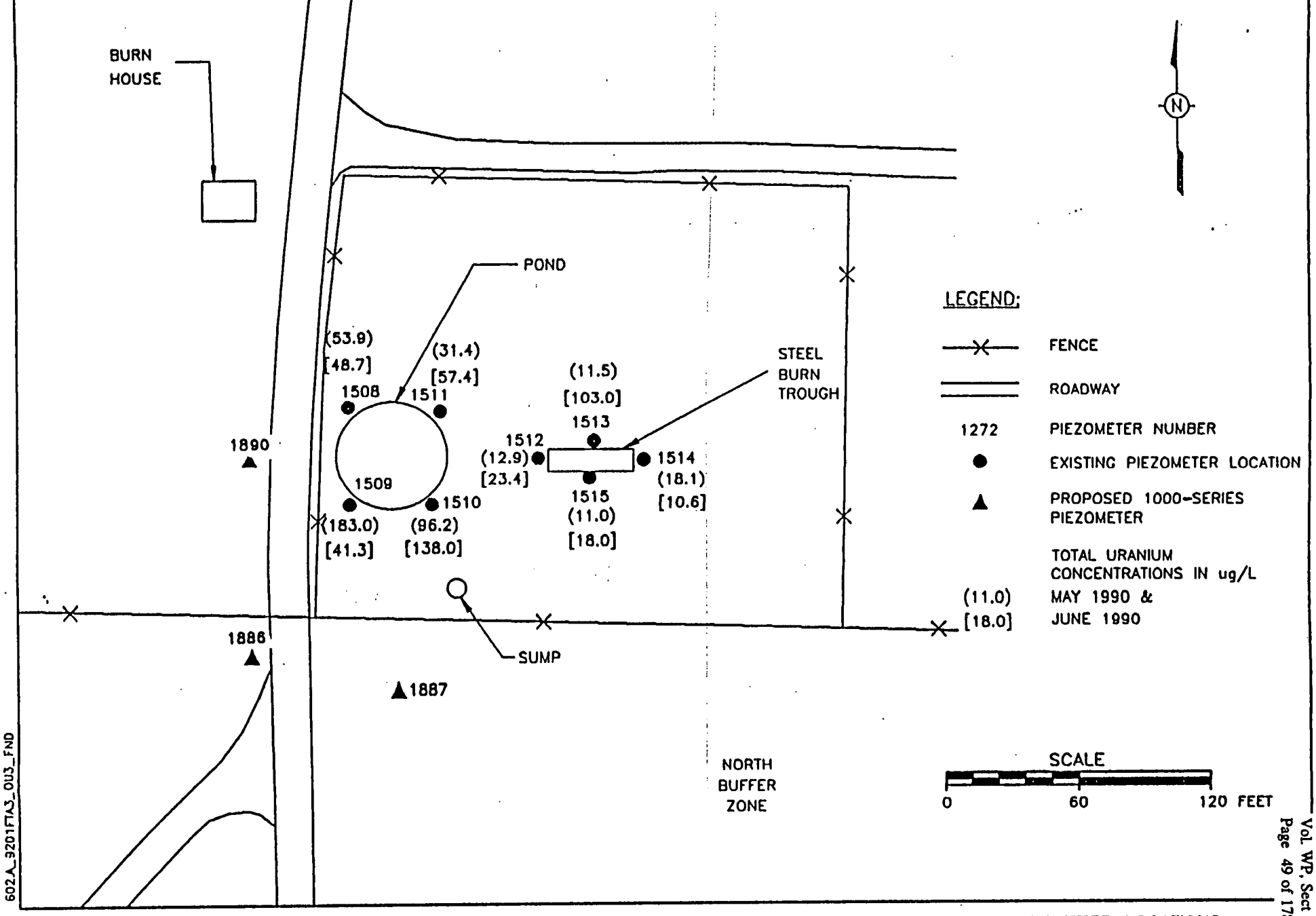

FIGURE 3. TOTAL URANIUM CONCENTRATIONS IN PERCHED GROUNDWATER AND PROPOSED PIEZOMETER LOCATIONS

Two perched groundwater samples were collected from each piezometer. The first sample, collected in May 1990, was analyzed for full radiological parameters and the second, collected in June 1990, was analyzed for total uranium only. This data is presented in Table 4. As with the surface soil, uranium is the dominant contaminant.

The perched groundwater samples collected in May 1990 from each piezometer were also analyzed for full HSL parameters. Table 5 shows those parameters that were detected above background concentrations or above concentrations detected in blank samples. In general, all samples contained elevated levels of heavy metals. The sample from Piezometer 1509 also contained high concentrations of a variety of volatile and semivolatile organic constituents. This boring is located southwest and down gradient of the fire-training pond. The water sample taken on the same date in May 1990 for radiological analysis contained the highest concentration of total uranium found in any water sample from the area. These results indicate that the pond or past activities near the pond have been a major source of contamination to the perched groundwater.

3.3 FIELD CHARACTERIZATION ACTIVITIES

Existing analytical data from the borings/piezometers in the fire training area are largely sufficient to meet the data needs for the RI/FS; however, two areas were not adequately characterized through previous sampling: the sump and the surface drainage down gradient from the fire training area. Historical accounts of activities in the fire training area indicate that significant quantities of waste oils and solvents were burned or otherwise expended in the fire training area. Consequently, it is likely that waste materials were transported away from the facility by storm water runoff. Contaminated storm water runoff would have contaminated shallow soils in the drainage path. Soils in the drainage networks immediately downstream of the facility have not previously been sampled.

Three 1000-series wells are proposed (1886, 1887, 1890, Figure 3) which will be used to further evaluate the southwestern extent of contamination. Groundwater samples will be collected twice sixty days apart and analyzed for full radiological, full HSL parameters, Dioxins/Furans, and Organophosphorus/Pesticides. Stainless steel well screen and risers will be utilized in these wells due to potential PVC degradation caused by possible high levels of organic compounds in the area.

TABLE 3
CHEMICAL CONCENTRATIONS IN SOILS FROM THE FIRE TRAINING AREA

Data presented by location, sample number, and sample depth.

NA indicates not available. For inorganic constituents, dashes indicate concentrations below background; for organic constituents, pesticides, and PCBs, dashes indicate no detection.

Constituents	Location	1508	1509	1510	1511	1512	1513	1514	1515
	Sample ID	51160	51161	53259	54439	51679	53519	53782	52259
	Depth (feet)	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5
Inorganic constituents (mg/kg)									
Arsenic		--	--	8.7	7.6	--	--	10	--
Beryllium		1.4	1.6	1.5	1.5	1.8	1.8	1.9	1.7
Cadmium		2.6	4.2	3.4	3.9	3.3	3.4	3.4	2.9
Calcium		44900	97700	7010	28600	20600	10100	--	--
Cobalt		12.3	10.2	26	18.6	14.7	13.4	20.3	16.9
Iron		--	--	28700	26500	--	29900	30200	26900
Lead		--	21.1	20.9	21	25.4	20.9	--	18.5
Magnesium		6190	24600	4620	12100	7660	4900	--	--
Manganese		--	--	660	833	678	--	1080	765
Mercury		0.18	0.18	--	--	--	--	--	--
Nickel		34.1	67.1	39.6	43.2	36.8	50.5	50	28.7
Silver		--	--	--	--	5.6	--	--	--
Zinc		52.2	--	67	64.8	75.3	74.8	74.7	54.8
Organic constituents (µg/kg)									
Volatiles									
1,1-Dichloroethane		--	6	--	--	--	--	--	--

TABLE 3 (Continued)

Constituents	Location	1508	1509	1510	1511	1512	1513	1514	1515
	Sample ID	51160	51161	53259	54439	51679	53519	53782	52259
	Depth (feet)	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5
1,1,1-Trichloroethane		--	3	--	--	--	--	--	--
1,2-Dichloroethylene		--	2	--	--	--	--	--	--
2-Butanone		76	--	--	--	--	--	--	--
Chloroform		--	--	--	--	--	--	--	2
Tetrachlorethene		--	2	--	--	--	--	--	--
Toluene		--	2	--	--	--	--	--	--
Trichloroethene		--	1	--	--	--	--	--	--
Semivolatiles									
Benzoic acid		--	--	--	N/A	--	--	--	--
bis(2-Ethylhexyl) phthalate		--	--	--	N/A	--	--	96	--
N-Nitrosodiphenylamine		--	--	--	N/A	--	--	--	--
Pentachlorophenol		--	--	--	N/A	--	98	260	--
Pesticides and PCBs (µg/kg)									
Aroclor 1260		240	--	--	--	2200	--	--	--
Other									
Cyanide		--	0.5	--	--	--	--	--	--

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TABLE 4

RADIOLOGICAL CONCENTRATIONS IN PERCHED GROUNDWATER IN THE FIRE TRAINING AREA

Results are reported in Pci/ℓ except total U which is reported in µg/ℓ. Data presented by piezometer number and sample date. NA indicates not available. A "less than" symbol (<) before a number indicates the parameter was not present above the detection limit of the instrument.

Parameter	1508 5/3/90	1508 6/5/90	1509 5/3/90	1509 6/5/90	1510 5/4/90	1510 6/5/90	1511 5/4/90	1511 6/5/90	1512 5/4/90	1512 6/18/90	1513 5/3/90	1513 6/18/90	1514 5/4/90	1514 6/18/90	1515 5/3/90	1515 6/18/90
Radium-226	3.4	NA	<1.0	NA	5.9	NA	<1.0	NA	<1.0	NA	<1.0	NA	<1.0	NA	<1.0	NA
Thorium-228	3.4	NA	<1.0	NA	<1.0	NA	<1.0	NA	<1.0	NA	1.3	NA	<1.0	NA	<1.0	NA
Thorium-230	3.4	NA	2.7	NA	1.2	NA	<1.0	NA	<1.0	NA	<1.0	NA	1.3	NA	<1.0	NA
Thorium-232	2.8	NA	<1.0	NA	1.3	NA	<1.0	NA	<1.0	NA	<1.0	NA	<1.0	NA	<1.0	NA
Total Thorium	25.6	NA	5.9	NA	11.8	NA	<3.7	NA	<7.0	NA	7.8	NA	<4.7	NA	2.8	NA
Uranium-234	15.7	NA	47.1	NA	44.2	NA	23.6	NA	4.4	NA	2.9	NA	6.2	NA	4.8	NA
Uranium-235/236	1.2	NA	2.4	NA	3.7	NA	2.5	NA	<1.0	NA	<1.0	NA	<1.0	NA	<1.0	NA
Uranium-238	15.2	NA	45.3	NA	38.5	NA	20.2	NA	3.2	NA	2.7	NA	5.3	NA	4.2	NA
Total Uranium	53.9	48.7	183	41.3	96.2	138.0	31.4	57.4	12.9	23.4	11.5	103.0	18.1	10.6	11.0	18.0[a]

[a] Duplicate concentration was 15.8 µg/L.

TABLE 5

CHEMICAL CONCENTRATIONS IN PERCHED WATER FROM THE FIRE TRAINING AREA

Data presented by location, sample number, and sample depth.
NA indicates not available. For inorganic constituents, dashes indicate concentrations below background; for organic constituents, pesticides, and PCBs, dashes indicate no detection.

Constituents	Location Sample ID	1508 46865	1509 46870	1510 46875	1511 46880	1512 46885	1513 46889	1514 46895	1515 46899
Inorganic constituents (µg/l)									
Aluminum		--	121	--	842	--	--	137	162
Arsenic		2.2	2.8	--	--	--	--	--	--
Barium		77.1	94.6	--	78.4	116	--	83.4	115
Cadmium		3.3	6.2	5.4	3.7	6.5	4.6	4.6	5.5
Calcium		105000	155000	126000	116000	136000	106000	98800	111000
Chromium		25.2	35.9	32.2	28	31.1	26.8	24.6	29.6
Lead		5.3	--	--	--	--	5	--	3.5
Magnesium		--	45300	--	--	52200	--	--	41800
Manganese		1470	2540	344	1220	794	67.3	74.3	206
Mercury		--	--	--	0.73	--	--	--	--
Nickel		--	25.6	--	--	20.8	20.2	--	--
Silver		17.9	24.3	21.6	19.3	21.5	18.5	17.9	--
Sodium		--	33600	--	--	--	--	--	--
Organic constituents (µg/l)									
Volatiles									
1,1-Dichloroethane		3	2500	--	--	--	--	--	--
1,1-Dichlorethene		--	490	--	--	--	--	--	--
1,1,1-Trichloroethane		--	2900	--	--	--	--	--	--
1,2-Dichloroethane		--	19	--	--	--	--	--	--
1,2-Dichloroethylene		--	1500	--	--	--	--	--	--
2-Propanone		--	--	--	--	--	--	--	--
Chloroethane		--	110	--	--	--	--	--	--
Ethylbenzene		--	13	--	--	--	--	--	--
Methylene chloride		--	26	--	--	--	--	--	--
Tetrachlorehtene		--	280	--	--	--	--	--	--
Toluene		--	260	--	--	--	--	--	--
Total xylenes		--	55	--	--	--	--	--	--
Trichloroethene		--	98	--	--	--	--	--	--
Semivolatiles									
2,4-Dimethylphenol		--	40	--	--	--	--	--	--
4-Methylphenol		--	15	--	--	--	--	--	--
Benzoic acid		--	25	--	--	--	--	--	--
Benzyl alcohol		--	5	--	--	--	--	--	--
bis(2-Ethylhexyl) phthalate		--	5	--	--	--	--	--	--

Four hand-auger borings will be completed in the drainage network down gradient from the fire training area (Figure 4). Samples for full HSL, full radiological analysis, dioxins/furans, and organophosphorus pesticides will be collected from 0 to 6 and 12 to 18 inches in each boring. Data from the four borings will be used to determine the nature and extent of soil contamination due to flow of contaminated surface water away from the fire training area.

One additional hand-auger boring will be completed in the sump (Figure 4). As it is unknown precisely what fill is in the sump, sample depths will be chosen after a hand-boring has been initiated. Two samples will be collected: one from high in the sump contents and one from low in the contents. Both samples will be analyzed for full HSL and full radiological parameters. The samples will also be analyzed for dioxins/furans and organophosphorus pesticides.

Data quality objectives for this investigation are summarized in Table 6. Piezometers and surface-soil sample locations are shown in Figure 4. The sampling program is outlined in Table 7.

The evaluation of potentially contaminated areas will be conducted through hand-auger sampling. Samples will be collected during dry weather when saturated soils will not create complicated working conditions. The procedures for sampling, sample handling, and sample analysis are specified in the March 1988 RI/FS Work Plan, associated Work Plan Addenda, and FEMP RI/FS Standard Operating Procedures. It is expected that the data derived from this investigation coupled with existing data will be sufficient to complete the characterization of the fire training area for the Operable Unit 5 RI/FS. Additional characterization may be needed to complete the RI/FS if unexpectedly high concentrations of contaminants are revealed in this investigation.

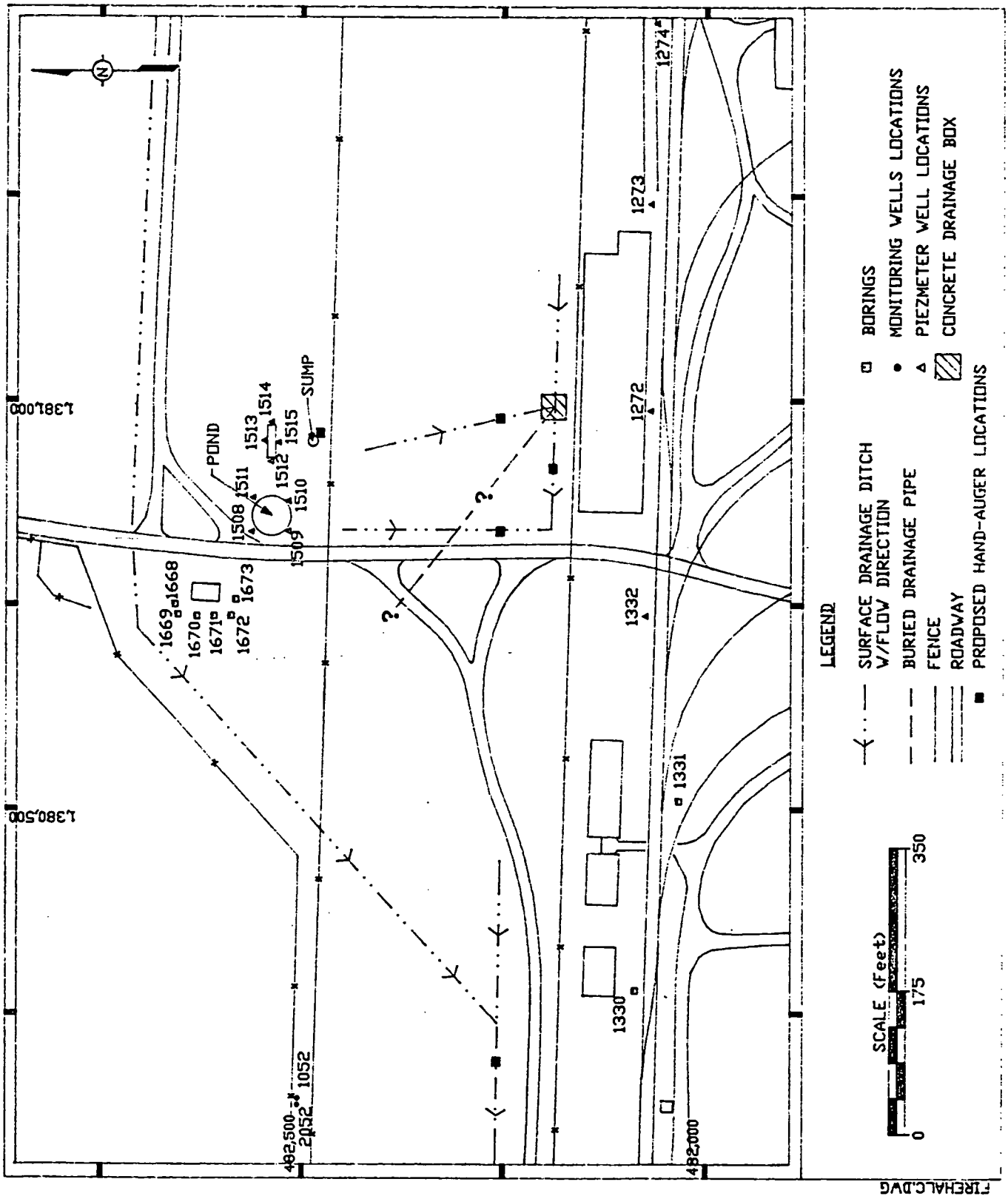

FIGURE 4. FIRE TRAINING AREA - HAND-AUGER LOCATIONS

TABLE 6
DATA QUALITY OBJECTIVES FOR THE INVESTIGATION OF THE FIRE TRAINING AREA

Activity	Complete one hand-auger boring within the contents of the former sump. Analyze samples from the upper and lower levels of the fill for full HSL and full radiological parameters.	Complete four hand-auger borings in drainage ditches downstream from the fire facility. Analyze soil samples from 0 to 6 and 12 to 18 inches for full radiological and full HSL parameters.
Objectives	Determine the nature of the material that presently fills the sump.	Determine the nature and extent of soil contamination in drainage courses due to surface runoff of contaminated water from the fire training area.
Prioritized data uses	The priority data use is site characterization. Site characterization data is used for risk assessment and selection of remedial alternatives.	
Appropriate analytical level*	Rad: Level V HSL: Level IV	Organo-phosphorous Pesticides: Level III Dioxins/Furans: Level V
Constituents of concern	Known: U, Ra, Th, Pu-238, Sr-90, Tc-99, HSL VOCs, HSL BNAs, PCBs, HSL metals. Suspected: Constituents on the full radiological and full HSL lists.	
Level of concern	See Appendix B	
Required detection limits	See Appendix B	
Critical samples**	No individual sample is considered critical; however, the aggregate of samples is considered critical to site characterization. The study requires that at least 75 percent of the samples attain the intended analytical level specified above upon completion of data validation.	

* = If samples can not attain their respective level of validation the samples will not be considered valid.

** = Critical samples are defined in the U.S. EPA DQO guidance as:

"those for which valid data must be obtained to satisfy the objectives of the sampling and analysis task. An example of a critical data point may be an up gradient well in a groundwater contamination study or any other data point considered vital to the decision making process."

TABLE 6 (cont)
DATA QUALITY OBJECTIVES FOR THE FIRE TRAINING AREA

Activity	Drill and sample three 1000-series borings in the southwest area of the Fire Training Area. Install piezometers in the borings utilizing Stainless Steel riser and screen. Collect soil samples continuously throughout the depth of the boring. Analyze groundwater samples from new wells for full radiological, full HSL, Dioxins/Furans, and Organo-phosphorus Pesticides.
Objectives	Determine the nature and extent of contamination of the perched groundwater due to past activities at the Fire Training Area.
Prioritized data uses	The priority data use is site characterization. Site characterization data is used for risk assessment and selection of remedial alternatives.
Appropriate analytical level*	Rad: Level V Organo-phosphorus Pesticides: Level III HSL: Level IV Dioxins/Furans: Level V
Constituents of concern	Known: U, Th, Ra, Pu-238, Sr-90, Tc-99, HSL VOCs, HSLs BNAs, PCBs, HSL metals. Suspected: constituents on the full radiological list and full HSL lists.
Level of concern	See Appendix B
Required detection limits	See Appendix B
Critical samples**	No individual sample is considered critical; however, the aggregate of samples is critical to site characterization. The study requires that at least 75 percent of the samples attain the intended analytical level specified above upon completion of data validation.

* = If samples can not attain their respective level of validation the samples will not be considered valid.

** = Critical samples are defined in the U.S. EPA DQO guidance as:

"those for which valid data must be obtained to satisfy the objectives of the sampling and analysis task. An example of a critical data point may be an up gradient well in a groundwater contamination study or any other data point considered vital to the decision making process."

TABLE 7
SUMMARY OF PROPOSED DRILLING AND SAMPLING PROGRAM FOR THE FIRE TRAINING AREA[a]

Borings/ Piezometers	Sample Depth (feet)	Boring Depth (feet)	Sample Type	Number of Samples per Boring[b e]	Sample Parameters[c]
Sump (1 boring)	Upper Lower	3 (est.)	Soil	2	Full HSL, Full Rad, Dioxins/Furans, Organophosphorus/ Pesticides (TAL-50.03.07-N)[d]
Drainage ditches (4 borings)	0-0.5 1.0-1.5	2	Soil	2	Full HSL, Full Rad, Dioxins/Furans, Organophosphorus/ Pesticides (TAL-50.03.07-N)[d]
Proposed Wells 1886, 1887, 1890			Water	2	Full HSL, Full Rad, Dioxins/Furans, Organophosphorus/ Pesticides (TAL-50.03.07-N)

[a] Sampling to be conducted in compliance with Revision 3 of the Remedial Investigation and Feasibility Study Work Plan, Feed Materials Production Center Vol I, Sampling Plan, Sections 3.0 and 4.0; Vol V, Quality Assurance Project Plan, Sections 5.0 and 6.0, March 1988; and Production and Additional Suspect Areas Work Plan, October 1989.

[b] Archive excess sample material and intervals not sent for analysis.

[c] The following QA/QC samples will be collected: 1) a rinsate of sample collection equipment will be analyzed for every 20 analytical samples; and 2) an appropriate trip/field blank will accompany each sample from collection in the field to its destination at the lab. The rinsates will be analyzed for the corresponding TAL of the sampling event. The trip/field blank for soil sampling will be analyzed for HSL VOCs. The trip/field blank for groundwater sampling will consist of VOCs, semivolatiles, and pesticides/PCBs.

[d] TAL: Target Analyte List. See Appendix A.

[e] The drill cuttings will be drummed, sampled for parameters specified by WEMCO or FERMCO, and trandsferred to an interim onsite storage facility.

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SECTION 4.0

WORK PLAN ADDENDUM
FOR THE
KC-2 WAREHOUSE AREA
SCRAP METAL AREA
AND THE ELECTRICAL SUBSTATION

4.1 INTRODUCTION

This work plan addendum presents a sampling and analysis plan for additional characterization of three areas: the KC-2 Warehouse and the general scrap metal area, located in the northeast quadrant of the production area, and the electrical substation in the southeast quadrant of the production area. These areas are shown in Figures 1, 2, and 3. This work plan addendum outlines soil sampling for polychlorinated biphenyl (PCB) aroclor analysis. Contamination of these areas is suspected due to their past histories and present uses. In addition, in order to further characterize the nature and extent of contamination present in these areas, full HSL and full radiological parameters will be sampled and analyzed at selected locations.

Environmental media sampling and analyses proposed for these areas will achieve a degree of characterization sufficiently detailed to provide for a knowledgeable selection of remedial alternatives to be determined during the feasibility study.

4.2 BACKGROUND - KC-2 WAREHOUSE

The KC-2 Warehouse is the designated Resource Conservation and Recovery Act (RCRA) storage facility for PCBs at the Fernald Environmental Management Project (FEMP). Access to the warehouse is through loading-bay doors on the south side of the building and a concrete pad extends from the south side of the building approximately 10 feet to a railroad bed. The railroad is oriented east-west on the south side of the KC-2 Warehouse. Surface water drains from the concrete pad south, which is uncontrolled sheet flow to the area occupied by the railroad bed.

4.2.1 FIELD CHARACTERIZATION ACTIVITIES - KC-2 WAREHOUSE

The concrete pad and the soils in the vicinity of the railroad bed do not show any visible signs of contamination, such as discolorations, evidence of oil stains or areas of stressed or dead vegetation. However, any past releases of PCB contaminated material should be found by sampling either on the concrete pad or in the soils along the railroad bed. Because the concrete pad does not show any visual evidence of contamination, the surface soils in the vicinity of the railroad bed are proposed for sampling. Figure 1 shows the proposed sampling locations along the railroad bed in the vicinity of the KC-2 Warehouse.

Because PCBs are relatively insoluble and tend to adhere to clay particles in the soil material, sampling of the upper 6 inches of soil at the railroad bed should be adequate to characterize the area for the presence of PCB, HSL and radiological contamination.

Samples will be collected from the four hand-auger borings shown in Figure 1. Soil samples will be collected from 0 to 6 inches in each boring. At each sampling location, the gravel will be removed from the soil surface prior to collecting the sample. All samples will be analyzed for PCB aroclors, full HSL and full radiological parameters as listed on Target Analyte List TAL-50.03.07-D in Appendix A.

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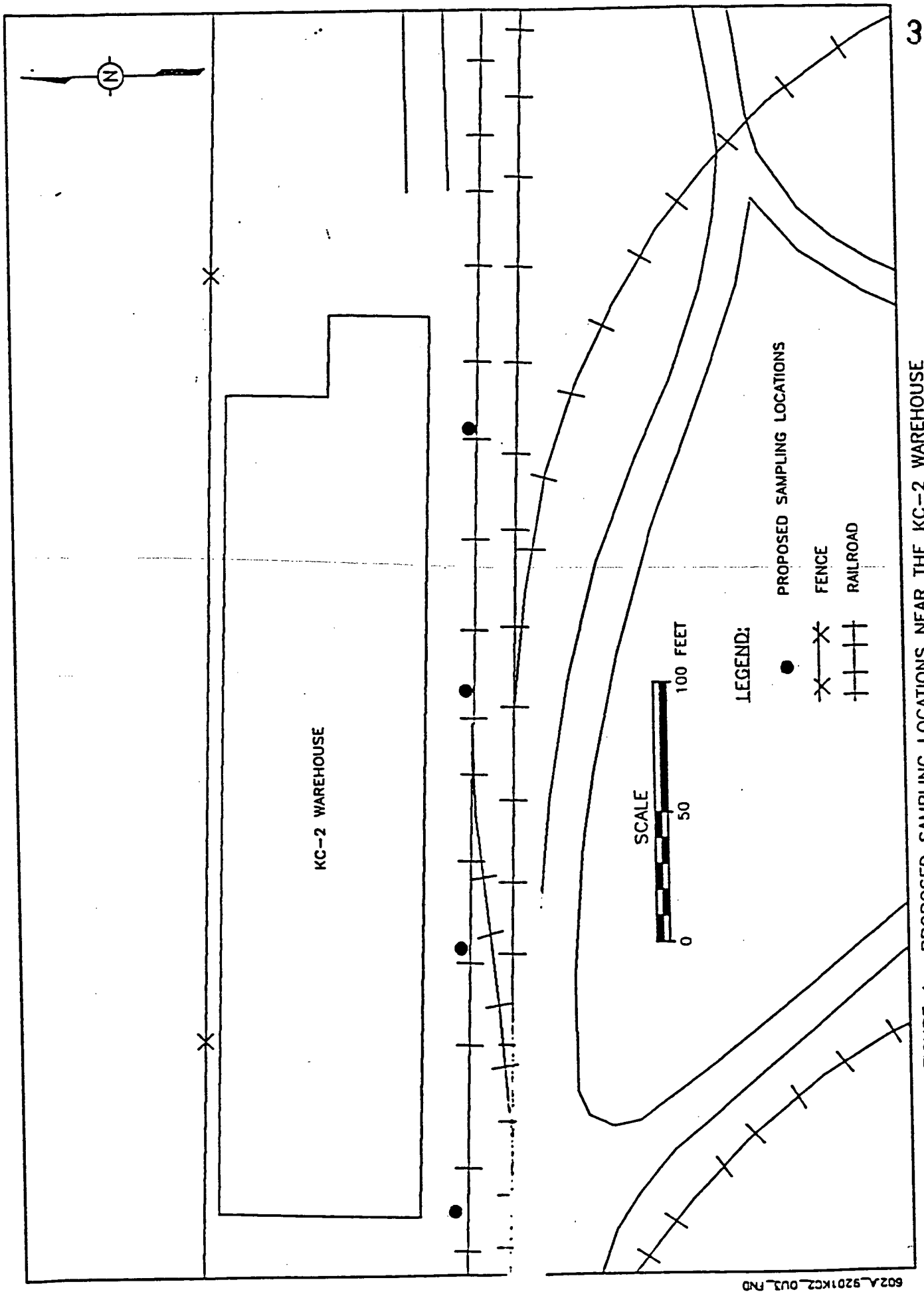

FIGURE 1. PROPOSED SAMPLING LOCATIONS NEAR THE KC-2 WAREHOUSE

4.3 BACKGROUND - SCRAP METAL AREA

The general Scrap Metal Area includes the region north and east of the scrap metal pile and the former drum baling area. This location has been a storage site for abandoned equipment, including transformers.

A visual inspection of the Scrap Metal Area does not show the presence of any transformers at this time. However, visual analysis of past photographs of the area shows possible evidence of transformer storage on and adjacent to the concrete pad upon which the scrap metal has been placed. Additionally, the Scrap Metal Area does not lend itself to detailed visual inspection due to the scrap metal height and the inaccessibility of material stored at the bottom of the scrap metal pile.

The Scrap Metal Area is scheduled for remedial removal action under FEMP Removal Action #15, titled "Scrap Metal Piles".

The remedial action proposed under this removal action essentially consists of removal of the scrap metal. FEMP staff believe that contaminate characterization of the Scrap Metal Area would be much enhanced by performing sampling after the removal action proposed under Removal Action #15. This is because access to the total area for sampling purposes would be greatly improved if the scrap metal was removed. However, the schedules for the Operable Unit 5 Remedial Investigation are not consistent with Removal Action #15 in that the removal of the scrap metal piles under this removal action is scheduled for 1994.

4.3.1 FIELD CHARACTERIZATION ACTIVITIES - SCRAP METAL AREA

Characterization of the Scrap Metal Area concrete pad can be performed relatively easily by sampling the surface water runoff point for the concrete pad. This point, located at the southwest corner of the D&D Building (Figure 2) is easily accessible and will provide a representative sample of runoff from the scrap metal concrete pad area. Also, sediment build up on the concrete pad in this area will also be sampled. The sediment source is from the scrap metal and residual material being stored on the concrete pad. This sediment should be representative of materials being stored on the concrete pad.

In order to characterize past drum baling activities and the possibility of past storage of scrap material which may have been stored in this vicinity yet not on the concrete pad, sampling of soils in surface water runoff areas is also proposed. These five sampling locations, shown on Figure 2, will be analyzed for PCB aroclor, full HSL and full radiological parameters. In addition, a storm water system access grate located approximately 100 feet south of the D&D Building (Figure 2) will be sampled, a total of seven sampling locations. The sewer system at this location is both an upslope and a surface drainage influent

collection system. It will be sampled for both sediment and water, if water is present in the storm sewer during sampling. This location and the media sampled and analyzed should be representative of water transported contaminates derived from materials stored adjacent to the Scrap Metal Area concrete pad. The sample analyses will consist of PCB aroclor, full HSL, and full radiological parameters.

If, during this investigation, a visual inspection of the margin of the Scrap Metal Area reveals the presence of any transformers, the manufacturer's information data plate, transformer model number, and serial number will be recorded. This information will be used to determine, through the manufacturer, if the transformer was produced using PCB containing oils and the concentration of PCB oil used.

Any transformers identified which do not display a manufacturer's information data plate, transformer model number, or serial number and do not show evidence of leakage will be isolated and placed in a secure location for future characterization.

Any transformers identified which show evidence of present or past leakage, as shown by obvious oil stains on the concrete or adjacent scrap metal pieces, will be isolated and placed in such a position that leakage is stopped, if necessary. After leakage has been stopped, wipe samples of the oil leakage, either on the transformer, on the concrete pad, or on any nearby scrap metal. These wipe samples will be taken from a surface area of 100 square centimeters. This area will be wiped with a hexane soaked swab. The swab will then be returned to the hexane sampling bottle for chemical analysis. These samples will be analyzed for PCB aroclors only. Following sampling, these transformers will be isolated and placed in a secure location for future remediation and proper disposal.

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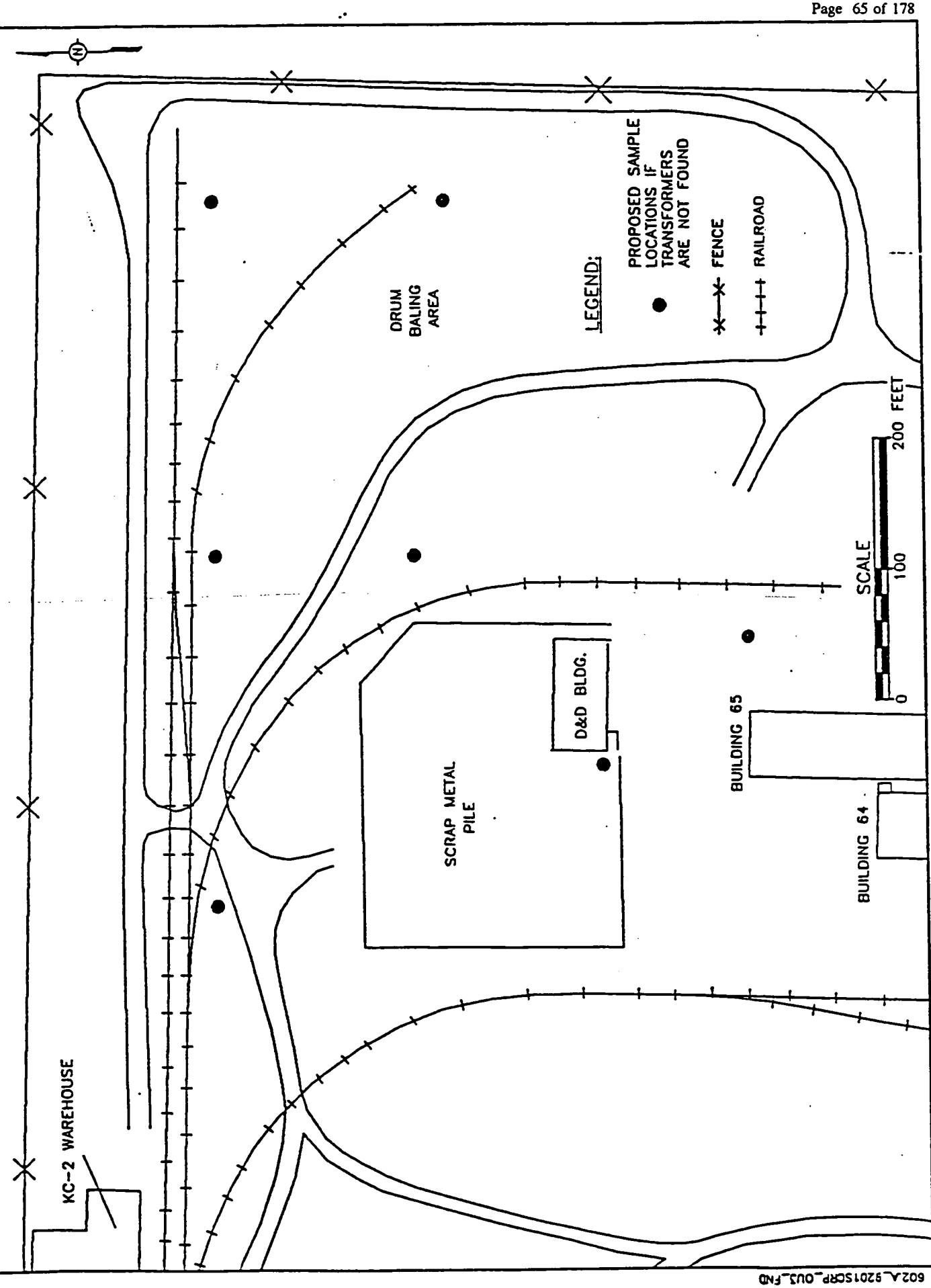

FIGURE 2. PROPOSED SAMPLING LOCATIONS IN THE SCRAP METAL AREA

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4.4 BACKGROUND - ELECTRICAL SUBSTATION AREA

PCB contamination of soils is suspected in the Electrical Substation Area. PCB contamination is suspected because of the long history of PCB oil containing transformer use at the substation. In the past, PCB sampling has been proposed for this area (refer to the Production and Additional Suspect Areas Work Plan Addendum); however, these samples have not been taken due to difficulties in obtaining penetration permits and Health and Safety approval for work in the substation.

Any characterization activities proposed for this area must take into consideration the close proximity of sampling locations to the high voltage sources at the substation.

In this work plan, DOE proposes to selectively sample soil at 9 oil tank locations inside the Electrical Substation perimeter fence and sample soil at 1 runoff location downslope from the substation. The reason for sampling is to further characterize any possible leakage from the oil tanks in this area.

4.4.1 FIELD CHARACTERIZATION ACTIVITIES - ELECTRICAL SUBSTATION AREA

As shown on Figure 3, sampling of soil material for the presence of PCB aroclors at 9 locations within the perimeter fence are proposed. These samples will be collected using a hand trowel. Also, the gravel constituent of the sample material will be removed from the sample prior to placing the sampled material into the container.

A visual inspection of the area where the 9 samples are to be sampled has not shown the presence of any good visual indicators of contamination. In fact, the area is covered with an approximately 3 inch thick layer of crushed rock. Thus, the crushed rock must be removed prior to sampling. The samples will be taken starting at a point where the overlying crushed rock has been removed down to a depth of 6 inches. If, during sampling, visual evidence of oil or other unusual staining of the crushed rock in encountered, this material will be sampled and analyzed for PCB aroclors, full HSL, and full RAD, as shown on Target Analyte List TAL-50.03.07-D in Appendix A.

In addition, one sample of soil material will be taken at a surface water runoff location approximately 20 feet south of the southeastern corner of the electrical substation perimeter fence. The purpose for collecting a soil sample at this point is because surface water runoff from the substation area is through the proposed sampling location. Thus, any PCB contamination, provided it has been transported that distance, should be detectable in a soil sample taken from this location. Also, to further characterize the presence of other possible contaminants of concern, the sample from this location will be analyzed for the

presence of other contaminants. The sample will be collected from a depth of 0 to 6 inches with either a hand trowel or a soil auger. The PCB analysis of the sample will be the same as that proposed for other Electrical Substation samples and in accordance with TAL-50.03.07-D. Additionally, full HSL and full radiological parameters will be analyzed from soils collected at this sampling location (TAL 50.03.07-D).

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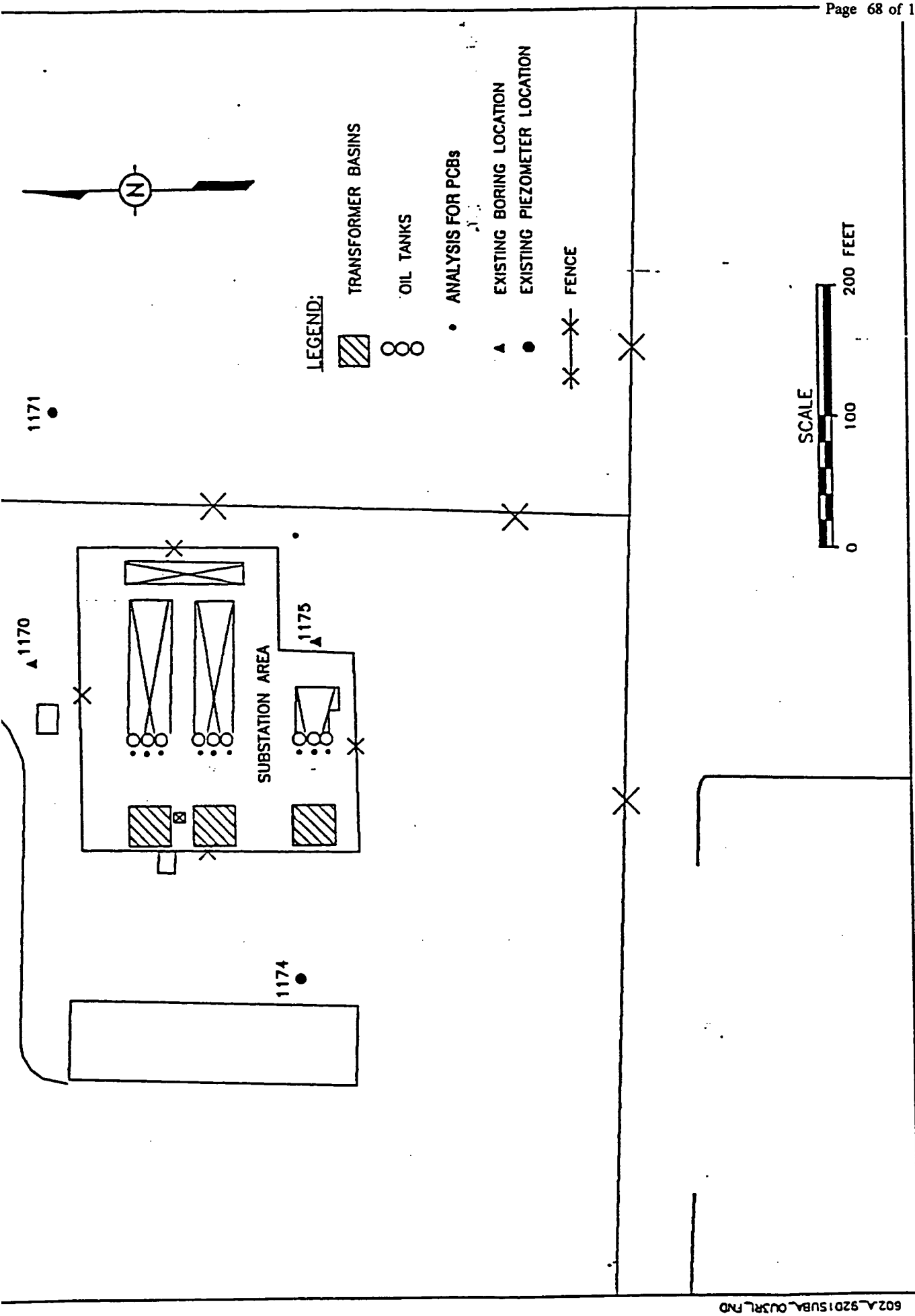

FIGURE 3. PROPOSED SAMPLING LOCATIONS IN THE SUBSTATION AREA

602A_920ISUBA_OU2RL.FND

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TABLE 1

SUMMARY OF PROPOSED DRILLING AND SAMPLING PROGRAM FOR THE KC-2 WAREHOUSE AREA, SCRAP METAL AREA, AND THE SUBSTATION[a]

Location	Number of Borings[b]	Approximate Depth (feet)	Sample Type	Number of Samples per Boring	Sample Parameters[d]
KC-2 Warehouse Area	4	0.5	Soil	1	PCBs, Full HSL, Full RAD (TAL-50.03.07-D)[c]
Scrap Metal Area	5	0.5	Soil	1	PCBs, Full HSL, Full RAD (TAL-50.03.07-D)[c]
Electrical Substation	10	0.5	Soil	1	PCBs, Full HSL, Full RAD (TAL-50.03.07-D)[c]
Scrap Metal Area			Sediment/Water	2	PCBs, Full HSL, Full RAD (TAL-50.03.07-D)[c]

[a] Sampling to be conducted in compliance with Revision 3 of the Remedial Investigation and Feasibility Study Work Plan, Feed Materials Production Center Vol. I; Sampling Plan, Sections 3.0 and 4.0, Vol. V; Quality Assurance Project Plan, Sections 5.0 and 6.0, March 1988; and Production and Additional Suspect Areas Work Plan, October 1989.

[b] All borings will be completed by hand augering or other manual techniques.

[c] TAL: Target Analyte List. See Appendix A.

[d] The only QA/QC samples required by the field program portion of this project are rinsates. A rinsate will be collected every 20 analytical samples.

TABLE 2
DATA QUALITY OBJECTIVES FOR SOIL SAMPLING OF THE KC-2 WAREHOUSE AREA, SCRAP METAL AREA, AND THE ELECTRICAL SUBSTATION

Activity	Collect soil samples from four 0.5-foot borings in the KC-2 warehouse area. Analyze for PCBs, full HSL, and full Radiological parameters.	Collect soil samples from five 0.5-foot borings in the scrap metal area. Collect sediment and/or water samples from one drainage area and one sewer inlet. Analyze for PCBs, full HSL, and Full radiological parameters.	Collect soil samples from nine 0.5-foot borings in the electrical substation. Collect one soil sample from outside the substation area in a locally low topographic area. Analyze for PCBs.
Objectives	Determine the nature and extent of PCB, HSL, and Radiological contamination adjacent to the KC-2 Warehouse storage area.	Determine the nature and extent of PCB contamination at the locations of transformers and/or oil stains in the scrap metal area.	Determine the nature and extent of PCB contamination due to long-term transformer use.
Prioritized data uses	Determine if PCBs, HSL, and/or Radiological contaminates are present in soil. The presence of PCBs must be clarified to determine if remedial alternatives for PCBs, HSL, and/or Radiological constituents must be developed.		
Appropriate analytical level*	HSL: Level IV PCBs: Level IV RAD: Level: V		
Constituents of concern	PCBs, full HSL, and full RAD		
Level of concern	See Appendix B		
Required detection limits	See Appendix B		
Critical samples**	No individual sample is considered critical; however the aggregate of samples at each area is considered critical to the goal of site characterization. The study requires that 75 percent of samples attain the intended analytical level specified above upon completion of data validation.		

* = If samples can not attain their respective level of validation the samples will not be considered valid.

** = Critical samples are defined in the U.S. EPA DQO guidance as:

"those for which valid data must be obtained to satisfy the objectives of the sampling and analysis task. An example of a critical data point may be an up gradient well in a groundwater contamination study or any other data point considered vital to the decision making process."

SECTION 5.0

WORK PLAN ADDENDUM FOR THE INVESTIGATION OF POTENTIAL SOIL AND GROUNDWATER CONTAMINATION RESULTING FROM THE K-65 SLURRY LINE AND CLEARWELL LINE

5.1 INTRODUCTION

This work plan addendum presents a sampling and analysis plan to further investigate the K-65 slurry line and the Clearwell Line, which are included under the Production and Additional Suspect Areas Work Plan for the Fernald Environmental Management Project (FEMP). The objective of this investigation is to determine the nature and extent of contamination due to past and present leaks in the pipelines. Leaks are a potential source of contamination for soil and perched groundwater along the course of the pipelines.

The wells which were proposed in the original draft of this Work Plan have been installed, and first round groundwater sampling has been completed. Analytical results are not available but will be incorporated in the report on this section. The following statement of work presents procedures as originally planned.

The K-65 slurry line extended from the hot raffinate building to the K-65 silos (Figure 1). Waste material generated from the processing of pitchblende ore was pumped to the silos through the slurry pipeline, which was wholly contained in a 2.5-feet deep concrete trench approximately 1460 feet in length. A visual inspection of the trench at one location verified that the slurry pipeline was removed from the trench. The radioactivity of the waste material was due primarily to the presence of radium-226, but other radionuclides, metals, and possibly organic constituents are also of concern.

The Clearwell Line is a system of pipelines that extend from the Clearwell to Manhole 175, with a portion of the pipe running through the K-65 pipe trench (Figure 1). Prior to February 1987, processed wastewater from the general sump was pumped through a system of pipelines to Waste Pit 5. Decant water from Waste Pit 5 flowed to the Clearwell and was pumped via the Clearwell Line to Manhole 175 for discharge into the Great Miami River. The Clearwell now receives only waste pit area runoff and rainfall recharge to Pit 5. Under normal conditions Clearwell water is transferred to the biodenitrification surge lagoon (BSL) for treatment and disposal. During times of heavy rainfall, the excess runoff is pumped from the Clearwell directly to Manhole 175 for discharge. According to the Westinghouse Environmental Management Company of Ohio (WEMCO) Waste Water Information Report, dated August 8, 1990, direct discharge has occurred a total of 26 days since 1987, with an average flow rate of 112 mgd. Also included in the WEMCO report is an analysis of water from the Clearwell Line taken at the National Pollutant Discharge Elimination System (NPDES) sampling site. This analysis is high in gross alpha, gross beta, nitrates and total uranium, and is moderately high in dissolved chromium, magnesium, nickel and copper. Groundwater samples taken from Wells 1031 and 2649, located near the Clearwell, have shown elevated levels of chromium, nickel and molybdenum as well as volatile organic compounds, including trichlorethene and tetrachloroethane. In addition, Well 1031 has also shown a trend of increasing uranium concentrations over three sampling rounds: three micrograms per liter (ug/l) in round two; 33 ug/l in round three; and 106 ug/l in round four.

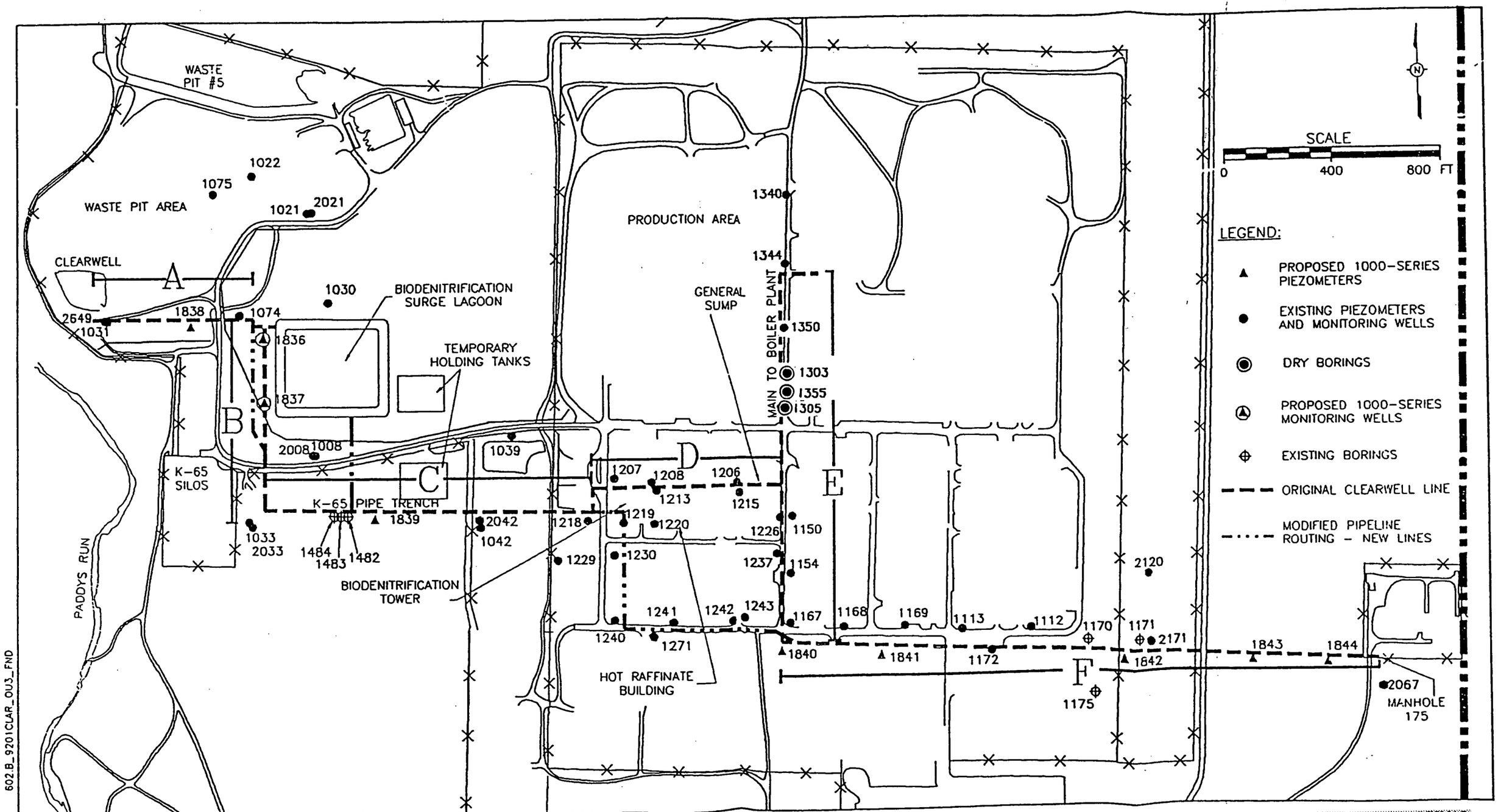

FIGURE 1. EXISTING AND ORIGINAL PIPELINES FROM CLEARWELL TO MANHOLE 175 AND PIPELINES IN K-65 PIPE TRENCH

5.2 PIPELINE TESTING

The Production and Additional Suspect Areas Work Plan Addendum called for acoustical testing of the Clearwell Line. Since the writing of that work plan, the Clearwell Line has been modified allowing portions of the line to be checked by WEMCO using a more accurate method of pressure testing. The lines that have been tested and/or the integrity documented are:

1. The new line from the biodenitrification (BDN) tower to the junction with the east-west main along First Street.

2. The new lines west of the BSL. These are joined to existing lines.

3. The discharge line from the BSL to the BDN tower discharges into a sump and is not a pressure line. WEMCO personnel do not believe it is leaking and part of this line can be visually checked in the K-65 pipe trench.

The rerouting and abandonment of some lines has made it impossible to determine if leakage has occurred in the past except through a drilling program. The pipelines that are now in service need to be pressure checked in order to determine if leakage is occurring; additionally, a field investigation involving drilling and sampling is needed to determine areas where past leaks have occurred. Since the pipelines that require testing are an integral part of the daily operations of the FEMP, this testing program must be carried out with detailed coordination using WEMCO subcontractors under the supervision of Advanced Sciences, Inc./International Technology Corp. (ASI/IT) and WEMCO. The lines that require testing are:

1. The pipeline from the Clearwell pumphouse to the discharge point into the BSL.

2. The entire line(s) from the general sump to the BSL (routed through the K-65 pipe trench).

3. The north-south pressure main down "B" Street from the general sump to the east-west main on First Street.

4. The alternate line from the Clearwell to the east-west main on First Street (for discharge of excess runoff to Manhole 175).

The pipelines should be tested under the Operable Unit 3 Work Plan per the Amended Consent Agreement.

The east-west main extending from "B" Street to Manhole 175 is generally inaccessible because of the lack of manholes along the line. This line is scheduled to be removed from service in late 1992 (verbal communication - WEMCO personnel). A drilling and sampling program to evaluate this line is outlined in Section 5.3.7 of this plan.

Because leaks may have occurred along some of the original or abandoned lines and it is not possible to test these lines, a soil and groundwater testing program is required.

5.3 FIELD CHARACTERIZATION ACTIVITIES

The following sections provide a detailed description of the drilling and sampling program that is necessary to characterize the environmental impact of the K-65 slurry line and the Clearwell Line. Piezometers are not intended as monitoring wells. The intent is to perform a one-time sampling of the perched groundwater to confirm the presence of or absence of radiological or chemical materials. If organic materials are found which are incompatible with or affected by PVC and which require long- term monitoring, the boring will be redrilled and a stainless steel monitoring well will be installed using the appropriate length of screen.

The first section provides an overview of the sampling program. The remaining sections discuss the details of the sampling program for the Clearwell Line as divided into the following segments:

A - Clearwell to BSL
B - BSL to K-65 pipe trench
C - K-65 pipe trench
D - End of K-65 pipe trench to general sump
E - Boiler plant to east-west main
F - East-West main to Manhole 175

These segments are illustrated in Figure 1. The Clearwell Line runs through the pipe trench previously occupied by the K-65 slurry line; therefore, the two lines are discussed together in Section 5.3.4 on Segment C of the Clearwell Line.

5.3.1 OVERVIEW OF THE SAMPLING PROGRAM

The evaluation of potentially contaminated areas will include soil and groundwater sampling in 1000-series borings, piezometers and monitoring wells. The drilling, sampling, and well installation procedures specified in the Remedial Investigation/Feasibility Study (RI/FS) Work Plan, dated March 1988, and associated Addenda will be followed. The 1000-series borings will be advanced with an auger rig to a maximum depth of 20 feet or, if water is encountered, the boring will be advanced to the first clay layer beneath the water-bearing zone and a 2-inch PVC piezometer will be installed in the boring unless otherwise stated in this work plan.

In each 1000-series boring, to be installed, one soil sample will be collected at the pipe invert elevation and another soil sample will be collected one to two feet below the pipeline invert elevation for HSL volatile organic compounds, and full radiological analyses. Specific depths for these soil samples are stated in later sections of this plan. Samples will also be collected for total uranium and total thorium

analysis at the following depth intervals: 0.0 to 0.5, 2.0 to 2.5, 5.0 to 5.5, 10.0 to 10.5, and 15.0 to 15.5 feet to provide consistency with other Production and Additional Suspect Areas sampling. Additional samples will be collected for full HSL paramenters if radiological contamination is found to increase with depth as indicated by field instruments.

All monitoring wells and piezometers will be developed prior to groundwater sampling. The 1000-series monitoring wells/piezometers will be developed by purging five well volumes prior to initial sampling unless they do not recharge sufficiently to allow the five volumes to be purged in two days. In cases where five volumes cannot be pumped in two days, the well will be purged dry and sampled when it recovers sufficiently.

Groundwater samples will be collected from each boring completed as a piezometer or monitoring well. Two rounds of samples will be collected from each piezometer or well and analyzed for full radiological parameters. The first sample will be collected from each piezometer or well for general groundwater quality parameters and HSL volatile organic compounds. The second sampled collected from the piezometers/wells will be analyzed for full RAD, full HSL, and groundwater quality parameters. Table 1 presents a summary of the proposed drilling and sampling. Table 2 summarizes the data objectives of this investigation.

Unless stated otherwise here, all procedures for drilling, sampling, well installation, well development, sample handling, and sample analysis will be as specified in the March 1988 RI/FS Work Plan and associated Work Plan Addenda.

5.3.2 SEGMENT A - CLEARWELL TO BSL

Segment A consists of the original pipeline extending east from the Clearwell pumphouse for approximately 600 feet, where it turns south (Figure 1). Since the discharge from the Clearwell is now into the BSL, valves were installed at the east end of the line, which may allow this section of the pipe to be pressure tested. Two 1000-series and one 2000-series monitoring wells already exist along Segment A. Wells 1031 and 2649 are located near the southeast corner of the Clearwell.

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TABLE 1
DRILLING AND SAMPLING PROGRAM
FOR THE CLEARWELL LINE & THE K-65 SLURRY LINE[a]

Location	Wells/ Piezometers[b]	Approximate Depth (ft)	Sample Type	No. of Soil Samples/Groundwater Rounds[e]	Analytical Parameters	TAL 50.03.07[g]
Segment A	1838[c]	20	Soil	5	Total Uranium & Total Thorium	
	"		Soil	2	Full Rad & HSL Volatiles	B
	"		Water	1st	Full Rad, GWQ[d], HSL Volatiles	C
	"		Water	2nd	Full Rad, GWQ, Full HSL	E
	1031		Water	1st	Full HSL	J
Segment B[f]	1836 1837	20	Soil	5	Total Uranium & Total Thorium	
			Soil	2	Full Rad & HSL Volatiles	B
			Water	1st	Full Rad, GWQ, HSL Volatiles	C
			Water	2nd	Full Rad, GWQ, Full HSL	E
Segment C	1839	20	Soil	5	Total Uranium & Total Thorium	
			Soil	2	Full Rad & Full HSL	D
			Water	1st	Full Rad, GWQ, HSL Volatiles	C
			Water	2nd	Full Rad, GWQ, Full HSL	E
Segment D	1206 1207 1208 1213 1215	NA	Water	1st	Full Rad, GWQ, HSL Volatiles	C
			Water	2nd	Full Rad, GWQ, Full HSL	E
Segment E	1150 1154 1167 1226 1237	NA	Water	1st	Full Rad, GWQ, HSL Volatiles	C
			Water	2nd	Full Rad, GWQ, Full HSL	E
	1344 1350		Water	1st and 2nd	Full RAD, GWQ, Full HSL	E

Segment F	1840 1841 1842 1843 1844	20	Soil	5	Total Uranium & Total Thorium	
			Soil	2	Full Rad & HSL Volatiles	B
			Water	1st	Full Rad, GWQ, HSL Volatiles	C
			Water	2nd	Full Rad, GWQ, Full HSL	E

[a] Sampling to be conducted in compliance with Revision 3 of the Remedial Investigation and Feasibility Study Work Plan, Feed Materials Production Center Vol I, Sampling Plan, Sections 3.0 and 4.0, Vol V, Quality Assurance Project Plan, Sections 5.0 and 6.0, March 1988, and Production and Additional Suspect Areas Work Plan, October 1989.
[b] A composite of borehole materials excluding samples submitted for other analyses from each boring will be subjected to a TCLP test and total U analysis. The 1000-series piezometers will be completed as 2-inch PVC piezometers and will be drilled with an auger rig. All 2000-series borings will be completed as 4-inch stainless steel monitoring wells and will be drilled using a cable tool rig.
[c] The 1000-series borings in this segment will be drilled with a cable tool rig.
[d] GWQ = General Groundwater Quality
[e] The following QA/QC samples will be collected: 1) a field duplicate is collected and analyzed every 10 samples for aqueous media, 2) a rinsate of sample collection equipment is collected and analyzed for every 20 analytical samples, and 3) an appropriate trip/field blank will accompany each sample from collection in the field to its destination at the lab. The lab will choose 1 in 20 general chemistry, volatiles, semivolatiles, and pesticide/PCB trip/field blanks for analyses.
[f] Two of these borings will be completed as 4-inch stainless steel monitoring wells.
[g] TAL: Target Analyte List. See Appendix A.

TABLE 2
DATA QUALITY OBJECTIVES FOR THE K-65 SLURRY LINE AND CLEARWELL LINE INVESTIGATION

Activity	Drill and sample nine 1000-series borings adjacent to pipelines. Install piezometers in borings if perched water is encountered. Collect soil samples at and two feet below the pipe invert elevation and at depths of 0, 2, 5, 10, and 15 feet. Analyze soils variously for full radiological, total U, total Th, and HSL VOCs. Analyze groundwater samples from new wells and 10 existing wells for full radiological, general groundwater, and HSL VOCs.
Objectives	Determine the nature and extent of contamination of soil and perched groundwater due to leaks from pipelines.
Prioritized data uses	The priority data use is site characterization. Site characterization data is used for risk assessment and selection of remedial alternatives.
Appropriate analytical level*	Rad: Level V Groundwater Quality (GWQ): Level III HSL: Level IV
Constituents of concern	Known: U, Th, Tc-99, HSL VOCs Suspected: constituents on the full radiological list and HSL VOCs
Level of concern	See Appendix B
Required detection limits	See Appendix B
Critical samples**	No individual sample is considered critical; however, the aggregate of samples is critical to site characterization. The study requires that at least 75 percent of the samples attain the intended analytical level specified above upon completion of data validation.

* = If samples can not attain their respective level of validation the samples will not be considered valid.

** = Critical samples are defined in the U.S. EPA DQO guidance as:

"those for which valid data must be obtained to satisfy the objectives of the sampling and analysis task. An example of a critical data point may be an up gradient well in a groundwater contamination study or any other data point considered vital to the decision making process."

Samples from these two wells provide the best available information on the contaminants that are carried through the Clearwell Line.

The most significant finding from samples taken from these wells has been the presence of elevated concentrations of volatile organic compounds, as shown in Table 3. Trichloroethene and tetrachloroethane were detected at the highest concentrations in Well 1031. Trichloroethene and tetrachloroethane were detected at lower concentrations in Well 2649. The samples from Well 1031 also show elevated concentrations of several of the general chemistry indicator parameters such as chloride, nitrates, and total organic halides (TOX), as well as trace amounts of several semivolatile organic compounds; an additional groundwater sample will be collected from Well 1031 and analyzed for full HSL parameters.

Well 1031 also has contained up to 106 µg/ℓ total uranium. The hydrograph for this well is flat indicating a constant source of water is present, such as the Clearwell. Well 1074, located on the north side of the line approximately 100 feet west of the east end of Segment A, has shown a maximum of only 7 µg/ℓ total uranium in the perched groundwater. Results of radiological analysis on groundwater from Well 2649 indicate that total uranium is present at 6 µg/ℓ, technetium-99 is also present in Well 2649.

Boring/Piezometer 1838 will be drilled in the approximate location shown in Figure 1. It will be drilled with a cable tool rig and casing will be telescoped if waste material from the waste pits is encountered. The depth of this segment of the pipeline is estimated to be 3.0 feet. The soil samples for HSL volatiles and full radiological analysis from the 1000-series boring will be taken at 2.5 to 3.5 and 5.0 to 6.0 feet. The soil and water analysis plan for Boring/Piezometer 1838 is as presented in Section 5.3.1 and outlined in Table 1.

An investigation of the extent of the contaminant plume identified in Well 2649 is being performed through the site RCRA program. The RCRA program has proposed, in another work plan (RCRA Groundwater Quality Assessment Plan, Rev. 2, 1991), that a 3000-series well be installed at Location 649 and that two 2000-series wells and one 3000-series well be installed down gradient of the Clearwell.

5.3.3 SEGMENT B - BSL TO K-65 PIPE TRENCH

Segment B is approximately 700 feet of buried pipe extending south from the elbow at the east end of Segment A to the point of entry into the K-65 pipe trench (Figure 1). Replacement pipe was laid several feet to the west and parallel to the original line along the west side of the BSL. The new line joins the old line just south of the BSL. The old line along the west side of the lagoon is out of service and cannot be tested. To determine if this abandoned pipe leaked in the past, 4-inch stainless steel monitoring wells, Numbers 1836 and 1837, will be installed immediately west of the abandoned pipe at the locations shown

TABLE 3

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN WELLS 1031 AND 2649

Results in parts per billion (ppb). NA indicates not analyzed; ND indicates not detected; a number preceded by a "less than" symbol (<) indicates that the compound was not present above the detection limit of the analytical instrument.

Well 1031

Analytical Parameter	9/18/89	2/18/90	5/4/90	8/22/90
1,1,1-Trichloroethane	<5.0	NA	1.7	<5.0
1,1-Dichloroethane	30.0	37.2	21.4	24.0
1,1-Dichloroethene	NA	NA	5.6	<5.0
1,2-Dichloroethane	2.0	2.6	1.8	<5.0
1,2-Dichloroethene	NA	NA	77.7	56.0
4-Methyl-2-pentanone	6.0	NA	5.9	<10.0
Benzene	3.0	NA	2.6	<5.0
Chloroform	2.0	NA	1.6	<5.0
Tetrachloroethane	300.0	NA	150.0	186.0
Toluene	2.0	NA	1.1	<5.0
Trichloroethene	530.0	NA	137.0	334.0
Vinyl chloride	16.0	NA	7.0	<5.0
Xylenes (total)	2.0	NA	NA	<5.0

Well 2649

Analytical Parameter	11/90	2/91
1,1,1-Trichloroethane	14.8	13.7
1,1-Dichloroethane	7.7	7.6
1,2-Dichloroethene	7.9	NA
Chloroform	ND	2.1
Tetrachloroethane	ND	1.3
trans-1,1-Dichloroethene	ND	1.5
Trichloroethene	182.0	181.0

in Figure 1. Located on the west side of the BSL, these wells will also serve as long-term monitoring points for the BSL. The depth of this segment of the pipeline is estimated to be 3.5 feet. The soil will be analyzed for HSL volatiles and full radiological analysis. Samples will be collected at depths of 3.0 to 4.0 and 6.0 to 7.0 feet. The soil and water analysis plan for these borings/wells is as presented in Section 5.3.1 and outlined in Table 1. The southern end of Segment B has been monitored by existing Wells 1033 and 2033.

5.3.4 SEGMENT C - K-65 PIPE TRENCH

Segment C is approximately 1200 feet of the K-65 pipe trench from the point of entry, near the west end, to the point of exit, near the hot raffinate building, as shown in Figure 1. Under the Production and Additional Suspect Areas Work Plan investigation, Piezometer 1218 was drilled near the point of exit from the trench. Water samples taken from Piezometer 1218 indicated total uranium concentrations ranging from a high of 130 µg/ℓ to a low of 58 µg/ℓ. Total uranium concentrations in the soil ranged from 46 µg/g at a depth of 1.5 feet to <11.0 µg/g at a depth of 10 feet. Water samples from Well 1042, located 400 feet west of Piezometer 1218, had a maximum total uranium concentration of 30 µg/ℓ.

During December 1989, as part of the Production and Additional Suspect Areas Work Plan investigation, an exploratory trench 50 feet in length was excavated just south of the K-65 pipe trench to explore an area that appeared as a darkened patch on an old aerial photograph. Location Numbers 1482, 1483, and 1484 were given to the end and the center points of the exploratory trench (Figure 1). Subsurface soil samples at these locations were analyzed for full radiological parameters. The analytical results are shown in Table 4. One sample taken at the contact between weathered and unweathered clay was analyzed for full HSL parameters (Table 5). All planned soil and groundwater sampling in this segment will include full HSL analyses.

The data from the trench samples indicate that the radionuclide concentrations are generally low at depth. A total thorium concentration of 17.1 µg/g was found at a depth of ten feet at Location 1482. Above-background levels of radium-226, radium-228, plutonium-239/240, strontium-90, and the isotopes of uranium and thorium were also present in samples from the trench (Table 4). Above-background concentrations of several HSL metals and volatiles were detected in Sample 56039, at Location 1482, from a depth of 14 feet (Table 5).

The results of the previous investigations indicate that some leakage has occurred from the pipelines that now or previously occupied the K-65 pipe trench. Therefore, Piezometer 1839 will be installed along the K-65 pipe trench near the exploratory Borings 1484, 1483, and 1482 to further define the extent of

groundwater contamination due to the K-65 pipe trench. Since the K-65 pipe trench is 2.5 feet deep, the soil samples for full HSL and full radiological analysis will be taken from 2.0 to 3.0 and 5.0 to 6.0 feet. The proposed water and soil analyses for this boring/well is presented in Table 1. The eastern 600 feet of the K-65 pipe trench currently has a sufficient number of sampling locations along its length.

As indicated, Piezometers 1218 and 1042 both indicate uranium concentrations along this length. Additionally, Piezometers 1219 and 1220 have documented groundwater contamination, and there is known soil contamination at Boring 1220. These locations are shown in Figure 1.

5.3.5 SEGMENT D - END OF K-65 PIPE TRENCH TO GENERAL SUMP AREA

From the exit point in the K-65 pipe trench, Segment D turns north for approximately 120 feet and then turns east for approximately 700 feet where it passes north of the general sump and then joins a north-south main, as shown in Figure 1.

A sufficient number of piezometers were installed in this area under the Production and Additional Suspect Areas program to confirm radiological contamination of the soils and perched groundwater; however, very limited HSL sampling was performed. Perched groundwater samples were collected for HSL parameters from Piezometers 1208 and 1213. The sample from Piezometer 1208 had 10 µg/ℓ of 1,1,1-trichloroethane and 8 µg/ℓ of 1,1-dichloroethane. The sample from Piezometer 1213 had 4 µg/ℓ of 1,1-dichloroethane. The presence of these compounds necessitates further sampling of the five piezometers in this area for full HSL, full RAD, and general groundwater quality parameters: 1206, 1207, 1208, 1213, and 1215. The groundwater sampling program is described in Section 5.3.1 and shown in Table 1.

5.3.6 SEGMENT E - BOILER PLANT TO EAST-WEST MAIN

At the general sump, the pipeline connects with a north-south main that extends approximately 800 feet north to the boiler plant and approximately 500 feet to the south, where it joins the east-west main that connects to Manhole 175.

A sufficient number of wells were installed in this area under the Production and Additional Suspect Areas program to confirm radiological contamination of the soils and perched groundwater; however, no HSL sampling was performed. Since the Clearwell Line may be contributing volatile organic, compounds to the environment, the seven existing piezometers 1150, 1154, 1167, 1226, 1237, 1344, and 1350 will be sampled in the first round for HSL volatiles, full RAD, and general groundwater quality parameters. The second round of water sampling will include full HSL, full RAD, and general groundwater quality. The groundwater sampling program is as described in Section 5.3.1 and shown in Table 1.

TABLE 4

RADIOLOGICAL RESULTS FOR K-65 TRENCH SUBSURFACE SOILS SAMPLES

Results are presented in picocuries per gram (pCi/g). Data presented by sample location and depth. NA indicates not analyzed; a number preceded by a "less than" symbol (<) indicates that the parameter was not present above the detection limit of the instrument.

	Trench Location 1482			Trench Location 1438		Trench Location 1484	
Radiological Parameters	6.5 ft.	10 ft.	14 ft.	5 ft.	8 ft.	5 ft.	8.5 ft.
Radium-226	<0.3	0.75	<0.3	1.01	0.85	<0.3	<0.3
Radium-228	<0.5	<0.5	<0.5	0.67	<0.5	0.594	<0.5
Total uranium[a]	3.78	<1.8	2.24	5.70	<4.41	2.35	4.77
Uranium-234	1.41	<0.6	<0.6	0.952	2.58	0.763	1.41
Uranium-238	1.40	<0.6	<0.6	0.832	2.59	0.717	1.09
Plutonium-239/240	<0.6	0.750	<0.6	<0.6	<0.6	1.04	<0.6
Thorium-228	1.05	2.85	<0.6	1.02	<0.6	0.616	0.998
Thorium-230	2.39	26.9	0.852	1.27	0.901	1.03	1.27
Thorium-232	0.89	1.90	<0.6	0.876	<0.6	<0.6	<0.6
Total thorium[a]	8.03	17.1	3.61	7.91	2.17	3.27	3.67
Strontium-90	4.31	1.91	0.70	5.97	<0.5	<0.5	1.19

[a] Results are in µg/g

TABLE 5
CHEMICAL RESULTS FOR K-65 TRENCH SUBSURFACE SOIL SAMPLES

Chemical Parameters	Trench Location 1482 Sample Depth = 14 feet Sample Number = 56039
Inorganic Constituents (mg/kg)	
Beryllium	1.2
Cadmium	4.3
Calcium	103000
Cobalt	14.6
Magnesium	23000
Nickel	37.6
Zinc	60.4
Organic Constituents (µg/kg)	
Volatiles	
Toluene	3
Trichloroethene	18

5.3.7 SEGMENT F - EAST-WEST MAIN TO MANHOLE 175

Segment F of the pipeline consists of approximately 1940 feet of 12-inch, cast iron pipe that carries the effluent from the plant and ancillary operations and the discharge from the storm water retention Basin to Manhole 175, which is located in the sewage treatment plant area. The original line is still in use. The possibility of pressure testing the line has been discounted because of the large volume of water transported through this segment and because a back up in the system would likely occur (WEMCO verbal communication). This line is scheduled to be taken out of service in late 1992. Possible soil and perched groundwater contamination will be delineated through the five proposed 1000-series borings/piezometers, 1840, 1841, 1842, 1843, and 1844 indicated in Figure 1. The first two borings/piezometers along this section of pipe, 1840 and 1841, will also provide information for the investigation of soil and perched groundwater contamination in the administration building area. Well 1841 was drilled to the proper depth and was dry soil samples were analyzed but no perched water samples were collected.

The depth of the pipeline in this segment varies from approximately six feet at the junction of the north-south main to approximately 13 feet at the east production area fence. Approximately 25 feet east of the production area fence the grade of the line increases to +3.86 percent for 175 feet and then flattens to 1.84 percent to Manhole 175. The depth of the line from the production area fence varies from a minimum of approximately four feet to a maximum of 11 feet. Therefore, the depths of the soil samples for HSL volatiles and full radiological analysis will be determined after the boring locations are staked and plotted on appropriate cross sections. The proposed soil and water analyses for these borings/piezometers are summarized in Table 1.

Water samples from the 1000-series piezometers located in the sewage treatment plant area contained total uranium values ranging from 23 to 6400 µg/ℓ in the perched groundwater. In addition, the water analysis from Well 2067 detected 9.66 µg/ℓ total uranium in December 1989 and 19.9 µg/ℓ total uranium in April 1990 in the upper groundwater zone of the Great Miami Aquifer. As the water samples collected in 1988 and early 1989 from Well 2067 contained less than 1 µg/ℓ, this increase is significant for it indicates that infiltration of uranium and possibly other contaminants to the Great Miami Aquifer has occurred. Well 2171 has been installed under the Miscellaneous Additional Wells Work Plan, near well 1843, to determine the nature and extent of contamination in the regional aquifer, specifically to determine the south edge of the plume that appears to be entering the aquifer near Plant 6. Preliminary results show total uranium concentrations to be at background levels. Data from Well 2171 will be used to determine if the uranium in Well 2067 is due to vertical migration from the vicinity of Manhole 175 area or lateral migration from the Plant 6 area.

APPENDIX A

TARGET ANALYTE LISTS

TABLE A.1

OPERABLE UNIT 5 RI/FS WORK PLAN ADDENDA

3852

TAL 50.03.07 A

FEMP RI/FS – PCBs – ANALYTICAL PARAMETERS

PCBs

1		Aroclor 1016
2		Aroclor 1221
3		Aroclor 1232
4		Aroclor 1242
5		Aroclor 1248
6		Aroclor 1254
7		Aroclor 1260

OPERABLE UNIT 5 RI/FS WORK PLAN ADDENDA

3852

TAL 50.03.07 B

FEMP RI/FS – HSL – ANALYTICAL PARAMETERS

VOLATILE ORGANICS

1		1,1–Dichloroethane
2		1,1–Dichloroethene
3		1,1,1–Trichloroethane
4		1,1,2–Trichloroethane
5		1,1,2,2–Tetrachloroethane
6		1,2–Dichloroethane
7		1,2–Dichloroethene (total)
8		1,2–Dichloroethylene
9		1,2–Dichloropropane
10		2–Butanone
11		2–Hexanone
12		4–Methyl–2–pentanone
13		Acetone
14		Benzene
15		Bromodichloromethane
16		Bromoform
17		Bromomethane
18		Carbon disulfide
19		Carbon tetrachloride
20		Chlorobenzene
21		Chloroethane
22		Chloroform
23		Chloromethane
24		cis–1,3–Dichloropropene
25		Dibromochloromethane
26		Ethylbenzene
27		Methylene chloride
28		Styrene
29		Tetrachloroethene
30		Toluene
31		Total xylenes
32		trans–1,3–Dichloropropene
33		Trichloroethene
34		Vinyl acetate
35		Vinyl chloride

FEMP RI/FS – FULL RADIOLOGICAL – ANALYTICAL PARAMETERS

RADIOLOGICAL

1		Cesium 137
2		Neptunium 237
3		Plutonium 238
4		Plutonium 239/240
5		Radium 226
6		Radium 228
7		Ruthenium 106
8		Strontium 90
9		Technetium 99
10		Thorium 228
11		Thorium 230
12		Thorium 232
13		Total Uranium
14		Uranium 234
15		Uranium 235/236
16		Uranium 238

MISC. RADIOLOGICAL

1		Gross alpha
2		Gross beta

3		Total Thorium

TABLE A.3

)PERABLE UNIT 5 RI/FS WORK PLAN ADDENDA

3852

TAL 50.03.07 C

EMP RI/FS – HSL –
NALYTICAL PARAMETERS

VOLATILE ORGANICS

1		1,1-Dichloroethane
2		1,1-Dichloroethene
3		1,1,1-Trichloroethane
4		1,1,2-Trichloroethane
5		1,1,2,2-Tetrachloroethane
6		1,2-Dichloroethane
7		1,2-Dichloroethene (total)
8		1,2-Dichloroethylene
9		1,2-Dichloropropane
0		2-Butanone
1		2-Hexanone
2		4-Methyl-2-pentanone
3		Acetone
4		Benzene
5		Bromodichloromethane
6		Bromoform
7		Bromomethane
8		Carbon disulfide
9		Carbon tetrachloride
0		Chlorobenzene
1		Chloroethane
2		Chloroform
3		Chloromethane
4		cis-1,3-Dichloropropene
5		Dibromochloromethane
6		Ethylbenzene
7		Methylene chloride
8		Styrene
9		Tetrachloroethene
0		Toluene
1		Total xylenes
2		trans-1,3-Dichloropropene
3		Trichloroethene
4		Vinyl acetate
5		Vinyl chloride

FEMP RI/FS – FULL RADIOLOGICAL –
ANALYTICAL PARAMETERS

RADIOLOGICAL

1		Cesium 137
2		Neptunium 237
3		Plutonium 238
4		Plutonium 239/240
5		Radium 226
6		Radium 228
7		Ruthenium 106
8		Strontium 90
9		Technetium 99
10		Thorium 228
11		Thorium 230
12		Thorium 232
13		Total Uranium
14		Uranium 234
15		Uranium 235/236
16		Uranium 238

MISCELLANEOUS

1		Gross alpha
2		Gross beta

3		Total Thorium

FEMP RI/FS – GENERAL GROUND WATER
QUALITY – ANALYTICAL PARAMETERS

INORGANICS

1		Aluminum
2		Arsenic
3		Barium
4		Cadmium
5		Calcium
6		Chromium
7		Copper
8		Iron
9		Lead
10		Magnesium
11		Manganese
12		Mercury
13		Molybdenum
14		Nickel
15		Potassium
16		Selenium
17		Silicon
18		Silver
19		Sodium
20		Vanadium

GENERAL CHEMISTRY

1		Ammonia
2		Chloride
3		Fluoride
4		Nitrate
5		Phenols
6		Phosphorus (total)
7		Sulfate
8		Sulfide
9		Total Organic Carbon (TOC)
10		Total Organic Halogens (TOX)
11		Total Organic Nitrogen (TON)

TABLE A.4

PERABLE UNIT 5 RI/FS WORK PLAN ADDENDA

AL 50.03.07 D

3852

MP RI/FS – FULL HSL – ANALYTICAL PARAMETERS

INORGANICS

	Aluminum
	Antimony
	Arsenic
	Barium
	Beryllium
	Cadmium
	Calcium
	Chromium (Total)
	Cobalt
	Copper
	Cyanide
	Iron
	Lead
	Magnesium
	Manganese
	Mercury
	Molybdenum
	Nickel
	Potassium
	Selenium
	Silicon
	Silver
	Sodium
	Thallium
	Vanadium
	Zinc

VOLATILE ORGANICS

	1,1-Dichloroethane
	1,1-Dichloroethene
	1,1,1-Trichloroethane
	1,1,2-Trichloroethane
	1,1,2,2-Tetrachloroethane
	1,2-Dichloroethane
	1,2-Dichloroethene (total)
	1,2-Dichloroethylene
	1,2-Dichloropropane
	2-Butanone
	2-Hexanone
	4-Methyl-2-pentanone
	Acetone
	Benzene
	Bromodichloromethane
	Bromoform
	Bromomethane
	Carbon disulfide
	Carbon tetrachloride
	Chlorobenzene
	Chloroethane
	Chloroform
	Chloromethane
	cis-1,3-Dichloropropene
	Dibromochloromethane
	Ethylbenzene
	Methylene chloride
	Styrene
	Tetrachloroethene
	Toluene
	Total xylenes
	trans-1,3-Dichloropropene
	Trichloroethene
	Vinyl acetate
	Vinyl chloride

SEMIVOLATILE ORGANICS

1	1,2-Dichlorobenzene
2	1,2,4-Trichlorobenzene
3	1,3-Dichlorobenzene
4	1,4-Dichlorobenzene
5	2-Chloronaphthalene
6	2-Chlorophenol
7	2-Methylnaphthalene
8	2-Methylphenol
9	2-Nitroaniline
10	2-Nitrophenol
11	2,4-Dichlorophenol
12	2,4-Dimethylphenol
13	2,4-Dinitrophenol
14	2,4-Dinitrotoluene
15	2,4,5-Trichlorophenol
16	2,4,6-Trichlorophenol
17	2,6-Dinitrotoluene
18	3-Nitroaniline
19	3,3'-Dichlorobenzidine
20	4-Bromophenyl phenylether
21	4-Chloro-3-methylphenol
22	4-Chloroaniline
23	4-Chlorophenyl-phenyl ether
24	4-Methylphenol
25	4-Nitroaniline
26	4-Nitrophenol
27	4,6-Dinitro-2-methylphenol
28	Acenaphthene
29	Acenaphthylene
30	Anthracene
31	Benzoic acid
32	Benzo(a)anthracene
33	Benzo(a)pyrene
34	Benzo(b)fluoranthene
35	Benzo(g,h,i)perylene
36	Benzo(k)fluoranthene
37	Benzyl alcohol
38	bis(2-Chloroethoxy)methane
39	bis(2-Chloroethyl)ether
40	bis(2-Chloroisopropyl) ether
41	bis(2-Ethylhexyl)phthalate
42	Butyl benzyl phthalate
43	Carbazole
44	Chrysene
45	Dibenzofuran
46	Dibenzo(a,h)anthracene
47	Diethylphthalate
48	Dimethylphthalate
49	Di-n-butyl phthalate
50	Di-n-octyl phthalate
51	Fluoranthene
52	Fluorene
53	Hexachlorobenzene
54	Hexachlorobutadiene
55	Hexachlorocyclopentadiene
56	Hexachloroethane
57	Indeno(1,2,3-cd)pyrene
58	Isophorone
59	Naphthalene
60	Nitrobenzene
61	N-Nitroso-di-n-propylamine
62	N-Nitrosodiphenylamine
63	Pentachlorophenol
64	Phenanthrene
65	Phenol
66	Pyrene

PESTICIDES / PCBs

1	4,4'-DDD
2	4,4'-DDE
3	4,4'-DDT
4	Aldrin
5	alpha-BHC
6	alpha-Chlordane
7	Aroclor 1016
8	Aroclor 1221
9	Aroclor 1232
10	Aroclor 1242
11	Aroclor 1248
12	Aroclor 1254
13	Aroclor 1260
14	beta-BHC
15	delta-BHC
16	Dieldrin
17	Endosulfan sulfate
18	Endosulfan-I
19	Endosulfan-II
20	Endrin
21	Endrin aldehyde
22	Endrin ketone
23	gamma-BHC
24	gamma-Chlordane
25	Heptachlor
26	Heptachlor epoxide
27	Methoxychlor
28	Toxaphene

FEMP RI/FS – FULL RADIOLOGICAL – ANALYTICAL PARAMETERS

RADIOLOGICAL

1	Cesium 137
2	Neptunium 237
3	Plutonium 238
4	Plutonium 239/240
5	Radium 226
6	Radium 228
7	Ruthenium 106
8	Strontium 90
9	Technetium 99
10	Thorium 228
11	Thorium 230
12	Thorium 232
13	Total Uranium
14	Uranium 234
15	Uranium 235/236
16	Uranium 238

MISC. RADIOLOGICAL

1	Gross alpha
2	Gross beta
3	Total Thorium

TABLE A.5

OPERABLE UNIT 5 RI/FS WORK PLAN ADDENDA

TAL 50.03.07 E

3852

FEMP RI/FS – FULL HSL – ANALYTICAL PARAMETERS

INORGANICS

1	Aluminum
2	Antimony
3	Arsenic
4	Barium
5	Beryllium
6	Cadmium
7	Calcium
8	Chromium (Total)
9	Cobalt
0	Copper
1	Cyanide
2	Iron
3	Lead
4	Magnesium
5	Manganese
6	Mercury
7	Molybdenum
8	Nickel
9	Potassium
0	Selenium
1	Silicon
2	Silver
3	Sodium
4	Thallium
5	Vanadium
6	Zinc

VOLATILE ORGANICS

1	1,1-Dichloroethane
2	1,1-Dichloroethene
3	1,1,1-Trichloroethane
4	1,1,2-Trichloroethane
5	1,1,2,2-Tetrachloroethane
6	1,2-Dichloroethane
7	1,2-Dichloroethene (total)
8	1,2-Dichloroethylene
9	1,2-Dichloropropane
0	2-Butanone
1	2-Hexanone
2	4-Methyl-2-pentanone
3	Acetone
4	Benzene
5	Bromodichloromethane
6	Bromoform
7	Bromomethane
8	Carbon disulfide
9	Carbon tetrachloride
0	Chlorobenzene
1	Chloroethane
2	Chloroform
3	Chloromethane
4	cis-1,3-Dichloropropene
5	Dibromochloromethane
6	Ethylbenzene
7	Methylene chloride
8	Styrene
9	Tetrachloroethene
0	Toluene
1	Total xylenes
2	trans-1,3-Dichloropropene
3	Trichloroethene
4	Vinyl acetate
5	Vinyl chloride

SEMIVOLATILE ORGANICS

1	1,2-Dichlorobenzene
2	1,2,4-Trichlorobenzene
3	1,3-Dichlorobenzene
4	1,4-Dichlorobenzene
5	2-Chloronaphthalene
6	2-Chlorophenol
7	2-Methylnaphthalene
8	2-Methylphenol
9	2-Nitroaniline
10	2-Nitrophenol
11	2,4-Dichlorophenol
12	2,4-Dimethylphenol
13	2,4-Dinitrophenol
14	2,4-Dinitrotoluene
15	2,4,5-Trichlorophenol
16	2,4,6-Trichlorophenol
17	2,6-Dinitrotoluene
18	3-Nitroaniline
19	3,3'-Dichlorobenzidine
20	4-Bromophenyl phenylether
21	4-Chloro-3-methylphenol
22	4-Chloroaniline
23	4-Chlorophenyl-phenyl ether
24	4-Methylphenol
25	4-Nitroaniline
26	4-Nitrophenol
27	4,6-Dinitro-2-methylphenol
28	Acenaphthene
29	Acenaphthylene
30	Anthracene
31	Benzoic acid
32	Benzo(a)anthracene
33	Benzo(a)pyrene
34	Benzo(b)fluoranthene
35	Benzo(g,h,i)perylene
36	Benzo(k)fluoranthene
37	Benzyl alcohol
38	bis(2-Chloroethoxy)methane
39	bis(2-Chloroethyl)ether
40	bis(2-Chloroisopropyl) ether
41	bis(2-Ethylhexyl)phthalate
42	Butyl benzyl phthalate
43	Carbazole
44	Chrysene
45	Dibenzofuran
46	Dibenzo(a,h)anthracene
47	Diethylphthalate
48	Dimethylphthalate
49	Di-n-butyl phthalate
50	Di-n-octyl phthalate
51	Fluoranthene
52	Fluorene
53	Hexachlorobenzene
54	Hexachlorobutadiene
55	Hexachlorocyclopentadiene
56	Hexachloroethane
57	Indeno(1,2,3-cd)pyrene
58	Isophorone
59	Naphthalene
60	Nitrobenzene
61	N-Nitroso-di-n-propylamine
62	N-Nitrosodiphenylamine
63	Pentachlorophenol
64	Phenanthrene
65	Phenol
66	Pyrene

PESTICIDES / PCBs

1	4,4'-DDD
2	4,4'-DDE
3	4,4'-DDT
4	Aldrin
5	alpha-BHC
6	alpha-Chlordane
7	Aroclor 1016
8	Aroclor 1221
9	Aroclor 1232
10	Aroclor 1242
11	Aroclor 1248
12	Aroclor 1254
13	Aroclor 1260
14	beta-BHC
15	delta-BHC
16	Dieldrin
17	Endosulfan sulfate
18	Endosulfan-I
19	Endosulfan-II
20	Endrin
21	Endrin aldehyde
22	Endrin ketone
23	gamma-BHC
24	gamma-Chlordane
25	Heptachlor
26	Heptachlor epoxide
27	Methoxychlor
28	Toxaphene

FEMP RI/FS – FULL RADIOLOGICAL – ANALYTICAL PARAMETERS

RADIOLOGICAL

1	Cesium 137
2	Neptunium 237
3	Plutonium 238
4	Plutonium 239/240
5	Radium 226
6	Radium 228
7	Ruthenium 106
8	Strontium 90
9	Technetium 99
10	Thorium 228
11	Thorium 230
12	Thorium 232
13	Total Uranium
14	Uranium 234
15	Uranium 235/236
16	Uranium 238

MISC. RADIOLOGICAL

1	Gross alpha
2	Gross beta
3	Total Thorium

FEMP RI/FS – GENERAL GROUND WATER QUALITY – ANALYTICAL PARAMETERS

GENERAL CHEMISTRY

1	Ammonia
2	Chloride
3	Fluoride
4	Nitrate
5	Phenols
6	Phosphorus (total)
7	Sulfate
8	Sulfide
9	Total Organic Carbon (TOC)
10	Total Organic Halogens (TOX)
11	Total Organic Nitrogen (TON)

MISC. GENERAL CHEMISTRY

1	Alkalinity

TABLE A.6

OPERABLE UNIT 5 RI/FS WORK PLAN ADDENDA

3852

TAL 50.03.07 F

FEMP RI/FS – FULL RADIOLOGICAL – ANALYTICAL PARAMETERS

1		Cesium 137
2		Neptunium 237
3		Plutonium 238
4		Plutonium 239/240
5		Radium 226
6		Radium 228
7		Ruthenium 106
8		Strontium 90
9		Technetium 99
10		Thorium 228
11		Thorium 230
12		Thorium 232
13		Total Uranium
14		Uranium 234
15		Uranium 235/236
16		Uranium 238

MISCELLANEOUS

17		Gross alpha
18		Gross beta

19		Total Thorium

TABLE A.7

OPERABLE UNIT 5 RI/FS WORK PLAN ADDENDA

TAL 50.03.07 G

3852

FEMP RI/FS – HSL – ANALYTICAL PARAMETERS

INORGANICS

1		Aluminum
2		Antimony
3		Arsenic
4		Barium
5		Beryllium
6		Cadmium
7		Calcium
8		Chromium (Total)
9		Cobalt
10		Copper
11		Cyanide
12		Iron
13		Lead
14		Magnesium
15		Manganese
16		Mercury
17		Molybdenum
18		Nickel
19		Potassium
20		Selenium
21		Silicon
22		Silver
23		Sodium
24		Thallium
25		Vanadium
26		Zinc

VOLATILE ORGANICS

1		1,1-Dichloroethane
2		1,1-Dichloroethene
3		1,1,1-Trichloroethane
4		1,1,2-Trichloroethane
5		1,1,2,2-Tetrachloroethane
6		1,2-Dichloroethane
7		1,2-Dichloroethene (total)
8		1,2-Dichloroethylene
9		1,2-Dichloropropane
10		2-Butanone
11		2-Hexanone
12		4-Methyl-2-pentanone
13		Acetone
14		Benzene
15		Bromodichloromethane
16		Bromoform
17		Bromomethane
18		Carbon disulfide
19		Carbon tetrachloride
20		Chlorobenzene
21		Chloroethane
22		Chloroform
23		Chloromethane
24		cis-1,3-Dichloropropene
25		Dibromochloromethane
26		Ethylbenzene
27		Methylene chloride
28		Styrene
29		Tetrachloroethene
30		Toluene
31		Total xylenes
32		trans-1,3-Dichloropropene
33		Trichloroethene
34		Vinyl acetate
35		Vinyl chloride

SEMIVOLATILE ORGANICS

1		1,2-Dichlorobenzene
2		1,2,4-Trichlorobenzene
3		1,3-Dichlorobenzene
4		1,4-Dichlorobenzene
5		2-Chloronaphthalene
6		2-Chlorophenol
7		2-Methylnaphthalene
8		2-Methylphenol
9		2-Nitroaniline
10		2-Nitrophenol
11		2,4-Dichlorophenol
12		2,4-Dimethylphenol
13		2,4-Dinitrophenol
14		2,4-Dinitrotoluene
15		2,4,5-Trichlorophenol
16		2,4,6-Trichlorophenol
17		2,6-Dinitrotoluene
18		3-Nitroaniline
19		3,3'-Dichlorobenzidine
20		4-Bromophenyl phenylether
21		4-Chloro-3-methylphenol
22		4-Chloroaniline
23		4-Chlorophenyl-phenyl ether
24		4-Methylphenol
25		4-Nitroaniline
26		4-Nitrophenol
27		4,6-Dinitro-2-methylphenol
28		Acenaphthene
29		Acenaphthylene
30		Anthracene
31		Benzoic acid
32		Benzo(a)anthracene
33		Benzo(a)pyrene
34		Benzo(b)fluoranthene
35		Benzo(g,h,i)perylene
36		Benzo(k)fluoranthene
37		Benzyl alcohol
38		bis(2-Chloroethoxy)methane
39		bis(2-Chloroethyl)ether
40		bis(2-Chloroisopropyl) ether
41		bis(2-Ethylhexyl)phthalate
42		Butyl benzyl phthalate
43		Carbazole
44		Chrysene
45		Dibenzofuran
46		Dibenzo(a,h)anthracene
47		Diethylphthalate
48		Dimethylphthalate
49		Di-n-butyl phthalate
50		Di-n-octyl phthalate
51		Fluoranthene
52		Fluorene
53		Hexachlorobenzene
54		Hexachlorobutadiene
55		Hexachlorocyclopentadiene
56		Hexachloroethane
57		Indeno(1,2,3-cd)pyrene
58		Isophorone
59		Naphthalene
60		Nitrobenzene
61		N-Nitroso-di-n-propylamine
62		N-Nitrosodiphenylamine
63		Pentachlorophenol
64		Phenanthrene
65		Phenol
66		Pyrene

FEMP RI/FS – FULL RADIOLOGICAL – ANALYTICAL PARAMETERS

1		Cesium 137
2		Neptunium 237
3		Plutonium 238
4		Plutonium 239/240
5		Radium 226
6		Radium 228
7		Ruthenium 106
8		Strontium 90
9		Technetium 99
10		Thorium 228
11		Thorium 230
12		Thorium 232
13		Total Uranium
14		Uranium 234
15		Uranium 235/236
16	.	Uranium 238

MISCELLANEOUS

17		Gross alpha
18		Gross beta

19		Total Thorium

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TABLE A.8

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OPERABLE UNIT 5 RI/FS WORK PLAN ADDENDA

TAL 50.03.07 H

FEMP RI/FS – HSL – ANALYTICAL PARAMETERS

INORGANICS

1		Aluminum
2		Antimony
3		Arsenic
4		Barium
5		Beryllium
6		Cadmium
7		Calcium
8		Chromium (Total)
9		Cobalt
10		Copper
11		Cyanide
12		Iron
13		Lead
14		Magnesium
15		Manganese
16		Mercury
17		Molybdenum
18		Nickel
19		Potassium
20		Selenium
21		Silicon
22		Silver
23		Sodium
24		Thallium
25		Vanadium
26		Zinc

VOLATILE ORGANICS

1		1,1–Dichloroethane
2		1,1–Dichloroethene
3		1,1,1–Trichloroethane
4		1,1,2–Trichloroethane
5		1,1,2,2–Tetrachloroethane
6		1,2–Dichloroethane
7		1,2–Dichloroethene (total)
8		1,2–Dichloroethylene
9		1,2–Dichloropropane
10		2–Butanone
11		2–Hexanone
12		4–Methyl–2–pentanone
13		Acetone
14		Benzene
15		Bromodichloromethane
16		Bromoform
17		Bromomethane
18		Carbon disulfide
19		Carbon tetrachloride
20		Chlorobenzene
21		Chloroethane
22		Chloroform
23		Chloromethane
24		cis–1,3–Dichloropropene
25		Dibromochloromethane
26		Ethylbenzene
27		Methylene chloride
28		Styrene
29		Tetrachloroethene
30		Toluene
31		Total xylenes
32		trans–1,3–Dichloropropene
33		Trichloroethene
34		Vinyl acetate
35		Vinyl chloride

SEMIVOLATILE ORGANICS

1		1,2–Dichlorobenzene
2		1,2,4–Trichlorobenzene
3		1,3–Dichlorobenzene
4		1,4–Dichlorobenzene
5		2–Chloronaphthalene
6		2–Chlorophenol
7		2–Methylnaphthalene
8		2–Methylphenol
9		2–Nitroaniline
10		2–Nitrophenol
11		2,4–Dichlorophenol
12		2,4–Dimethylphenol
13		2,4–Dinitrophenol
14		2,4–Dinitrotoluene
15		2,4,5–Trichlorophenol
16		2,4,6–Trichlorophenol
17		2,6–Dinitrotoluene
18		3–Nitroaniline
19		3,3'–Dichlorobenzidine
20		4–Bromophenyl phenylether
21		4–Chloro–3–methylphenol
22		4–Chloroaniline
23		4–Chlorophenyl–phenyl ether
24		4–Methylphenol
25		4–Nitroaniline
26		4–Nitrophenol
27		4,6–Dinitro–2–methylphenol
28		Acenaphthene
29		Acenaphthylene
30		Anthracene
31		Benzoic acid
32		Benzo(a)anthracene
33		Benzo(a)pyrene
34		Benzo(b)fluoranthene
35		Benzo(g,h,i)perylene
36		Benzo(k)fluoranthene
37		Benzyl alcohol
38		bis(2–Chloroethoxy)methane
39		bis(2–Chloroethyl)ether
40		bis(2–Chloroisopropyl) ether
41		bis(2–Ethylhexyl)phthalate
42		Butyl benzyl phthalate
43		Carbazole
44		Chrysene
45		Dibenzofuran
46		Dibenzo(a,h)anthracene
47		Diethylphthalate
48		Dimethylphthalate
49		Di–n–butyl phthalate
50		Di–n–octyl phthalate
51		Fluoranthene
52		Fluorene
53		Hexachlorobenzene
54		Hexachlorobutadiene
55		Hexachlorocyclopentadiene
56		Hexachloroethane
57		Indeno(1,2,3–cd)pyrene
58		Isophorone
59		Naphthalene
60		Nitrobenzene
61		N–Nitroso–di–n–propylamine
62		N–Nitrosodiphenylamine
63		Pentachlorophenol
64		Phenanthrene
65		Phenol
66		Pyrene

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TABLE A.9

OPERABLE UNIT 5 RI/FS WORK PLAN ADDENDA

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TAL 50.03.07 J

FEMP RI/FS – FULL HSL – ANALYTICAL PARAMETERS

INORGANICS

1		Aluminum
2		Antimony
3		Arsenic
4		Barium
5		Beryllium
6		Cadmium
7		Calcium
8		Chromium (Total)
9		Cobalt
10		Copper
11		Cyanide
12		Iron
13		Lead
14		Magnesium
15		Manganese
16		Mercury
17		Molybdenum
18		Nickel
19		Potassium
20		Selenium
21		Silicon
22		Silver
23		Sodium
24		Thallium
25		Vanadium
26		Zinc

VOLATILE ORGANICS

1		1,1-Dichloroethane
2		1,1-Dichloroethene
3		1,1,1-Trichloroethane
4		1,1,2-Trichloroethane
5		1,1,2,2-Tetrachloroethane
6		1,2-Dichloroethane
7		1,2-Dichloroethene (total)
8		1,2-Dichloroethylene
9		1,2-Dichloropropane
10		2-Butanone
11		2-Hexanone
12		4-Methyl-2-pentanone
13		Acetone
14		Benzene
15		Bromodichloromethane
16		Bromoform
17		Bromomethane
18		Carbon disulfide
19		Carbon tetrachloride
20		Chlorobenzene
21		Chloroethane
22		Chloroform
23		Chloromethane
24		cis-1,3-Dichloropropene
25		Dibromochloromethane
26		Ethylbenzene
27		Methylene chloride
28		Styrene
29		Tetrachloroethene
30		Toluene
31		Total xylenes
32		trans-1,3-Dichloropropene
33		Trichloroethene
34		Vinyl acetate
35		Vinyl chloride

SEMIVOLATILE ORGANICS

1		1,2-Dichlorobenzene
2		1,2,4-Trichlorobenzene
3		1,3-Dichlorobenzene
4		1,4-Dichlorobenzene
5		2-Chloronaphthalene
6		2-Chlorophenol
7		2-Methylnaphthalene
8		2-Methylphenol
9		2-Nitroaniline
10		2-Nitrophenol
11		2,4-Dichlorophenol
12		2,4-Dimethylphenol
13		2,4-Dinitrophenol
14		2,4-Dinitrotoluene
15		2,4,5-Trichlorophenol
16		2,4,6-Trichlorophenol
17		2,6-Dinitrotoluene
18		3-Nitroaniline
19		3,3'-Dichlorobenzidine
20		4-Bromophenyl phenylether
21		4-Chloro-3-methylphenol
22		4-Chloroaniline
23		4-Chlorophenyl-phenyl ether
24		4-Methylphenol
25		4-Nitroaniline
26		4-Nitrophenol
27		4,6-Dinitro-2-methylphenol
28		Acenaphthene
29		Acenaphthylene
30		Anthracene
31		Benzoic acid
32		Benzo(a)anthracene
33		Benzo(a)pyrene
34		Benzo(b)fluoranthene
35		Benzo(g,h,i)perylene
36		Benzo(k)fluoranthene
37		Benzyl alcohol
38		bis(2-Chloroethoxy)methane
39		bis(2-Chloroethyl)ether
40		bis(2-Chloroisopropyl) ether
41		bis(2-Ethylhexyl)phthalate
42		Butyl benzyl phthalate
43		Carbazole
44		Chrysene
45		Dibenzofuran
46		Dibenzo(a,h)anthracene
47		Diethylphthalate
48		Dimethylphthalate
49		Di-n-butyl phthalate
50		Di-n-octyl phthalate
51		Fluoranthene
52		Fluorene
53		Hexachlorobenzene
54		Hexachlorobutadiene
55		Hexachlorocyclopentadiene
56		Hexachloroethane
57		Indeno(1,2,3-cd)pyrene
58		Isophorone
59		Naphthalene
60		Nitrobenzene
61		N-Nitroso-di-n-propylamine
62		N-Nitrosodiphenylamine
63		Pentachlorophenol
64		Phenanthrene
65		Phenol
66		Pyrene

PESTICIDES / PCBs

1		4,4'-DDD
2		4,4'-DDE
3		4,4'-DDT
4		Aldrin
5		alpha-BHC
6		alpha-Chlordane
7		Aroclor 1016
8		Aroclor 1221
9		Aroclor 1232
10		Aroclor 1242
11		Aroclor 1248
12		Aroclor 1254
13		Aroclor 1260
14		beta-BHC
15		delta-BHC
16		Dieldrin
17		Endosulfan sulfate
18		Endosulfan-I
19		Endosulfan-II
20		Endrin
21		Endrin aldehyde
22		Endrin ketone
23		gamma-BHC
24		gamma-Chlordane
25		Heptachlor
26		Heptachlor epoxide
27		Methoxychlor
28		Toxaphene

TABLE A.10

OPERABLE UNIT 5 RI/FS WORK PLAN ADDENDA

FIRE TRAINING AREA SOILS

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TAL 50.03.07 N

FEMP RI/FS – HSL PLUS – ANALYTICAL PARAMETERS

INORGANICS

1	Aluminum
2	Antimony
3	Arsenic
4	Barium
5	Beryllium
6	Cadmium
7	Calcium
8	Chromium (Total)
9	Cobalt
10	Copper
11	Cyanide
12	Iron
13	Lead
14	Magnesium
15	Manganese
16	Mercury
17	Molybdenum
18	Nickel
19	Potassium
20	Selenium
21	Silicon
22	Silver
23	Sodium
24	Thallium
25	Vanadium
26	Zinc

VOLATILE ORGANICS

1	1,1-Dichloroethane
2	1,1-Dichloroethene
3	1,1,1-Trichloroethane
4	1,1,2-Trichloroethane
5	1,1,2,2-Tetrachloroethane
6	1,2-Dichloroethane
7	1,2-Dichloroethene (total)
8	1,2-Dichloroethylene
9	1,2-Dichloropropane
10	2-Butanone
11	2-Hexanone
12	4-Methyl-2-pentanone
13	Acetone
14	Benzene
15	Bromodichloromethane
16	Bromoform
17	Bromomethane
18	Carbon disulfide
19	Carbon tetrachloride
20	Chlorobenzene
21	Chloroethane
22	Chloroform
23	Chloromethane
24	cis-1,3-Dichloropropene
25	Dibromochloromethane
26	Ethylbenzene
27	Methylene chloride
28	Styrene
29	Tetrachloroethene
30	Toluene
31	Total xylenes
32	trans-1,3-Dichloropropene
33	Trichloroethene
34	Vinyl acetate
35	Vinyl chloride

SEMIVOLATILE ORGANICS

1	1,2-Dichlorobenzene
2	1,2,4-Trichlorobenzene
3	1,3-Dichlorobenzene
4	1,4-Dichlorobenzene
5	2-Chloronaphthalene
6	2-Chlorophenol
7	2-Methylnaphthalene
8	2-Methylphenol
9	2-Nitroaniline
10	2-Nitrophenol
11	2,4-Dichlorophenol
12	2,4-Dimethylphenol
13	2,4-Dinitrophenol
14	2,4-Dinitrotoluene
15	2,4,5-Trichlorophenol
16	2,4,6-Trichlorophenol
17	2,6-Dinitrotoluene
18	3-Nitroaniline
19	3,3'-Dichlorobenzidine
20	4-Bromophenyl phenylether
21	4-Chloro-3-methylphenol
22	4-Chloroaniline
23	4-Chlorophenyl-phenyl ether
24	4-Methylphenol
25	4-Nitroaniline
26	4-Nitrophenol
27	4,6-Dinitro-2-methylphenol
28	Acenaphthene
29	Acenaphthylene
30	Anthracene
31	Benzoic acid
32	Benzo(a)anthracene
33	Benzo(a)pyrene
34	Benzo(b)fluoranthene
35	Benzo(g,h,i)perylene
36	Benzo(k)fluoranthene
37	Benzyl alcohol
38	bis(2-Chloroethoxy)methane
39	bis(2-Chloroethyl)ether
40	bis(2-Chloroisopropyl) ether
41	bis(2-Ethylhexyl)phthalate
42	Butyl benzyl phthalate
43	Carbazole
44	Chrysene
45	Dibenzofuran
46	Dibenzo(a,h)anthracene
47	Diethylphthalate
48	Dimethylphthalate
49	Di-n-butyl phthalate
50	Di-n-octyl phthalate
51	Fluoranthene
52	Fluorene
53	Hexachlorobenzene
54	Hexachlorobutadiene
55	Hexachlorocyclopentadiene
56	Hexachloroethane
57	Indeno(1,2,3-cd)pyrene
58	Isophorone
59	Naphthalene
60	Nitrobenzene
61	N-Nitroso-di-n-propylamine
62	N-Nitrosodiphenylamine
63	Pentachlorophenol
64	Phenanthrene
65	Phenol
66	Pyrene

PESTICIDES / PCBs

1	4,4'-DDD
2	4,4'-DDE
3	4,4'-DDT
4	Aldrin
5	alpha-BHC
6	alpha-Chlordane
7	Aroclor 1016
8	Aroclor 1221
9	Aroclor 1232
10	Aroclor 1242
11	Aroclor 1248
12	Aroclor 1254
13	Aroclor 1260
14	beta-BHC
15	delta-BHC
16	Dieldrin
17	Endosulfan sulfate
18	Endosulfan-I
19	Endosulfan-II
20	Endrin
21	Endrin aldehyde
22	Endrin ketone
23	gamma-BHC
24	gamma-Chlordane
25	Heptachlor
26	Heptachlor epoxide
27	Methoxychlor
28	Toxaphene

ORGANOPHOSPHORUS PESTICIDES

1	Azinphosmethyl
2	Demeton
3	Diazinon
4	Disulfoton
5	Ethion
6	Malathion
7	Parathion, ethyl
8	Parathion, methyl

DIOXINS / FURANS

1	1,2,3,4,6,7,8-Heptachlorodibenzofuran
2	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
3	1,2,3,4,7,8-Hexachlorodibenzofuran
4	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin
5	1,2,3,4,7,8,9-Heptachlorodibenzofuran
6	1,2,3,6,7,8-Hexachlorodibenzofuran
7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin
8	1,2,3,7,8-Pentachlorodibenzofuran
9	1,2,3,7,8-Pentachlorodibenzo-p-dioxin
10	1,2,3,7,8,9-Hexachlorodibenzofuran
11	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin
12	2,3,4,6,7,8-Hexachlorodibenzofuran
13	2,3,4,7,8-Pentachlorodibenzofuran
14	2,3,7,8-TCDD
15	2,3,7,8-TCDF
16	Octachlorodibezofuran
17	Octachlorodibezo-p-dioxin
18	Total Heptachlorodibenzofuran
19	Total Heptachlorodibenzo-p-dioxin
20	Total Hexachlorodibenzofuran
21	Total Hexachlorodibenzo-p-dioxin
22	Total Pentachlorodibenzofuran
23	Total Pentachlorodibenzo-p-dioxin
24	Total Tetrachlorodibenzofuran
25	Total Tetrachlorodibenzo-p-dioxin

TABLE A.10 (Con't)

OPERABLE UNIT 5 RI/FS WORK PLAN ADDENDA

FIRE TRAINING AREA SOILS

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TAL 50.03.07 N

FEMP RI/FS – FULL RADIOLOGICAL – ANALYICAL PARAMETERS

RADIOLOGICAL

1		Cesium 137
2		Neptunium 237
3		Plutonium 238
4		Plutonium 239/240
5		Radium 226
6		Radium 228
7		Ruthenium 106
8		Strontium 90
9		Technetium 99
10		Thorium 228
11		Thorium 230
12		Thorium 232
13		Total Uranium
14		Uranium 234
15		Uranium 235/236
16		Uranium 238

MISC. RADIOLOGICAL

1		Gross alpha
2		Gross beta

3		Total Thorium

APPENDIX B

PRELIMINARY REMEDIATION GOALS

TABLE B-1
RESULTS OF USING VOLATILIZATION PATHWAY TO DETERMINE PRELIMINARY REMEDIATION GOALS

Chemical	Molecular Diffusivity[a] (cm^2/s)	Henry's Law Constant[b] ($atm\text{-}m^3/mol$)	K_{oc}[c] (cm^3/g)	O_c[d]	K_d[e] (cm^3/g)	Effective Diffusivity[f] (cm^2/s)	K_as[g] (cm^3/g)	Alpha[h] (cm^2/s)	VF[i] (m^3/kg)	Preliminary Remediation Goal[j] (mg/kg)
Acetone	0.106	3.97E-05	2.80E-01	0.01	0.0028	0.075	0.58	0.0352	1.31E+05	9.4E+03
2-Butanone	0.092	4.35E-05	9.40E-01	0.01	0.0094	0.065	0.19	0.0146	2.99E+05	1.9E+04
Ethylbenzene	0.074	7.90E-03	6.81E+02	0.01	6.81	0.052	0.05	0.0035	7.32E+05	5.3E+05
Tetrachloroethene	0.076	2.27E-02	6.65E+02	0.01	6.65	0.054	0.14	0.0095	3.95E+05	2.9E+03
Toluene	0.080	6.61E-03	2.59E+02	0.01	2.59	0.057	0.10	0.0079	4.54E+05	1.9E+05
1,1,1-Trichloroethane	0.082	2.76E-02	1.52E+02	0.01	1.52	0.058	0.74	0.0308	1.24E+05	2.6E+04
Total Xylenes	0.074	7.23E-03	2.40E+02	0.01	2.4	0.052	0.12	0.0083	4.32E+05	2.8E+04

[a] Lyman (1982)
[b] EPA (1986b)
[c] K_{oc} = partition coefficient for organic carbon, from U.S. Air Force Systems Command (1990)
[d] O_c = organic carbon, assume organic carbon content of sand
[e] K_d = distribution, taken from EPA (1991a)
[f] $D_i \times E^{0.33}$ (EPA 1991a)
[g] $(H/K_d) \times 41$ (EPA 1991a)
[h] $(D_{ei} \times E)/E + (P_s)(1 - E)/K_as$ (EPA 1991a); E = 0.35
[i] Equation 2-7 (EPA 1991a)
[j] Calculated using exposure parameters given in Equations 2-4 and 2-5, for the inhalation route only.

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TABLE B-2
PRELIMINARY REMEDIATION GOALS - GREAT MIAMI AQUIFER
RESIDENT FARMER LAND USE SCENARIO
WATER INGESTION

Chemical	Risk-Based PRGs		ARAR/TBC-Based PRGs		
			Federal Standards		State Standards
	HI=0.20 R_fD-Based PRG[a]	10^{-6} SF-Based PRG, above background[b]	Source[c]	Concentration[d]	Ground-waters[e]
RADIONUCLIDES (pCi/ℓ)					
Ac-227 + 7 daughters		0.06	4 mrem dose limit[f]	0.4	
Am-241		0.09	4 mrem dose	1.5	
Cs-137 + 1 daughter		0.7	MCL[g]	110	
Pb-210 + 2 daughters		0.03	4 mrem dose	1	
Np-237 + 1 daughter		0.09	4 mrem dose	1	
Pa-231		0.2	4 mrem dose	0.5	
Pu-238		0.09	4 mrem dose	1.7	
Pu-239		0.09	4 mrem dose	1.5	
Pu-240		0.09	4 mrem dose	1.5	
Ra-226 + 5 daughters		0.2	PMCL[h]	20	5
Ra-228 + 1 daughter		0.2	PMCL	20	5
Rn-222			PMCL	300	
Ru-106 + 1 daughter		2	MCL	20	
Sr-90 + 1 daughter		0.6	MCL	4	8
Tc-99		16	MCL	3750	
Th-228 + 7 daughters		0.4	4 mrem dose	14	
Th-230		2	4 mrem dose	10	
Th-232		2	4 mrem dose	2	
U-233		1	4 mrem dose	19	
U-234		1	PMCL	7	
U-235 + 1 daughter		1	PMCL	0.3	
U-238 + 2 daughters		1	PMCL	7	
INORGANICS (mg/ℓ)					
Aluminum[i]					

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TABLE B-2 (Continued)
PRELIMINARY REMEDIATION GOALS - GREAT MIAMI AQUIFER
RESIDENT FARMER LAND USE SCENARIO
WATER INGESTION

Chemical	Risk-Based PRGs		ARAR/TBC-Based PRGs		
			Federal Standards		State Standards
	HI=0.20 R_fD-Based PRG[a]	10^{-6} SF-Based PRG, above background[b]	Source[c]	Concentration[d]	Ground-waters[e]
Ammonia	7				
Antimony	0.003				
Arsenic	0.007		MCL	0.05	0.05
Barium	0.4		MCL	2	1
Beryllium	0.04	8E-06	PMCL	0.001	
Boron	0.7				
Cadmium	0.004		MCL	0.005	0.01
Chromium	0.04		MCL	0.1	0.05
Cobalt	0.02				
Copper[i]					
Iron[i]					
Lead	0.005		MCL	0.005	0.05
Magnesium[i]					
Manganese	0.7				
Mercury	0.002		MCL	0.002	0.002
Molybdenum	0.03				
Nickel	0.1		PMCL	0.1	
Nitrate[i]					
Selenium	0.04		MCL	0.05	0.01
Silver	0.02		MCL	0.05	0.05
Thallium	0.0005		PMCL	0.002	
Uranium	0.02		MCL	0.02	
Vanadium	0.05				
Zinc	1				
Cyanide	0.1		PMCL	0.2	

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TABLE B-2 (Continued)
PRELIMINARY REMEDIATION GOALS - GREAT MIAMI AQUIFER
RESIDENT FARMER LAND USE SCENARIO
WATER INGESTION

Chemical	Risk-Based PRGs		ARAR/TBC-Based PRGs		
			Federal Standards		State Standards
	HI=0.20 RfD-Based PRG[a]	10^{-6} SF-Based PRG, above background[b]	Source[c]	Concentration[d]	Ground-waters[e]
ORGANICS (mg/ℓ)					
1,1,2-Trichloro-1,2,2-trifluoroethane	20				
1,1,2,2-Tetrachloroethane		0.0002			
1,1,1-Trichloroethane	0.7		MCL	0.2	0.2
1,1-Dichloroethane	0.7				
1,1-Dichloroethene	0.07	0.00006	MCL	0.007	0.007
1,2-Dichloroethane		0.0004	MCL	0.005	0.005
1,2-cis-Dichloroethene	0.07		MCL	0.07	
1,2-trans-Dichloroethene	0.1		MCL	0.1	
1,4-Dioxane		0.003			
2-Butanone	0.4				
2-Hexanone[i]					
2-Methylnaphthalene[i]					
2-Methylphenol[i]					
2-Methyl-4,6-Dinitrophenol[i]					
2-Nitrophenol[i]					
2,3,4,6-Tetrachlorophenol[i]					
2,4-Dimethylphenol	0.1				
3-Nitroaniline[i]					
4-Methyl-2-pentanone	0.4				
4-Methylphenol[i]					
4-Nitrophenol[i]					
Acenaphthene	0.4				
Acenaphthylene[i]					
Acetone	0.7				

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TABLE B-2 (Continued)
PRELIMINARY REMEDIATION GOALS - GREAT MIAMI AQUIFER
RESIDENT FARMER LAND USE SCENARIO
WATER INGESTION

Chemical	Risk-Based PRGs		ARAR/TBC-Based PRGs		
			Federal Standards		State Standards
	HI=0.20 R_fD-Based PRG[a]	10^{-6} SF-Based PRG, above background[b]	Source[c]	Concentration[d]	Ground-waters[e]
Aldrin	0.0002	2E-06			
Anthracene	2				
Aroclor-1242		5E-06	MCL	0.0005	
Aroclor-1248		5E-06	MCL	0.0005	
Aroclor-1254		5E-06	MCL	0.0005	
Aroclor-1260		5E-06	MCL	0.0005	
Benzene		0.001	MCL	0.005	0.005
Benzo(a)anthracene[i]			PMCL	0.0001	
Benzo(a)pyrene		3E-06	PMCL	0.0002	
Benzo(b)fluoranthene[i]			PMCL	0.0002	
Benzo(g,h,i)perylene[i]					
Benzo(k)fluoranthene[i]			PMCL	0.0002	
Benzoic acid	29				
Benzyl alcohol	2				
Bis(2-ethylhexyl)phthalate	0.1	0.003			
Bromochloromethane[i]					
Bromodichloromethane		0.0003			
Butanol	0.7				
Butyl benzyl phthalate	1				
Carbon disulfide	0.7				
Carbon tetrachloride	0.005	0.0003	MCL	0.005	0.005
Chlordane	0.0004	0.00003	MCL	0.002	
Chlorobenzene	0.1				
Chloroethane[i]					
Chloroform	0.07	0.006	MLC	0.1	

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TABLE B-2 (Continued)
PRELIMINARY REMEDIATION GOALS - GREAT MIAMI AQUIFER
RESIDENT FARMER LAND USE SCENARIO
WATER INGESTION

Chemical	Risk-Based PRGs		ARAR/TBC-Based PRGs		
			Federal Standards		State Standards
	HI=0.20 R_fD-Based PRG[a]	10^{-6} SF-Based PRG, above background[b]	Source[c]	Concentration[d]	Ground-waters[e]
Chrysene[i]			PMCL	0.0002	
Cyclohexane[i]					
DDT	0.004	0.0001			
Di-n-butyl phthalate	0.7				
Di-n-octyl phthalate	0.1				
Dibenzo(a,h)anthracene[i]			PMCL	0.0003	
Dibenzofuran[i]					
Diethylphthalate	6.0				
Dimethylphthalate	70				
Ethyl parathion[i]					
Ethylbenzene	0.07		MCL	0.7	
Fluoranthene	0.3				
Fluorene	0.3				
Heptachlor	0.004	8E-06	MCL	0.0004	
alpha-Hexachlorocyclohexane		6E-06		0.0002	
beta-Hexachlorocyclohexane		0.00002			0.004
Indeno(1,2,3-cd)pyrene[i]			PMCL	0.0004	
Isophorone	1.0				
Methyl parathion	0.02				
Methylene chloride	0.4	0.005	PMCL	0.005	
N-nitrosodiethylamine		2E-07			
N-nitrosodiphenylamine		0.007			
Naphthalene	0.03				
Pentachlorophenol	0.2	0.0003	MCL	0.001	
Phenanthrene[i]					

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TABLE B-2 (Continued)
PRELIMINARY REMEDIATION GOALS - GREAT MIAMI AQUIFER
RESIDENT FARMER LAND USE SCENARIO
WATER INGESTION

Chemical	Risk-Based PRGs		ARAR/TBC-Based PRGs		
			Federal Standards		State Standards
	HI=0.20 R_fD-Based PRG[a]	10^{-6} SF-Based PRG, above background[b]	Source[c]	Concentration[d]	Ground-waters[e]
Phenol	4				
Pyrene	0.2				
Tetrachloroethene	0.07	0.0007	MCL	0.005	
Toluene	1		MCL	1	
Trichloroethene		0.003	MCL	0.005	0.0
Vinyl chloride		0.00002	MCL	0.002	0.002
Xylenes (total)	15		MCL	10	

[a] PRGs developed using equations and parameters for drinking water ingestion and RfDs from Health Effects Assessment Summary Tables (EPA, 1992a) and the Integrated Risk Information System (EPA, 1992b).
[b] PRGs developed using equations and parameters for drinking water ingestion and chemical-specific SFs from HEAST and IRIS. Values represent cleanup goal above background values since 10^{-6} target risk represents an **incremental** lifetime cancer risk goal.
[c] ARAR-based PRGs are developed from several sources. The primary source is promulgated or prosed maximum contaminnat levels (MCLs) developed under the Safe Drinking Water Act, 40CFR141, 142. If no MCL exists that strckly applies to the individual radionuclide, a PRG is developed using the 4 mrem dose limit that strckly applies to man-made beta and gamma emitters.
[d] Concentration in pCi/ℓ for radionuclides and mg/ℓ for chemicals, corresponding to MCL or PMCL values.
[e] Based on OAC3745-81-16; for many radionuclides, values are based on an average annual dose of beta particle and photon (e.g., gamma) of 4 mrem/year.
[f] PRG based on interpretation to 4 mrem/year dose limit for beta and gamma emitters may be applicable to alpha emitters. PRG developed using committed effective dose equivalents (CEDE) to 4 mrem/year of intake at a rate of 730 ℓ/yr, using Dose conversion factros (DCFs) from EPA (1988b).
[g] PRG developed using the strickly applicable MCL of 4 mrem/year for man-made beta and gamma emitters (40 CFR 141, 142). Value developed using a CEDE or critical organ dose equivalent (if available or if more conservative) to 4 mrem/yr intake at a rate of 730 ℓ/yr, using DCFs from EPA (1988b).
[h] Proposed MCLs from "Federal Register", Vol. 55, No. 138, p.33050.
[i] No toxicity data available to develop a PRG.

TABLE B-3
PRELIMINARY REMEDIATION GOALS - SURFACE SOILS AND WASTE MATERIAL
RESIDENTIAL/RECREATIONAL LAND USE SCENARIO
SOIL INGESTION AND EXTERNAL RADIATION

Chemical	Future Land Use Residential			Future Land Use Recreational			Other ARARs/ TBCs[g]
	HI=0.20 R_fD-Based PRG[a]	10^{-6} Risk-Based PRG, above background[b]	Dose Limit-Based PRG[c]	HI=0.20 R_fD-Based PRG[d]	10^{-6} Risk-Based PRG, above background[e]	Dose Limit-Based PRG[f]	
RADIONUCLIDES (pCi/g)							
Ac-227 + 7 daughters		0.04	0.9		2	18	
Am-241		1	7		140	22	
Cs-137 + 1 daughter		0.02	0.7		1	11	
Pb-210 + 2daughter		0.6	4.9		70	155	
Np-237 + 1 daughter		0.08	2.2		5	41	
Pa-231		1.0	2.4		70	72	
Pu-238[h]		1.7	8.2		220	260	
Pu-239[h]		1.6	7.4		210	240	
Pu-240[h]		1.6	7.4		210	240	
Ra-226 + 5 daughters[h]		0.006	0.2		0.4	3.8	5[g]
Ra-228 + 1 daughter[h]		0.01	0.5		0.7	7.7	5[g]
Ru-106 + 1 daughter		0.05	2.2		3	34	
Sr-90 + 1 daughter		10	184		1,340	5,900	
Tc-99		290	17,800		36,600	560,000	
Th-228 + 7 daughters[h]		0.006	0.3		0.4	4	
Th-230[h]		28	48		3,400	1,520	5[i]

TABLE B-3
PRELIMINARY REMEDIATION GOALS - SURFACE SOILS AND WASTE MATERIAL
RESIDENTIAL/RECREATIONAL LAND USE SCENARIO
SOIL INGESTION AND EXTERNAL RADIATION

Chemical	Future Land Use Residential			Future Land Use Recreational			Other ARARs/ TBCs[g]
	HI=0.20 R_fD-Based PRG[a]	10^{-6} Risk-Based PRG, above background[b]	Dose Limit-Based PRG[c]	HI=0.20 R_fD-Based PRG[d]	10^{-6} Risk-Based PRG, above background[e]	Dose Limit-Based PRG[f]	
RADIONUCLIDES (pCi/g)							
Ac-227 + 7 daughters		0.04	0.9		2	18	
Am-241		1	7		140	22	
Cs-137 + 1 daughter		0.02	0.7		1	11	
Pb-210 + 2daughter		0.6	4.9		70	155	
Np-237 + 1 daughter		0.08	2.2		5	41	
Pa-231		1.0	2.4		70	72	
Pu-238[h]		1.7	8.2		220	260	
Pu-239[h]		1.6	7.4		210	240	
Pu-240[h]		1.6	7.4		210	240	
Ra-226 + 5 daughters[h]		0.006	0.2		0.4	3.8	5[g]
Ra-228 + 1 daughter[h]		0.01	0.5		0.7	7.7	5[g]
Ru-106 + 1 daughter		0.05	2.2		3	34	
Sr-90 + 1 daughter		10	184		1,340	5,900	
Tc-99		290	17,800		36,600	560,000	

TABLE B-3
PRELIMINARY REMEDIATION GOALS - SURFACE SOILS AND WASTE MATERIAL
RESIDENTIAL/RECREATIONAL LAND USE SCENARIO
SOIL INGESTION AND EXTERNAL RADIATION

Chemical	Future Land Use Residential			Future Land Use Recreational			Other ARARs/ TBCs[g]
	HI=0.20 R_fD-Based PRG[a]	10^{-6} Risk-Based PRG, above background[b]	Dose Limit-Based PRG[c]	HI=0.20 R_fD-Based PRG[d]	10^{-6} Risk-Based PRG, above background[e]	Dose Limit-Based PRG[f]	
Th-232[h]		30	9.6		3,800	305	5[i]
U-233[h]		23	90		2,800	2,900	35[j]
U-234[h]		23	92		2,900	2,930	35[j]
U-235 + 1 daughter[h]		0.14	5.8		9	92	35[j]
U-238 + 2 daughters[h]		0.9	29		60	527	35[j]
INORGANICS (mg/kg)							
Aluminum[k]							
Ammonia							
Antimony	50			1,050			
Arsenic	130			780			
Barium	6400			183,000			
Beryllium	640	0.2		13,000	16	17	
Boron	11500			235,000			
Cadmium	130			2,600			
Chromium	640			13,000			
Cobalt	330			6,800			

TABLE B-3
PRELIMINARY REMEDIATION GOALS - SURFACE SOILS AND WASTE MATERIAL
RESIDENTIAL/RECREATIONAL LAND USE SCENARIO
SOIL INGESTION AND EXTERNAL RADIATION

Chemical	Future Land Use Residential			Future Land Use Recreational			Other ARARs/ TBCs[g]
	HI=0.20 R_fD-Based PRG[a]	10^{-6} Risk-Based PRG, above background[b]	Dose Limit-Based PRG[c]	HI=0.20 R_fD-Based PRG[d]	10^{-6} Risk-Based PRG, above background[e]	Dose Limit-Based PRG[f]	
Copper[j]							
Iron[j]							
Lead	90			1,800			
Magnesium[j]							
Manganese	12,800			262,000			
Mercury	40			780			
Molybdenum	510			13,000			
Nickel	2,600			52,000			
Nitrate[j]							
Selenium	640			13,000			
Silver	380			13,000			
Thallium	9			180			
Uranium	380			78,500			
Vanadium	900			18,300			
Zinc	25,600			523,000			
Cyanide	2,600			780			

TABLE B-3
PRELIMINARY REMEDIATION GOALS - SURFACE SOILS AND WASTE MATERIAL
RESIDENTIAL/RECREATIONAL LAND USE SCENARIO
SOIL INGESTION AND EXTERNAL RADIATION

Chemical	Future Land Use Residential			Future Land Use Recreational			Other ARARs/ TBCs[g]
	HI=0.20 R_fD-Based PRG[a]	10^{-6} Risk-Based PRG, above background[b]	Dose Limit-Based PRG[c]	HI=0.20 R_fD-Based PRG[d]	10^{-6} Risk-Based PRG, above background[e]	Dose Limit-Based PRG[f]	
ORGANICS (mg/kg)							
1,1,2-Trichloro-1,2,2-trifluoroethane	38,400			7,850,000			
1,1,2,2-Tetrachloroethane		4			690		
1,1,1-Trichloroethane	11,500			235,000			
1,1-Dichloroethane	12,800			262,000			
1,1-Dichloroethene	1,200	1		235,000	230		
1,2-Dichloroethane		8			1500		
1,2-cis-Dichloroethene	1,300			1,050			
1,2-trans-Dichloroethene	2,600			235,000			
1,4-Dioxane		60			12600		
2-Hexanone[j]							
2-Butanone	6,400			134,000			
2-Methylnaphthalene[j]							
2-Methylphenol[j]							
2-Methyl-4,6-Dinitrophenol[j]							
2-Nitrophenol[j]							

TABLE B-3
PRELIMINARY REMEDIATION GOALS - SURFACE SOILS AND WASTE MATERIAL
RESIDENTIAL/RECREATIONAL LAND USE SCENARIO
SOIL INGESTION AND EXTERNAL RADIATION

Chemical	Future Land Use Residential			Future Land Use Recreational			Other ARARs/ TBCs[g]
	HI=0.20 R_fD-Based PRG[a]	10^{-6} Risk-Based PRG, above background[b]	Dose Limit-Based PRG[c]	HI=0.20 R_fD-Based PRG[d]	10^{-6} Risk-Based PRG, above background[e]	Dose Limit-Based PRG[f]	
2,3,4,6-Tetrachlorophenol[j]							
2,4-Dimethylphenol	2,600			52,300			
3-Nitroaniline[j]							
4-Methyl-2-pentanone	6,400						
4-Methylphenol							
4-Nitrophenol[j]							
Acenaphthene	7,700			157,000			
Acenaphthylene[j]							
Acetone	12,800			262,000			
Aldrin					8.0		
Anthracene	38,400			785,000			
Aroclor-1242		0.09			18		10[i]
Aroclor-1248		0.09			18		10[i]
Aroclor-1254		0.09			18		10[i]
Aroclor-1260		0.09			18		10[i]
Benzene		200			4,800		

TABLE B-3
PRELIMINARY REMEDIATION GOALS - SURFACE SOILS AND WASTE MATERIAL
RESIDENTIAL/RECREATIONAL LAND USE SCENARIO
SOIL INGESTION AND EXTERNAL RADIATION

Chemical	Future Land Use Residential			Future Land Use Recreational			Other ARARs/ TBCs[g]
	HI=0.20 R_fD-Based PRG[a]	10^{-6} Risk-Based PRG, above background[b]	Dose Limit-Based PRG[c]	HI=0.20 R_fD-Based PRG[d]	10^{-6} Risk-Based PRG, above background[e]	Dose Limit-Based PRG[f]	
Benzo(a)anthracene[j]							
Benzo(a)pyrene		0.06			24		
Benzo(b)fluoranthene[j]							
Benzo(g,h,i)perylene[j]							
Benzo(k)fluoranthene[j]							
Benzoic acid	512,000			10,460,000			
Benzyl alcohol	38,400			785,000			
Bis(2-ethylhexyl)phthalate	2,600	50		52,000	9,900		
Bromochloromethane[j]							
Bromodichloromethane		5			1,100		
Butanol[j]							
Butyl benzyl phthalate	25,600			523,000			
Carbon disulfide	12,800			262,000			
Carbon tetrachloride	90	5		1,830	1,100		
Chlordane	8	0.5		160	100		
Chlorobenzene	2,600			523,000			

TABLE B-3
PRELIMINARY REMEDIATION GOALS - SURFACE SOILS AND WASTE MATERIAL
RESIDENTIAL/RECREATIONAL LAND USE SCENARIO
SOIL INGESTION AND EXTERNAL RADIATION

Chemical	Future Land Use Residential			Future Land Use Recreational			Other ARARs/ TBCs[g]
	HI=0.20 R_fD-Based PRG[a]	10^{-6} Risk-Based PRG, above background[b]	Dose Limit-Based PRG[c]	HI=0.20 R_fD-Based PRG[d]	10^{-6} Risk-Based PRG, above background[e]	Dose Limit-Based PRG[f]	
Chloroethane[j]							
Chloroform	1,300	100		26,000	22,800		
Chrysene							
Cyclohexane[j]							
DDT	60	2		1,300	400		
Di-n-butyl phthalate	12,800			262,000			
Di-n-octyl phthalate	2,600			52,000			
Dibenzo(a,h)anthracene[j]							
Dibenzofuran							
Diethylphthalate				2,000,000			
Dimethylphthalate							
Ethyl parathion[j]							
Ethylbenzene	1,300			262,000			
Fluoranthene	5,100			105,000			
Fluorene	5,100			105,000			
alpha-Hexachlorocyclohexane					20		

TABLE B-3
PRELIMINARY REMEDIATION GOALS - SURFACE SOILS AND WASTE MATERIAL
RESIDENTIAL/RECREATIONAL LAND USE SCENARIO
SOIL INGESTION AND EXTERNAL RADIATION

Chemical	Future Land Use Residential			Future Land Use Recreational			Other ARARs/ TBCs[g]
	HI=0.20 R_fD-Based PRG[a]	10^{-6} Risk-Based PRG, above background[b]	Dose Limit-Based PRG[c]	HI=0.20 R_fD-Based PRG[d]	10^{-6} Risk-Based PRG, above background[e]	Dose Limit-Based PRG[f]	
Vinyl chloride		0.04			70		
Xylenes (total)	260			5,232,000			

[a] PRG developed using equation and parameters for soil ingestion and chemical-specific RfDs from Health Effect Assessment Summary Tables (HEAST) (EPA 1992a) and Integrated Risk Information System (IRIS) (EPA 1992b).
[b] PRG developed using equation and chemical-specific SFs from HEAST and IRIS.
[c] PRG based on 100 mrem dose limit for exposures to the general public (10CFR20) and a CEDE DCFs from EPA (1988b). The calculated dose-based PRG has been divided by 100 to account for the fact that the 100 mrem limit is for all exposures, while the PRG is for a single exposure pathway and radionuclide. Exposure pathways and parameters are the same as those used for risk-based residential PRGs.
[d] PRGs developed using parameters for recreational exposures and HEAST.
[e] PRGs developed using parameters for recreational exposures and HEAST and IRIS.
[f] PRG based on 100 mrem dose limit for exposures to the general public (10CFR20) and a CEDE DCFs from EPA (1988b). The calculated dose-based PRG has been divided by 100 to account for the fact that the 100 mrem limit is for all exposures, while the PRG is for a single exposure pathway and radionuclide. Exposure pathways and parameters are the same as those used for risk-based recreational PRGs.
[g] First 15 cm depth (40CFR192).
[h] The methodology used to calculate PRGs results in different values for different isotopes of a given radionuclide. In most cases, this is due to differences in external dose rate factors among isotopes. The lowest value calculated for a given radionuclide will drive the choice of the PRG used in design of remedial alternatives.
[i] First 15 cm depth (DOE Order 5400.5).
[j] Based on Nuclear Regulatory Commission Branch Technical Position on "Disposal or On-site Storage of Residual Thorium or Uranium (either as natural ores or without daughters present) from Past Operations."
[k] No toxicity data available to develop a PRG.

TABLE B-4
PRELIMINARY REMEDIATION GOALS FOR SURFACE WATER BASED ON PROTECTION OF AQUATIC SPECIES

Chemical	ARAR/TBC-Based PRGs		Other Considerations	
	Federal Ambient Water Quality Criteria[a] (acute/chronic) (mg/ℓ)	Ohio State Water Quality Standards[b] (maximum/30-day average) (mg/ℓ)	Background Upper Tolerance Limit[c] (mg/ℓ)	Contract Required Detection Limit[d] (mg/ℓ)
INORGANICS				
Antimony	9/1.6(*)	0.65/0.19		0.06
Arsenic	0.36/.19(*)	0.36/0.19		0.01
Beryllium	0.13/0.0053(*)	3.75/0.17		0.005
Cadmium	0.0039/0.0011(+)	0.02/0.02	0.0002	0.005
Chromium	1.7/0.210	4.92/0.46	0.027	0.01
Copper	0.018/0.012(+)	0.06/0.04	0.01	0.025
Iron	- / 1.0		1.30	0.1
Lead	0.082/0.0032(+)	0.63/0.03	0.002	0.005
Mercury	0.0024/0.000012	0.001/0.0002		0.0002
Nickel	1.4/0.16(+)	4.51/0.50	0.036	0.04
Selenium	0.28/0.036	0.02/0.005		0.005
Silver	0.0041/0.00012(+)	0.01		0.01
Thallium	1.4/0.04(*)			0.01
Zinc	0.12/0.11(+)	0.33/0.30	0.014	0.02
Cyanide	0.022/0.0052	0.046/0.012 (E)		0.01
ORGANICS				
1,1,2-Trichloro-1,2,2-trifluoroethane	2.4/9.02(*)			
1,1,2,2-Tetrachloroethane		1/0.36		
1,1,1-Trichloroethane	31.2/ - (*)	2/0.088		0.005
1,1-Dichloroethene	11.6/ - (*)	1.5/0.078		0.005
1,2-Dichloroethane	118/20(*)	12/3.5		0.005
1,2-cis-Dichloroethene	11.6/ - (*)			
1,2-trans-Dichloroethene	11.6/ - (*)			0.005

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TABLE B-4
PRELIMINARY REMEDIATION GOALS FOR SURFACE WATER BASED ON PROTECTION OF AQUATIC SPECIES

Chemical	ARAR/TBC-Based PRGs		Other Considerations	
	Federal Ambient Water Quality Criteria[a] (acute/chronic) (mg/ℓ)	Ohio State Water Quality Standards[b] (maximum/30-day average) (mg/ℓ)	Background Upper Tolerance Limit[c] (mg/ℓ)	Contract Required Detection Limit[d] (mg/ℓ)
2,4-Dimethylphenol	2.12/-(*)			0.01
Acenaphthene	1.7/0.52(*)	0.067/0.067		0.01
Acetone		0.55/0.078		0.01
Aroclor-1242	0.002/0.000014	- /0.001		0.0005
Aroclor-1248	0.002/0.000014	- /0.001		0.0005
Aroclor-1254	0.002/0.000014	- /0.001		0.001
Aroclor-1260	0.002/0.000014	- /0.001		0.001
Benzene	5.3/ - (*)	1.1/0.56		0.005
Bis(2-ethylhexyl)phthalate		1.1/0.0084		0.01
Butyl benzyl phthalate		0.23/0.049		0.01
Carbon Tetrachloride	35.2/ - (*)	1.8.0.28		0.005
Chlordane	0.0024/0.0000043	0.00001/0.0000048		0.0005
Chlorobenzene	0.25/0.05(*)	0.59/0.026		0.005
Chloroform	28.9/1.24(*)	1.8.0.079		0.005
DDT	0.0011/0.000001	0.000001/0.00000024		
Di-n-butyl Phthalate		0.35/0.19		0.01
Ethylbenzene	32/ - (*)	1.4/0.062		0.005
Fluoranthene	3.9/ - (*)	0.2/0.0089		0.01
beta-Hexachlorocyclohexane	0.002/0.00008	- /0.00055		0.00005
Methylene Chloride		9.7/0.43		0.005
N-nitrosodiphenylamine		0.29/0.013		0.01
Naphthalene	2.3/0.620	0.16/0.044		0.01
Pentachlorophenol	0.02/0.013(++)	0.04/0.02		0.05
Phenol	10.2/2.5(*)	5.3/0.37 (E)		0.01

TABLE B-4
PRELIMINARY REMEDIATION GOALS FOR SURFACE WATER BASED ON PROTECTION OF AQUATIC SPECIES

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Chemical	ARAR/TBC-Based PRGs		Other Considerations	
	Federal Ambient Water Quality Criteria[a] (acute/chronic) (mg/ℓ)	Ohio State Water Quality Standards[b] (maximum/30-day average) (mg/ℓ)	Background Upper Tolerance Limit[c] (mg/ℓ)	Contract Required Detection Limit[d] (mg/ℓ)
Tetrachloroethene	5.28/0.84(*)	0.54/0.073		0.005
Toluene	17.5/	2.4/1.7		0.005
Trichloroethene	46/21.9(*)	0.0 1.7/0.075		
Vinyl Chloride	0.002	/5.25		0.01
Xylenes (total)	10			0.005

[a] Federal ambient water quality criteria from "Quality Criteria for Water 1986" (EPA, 1986b). Values are for freshwater species. Footnotes as listed in EPA (1986b) include: (*) - hardness dependent criteria (100 mg/ℓ used); (+) - insufficient data to develop criteria, value presented is the LOEL (Lowest Observed Effect Level; (++) - pH dependent criteria (7.8 pH used).

[b] Numerical criteria from Ohio Water Quality Standards, Chapter 3745-1 of the Ohio Adminstrative Code. Values are for modified warm water habitats unless noted by (E), which represent "exceptional" warm water habitat.

[c] Ohio EPA data from the Great Miami River (Ohio Environmental Protection Agency, 1989, "Great Miami River Intensive Stream Survey").

[d] From CLP Statement of Work 3900LM01.08.

APPENDIX C

PLANT 1 PAD REMOVAL ACTION DATA

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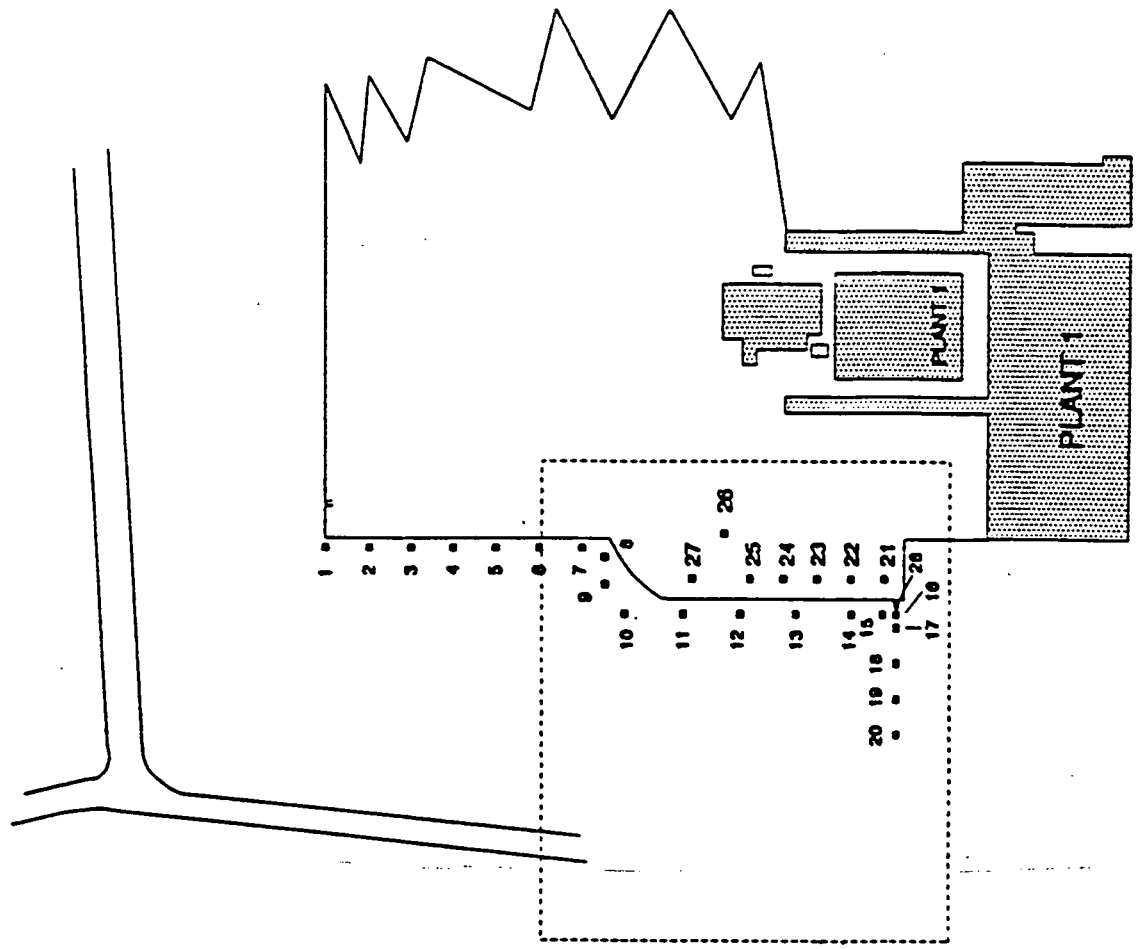

FIGURE 2

PLANT 1 STORAGE PAD

SOIL SAMPLING

ADDITIONAL SOIL SAMPLING PERFORMED IN THIS AREA (SEE FIGURE 3)

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TABLE A-1
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

RCRA METALS

----- Sample ------ Location	Depth	Total Ag (ug/g)	Total As (ug/g)	Total Ba (ug/g)	Total Cd (ug/g)	Total Cr (ug/g)	Total Hg (ug/g)	Total Pb (ug/g)	Total Se (ug/g)
1	0	I	I	I	I	I	I	22.80	I
	1	I	I	I	I	I	I	22.10	I
	2	I	I	I	I	I	I	57.00	I
2	0	< 1	5.00	55.00	< 0.2	7.20	< 0.1	61.30	< 0.1
	1	< 1	4.50	55.50	< 0.2	7.30	< 0.1	39.30	< 0.1
	2	< 1	4.50	75.50	< 0.2	7.70	< 0.1	120.00	< 0.1
3	0	< 1	6.20	69.50	< 0.2	12.30	< 0.1	55.40	< 0.1
	1	< 1	6.50	79.50	< 0.2	9.30	< 0.1	49.60	< 0.1
	2	< 1	4.40	59.00	< 0.2	7.20	< 0.1	8.85	< 0.1
4	0	< 1	4.84	88.10	0.75	11.90	< 0.1	41.80	R
	1	< 1	1.94	84.80	0.30	8.73	< 0.1	15.30	R
	2	< 1	5.72	58.40	< 0.2	8.74	< 0.1	11.50	R
5	0	< 1	5.11	80.00	0.20	8.70	< 0.1	21.40	R
	1	< 1	4.66	55.70	0.20	7.17	< 0.1	10.50	R
	2	< 1	4.36	59.40	< 0.2	7.83	< 0.1	9.90	R
6	0	< 1	6.15	102.00	0.25	11.20	< 0.1	109.70	< 0.1
	1	< 1	7.02	70.40	1.15	7.94	< 0.1	16.10	R
	2	< 1	4.51	117.90	0.80	11.70	< 0.1	12.00	R
7	0	< 1	7.19	104.50	0.55	10.00	< 0.1	22.60	R
	1	< 1	8.09	84.90	0.45	9.39	< 0.1	12.30	R
	2	< 1	6.23	78.20	0.30	6.38	< 0.1	11.50	R
8	0	< 1	8.46	127.60	0.35	6.83	< 0.1	32.50	R
	1	< 1	6.88	115.60	< 0.2	5.53	< 0.1	16.60	R
	2	< 1	4.65	94.20	0.25	6.18	< 0.1	13.80	R
9	0	< 1	6.78	42.90	0.20	2.75	< 0.1	20.90	R
	1	< 1	5.81	93.60	0.30	5.68	< 0.1	14.60	R
	2	< 1	5.58	67.40	< 0.20	4.54	< 0.1	126.70	< 0.1
10	0	< 1	4.41	51.30	0.25	3.29	< 0.1	7.97	R
	1	< 1	6.79	82.90	0.20	6.40	< 0.1	12.70	R
	2	< 1	0.76	39.00	< 0.20	1.45	< 0.1	6.69	R
11	0	< 1	4.04	87.40	1.10	9.64	< 0.1	22.20	< 0.10
	1	< 1	5.55	124.30	0.25	12.00	< 0.1	26.00	< 0.10
	2	< 1	4.14	82.80	0.30	10.70	< 0.1	18.00	< 0.10
12	0	< 1	3.38	46.10	0.40	7.49	< 0.1	21.00	< 0.10
	1	< 1	5.39	85.00	0.20	10.40	0.10	21.90	< 0.10
	2	< 1	4.78	174.60	0.60	12.20	< 0.1	16.90	< 0.10
13	0	< 1	4.35	68.90	0.45	9.59	< 0.1	31.90	< 0.10
	1	< 1	4.14	98.10	0.25	10.90	< 0.1	15.50	< 0.10
	2	< 1	4.84	85.40	< 0.20	10.30	< 0.1	17.30	< 0.10
14	0	< 1	3.04	73.90	< 0.20	6.05	< 0.1	33.30	< 0.10
	1	< 1	5.96	170.30	0.50	11.20	< 0.1	18.40	< 0.10
	2	< 1	5.44	102.20	0.75	12.60	< 0.1	21.20	< 0.10
15	0	< 1	6.75	136.00	0.45	8.55	< 0.1	24.80	< 0.10
	1	< 1	8.12	120.00	0.20	10.00	< 0.1	15.80	< 0.10
	2	< 1	4.84	98.00	0.20	8.25	< 0.1	13.70	< 0.10

TABLE A-1
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

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RCRA METALS

Sample Location	Sample Depth	Total Ag (ug/g)	Total As (ug/g)	Total Ba (ug/g)	Total Cd (ug/g)	Total Cr (ug/g)	Total Hg (ug/g)	Total Pb (ug/g)	Total Se (ug/g)
16	0	< 1	5.82	67.50	< 0.20	6.95	< 0.1	18.80	< 0.10
	1	< 1	7.00	73.50	2.40	9.30	< 0.1	15.40	0.16
	2	< 1	7.20	84.00	2.20	11.20	< 0.1	14.40	0.10
17	0	< 1	6.20	81.00	1.55	14.30	< 0.1	72.00	0.25
	1	< 1	7.02	73.00	1.10	9.95	< 0.1	16.20	< 0.10
	2	5.80	6.96	100.50	0.95	10.30	< 0.1	13.40	0.10
18	0	< 1	6.49	87.50	1.25	10.60	< 0.1	71.50	0.19
	1	I	I	I	I	I	I	I	I
	2	I	I	I	I	I	I	I	I
19	0	< 1	4.72	71.50	0.60	7.00	< 0.1	43.60	< 0.10
	1	< 1	5.46	75.50	0.45	7.35	< 0.1	42.60	< 0.10
	2	< 1	3.42	130.00	0.20	9.40	< 0.1	14.40	< 0.10
20	0	< 1	3.20	52.00	0.30	8.05	< 0.1	42.00	< 0.10
	1	< 1	3.89	57.50	0.40	9.00	< 0.1	41.60	< 0.10
	2	< 1	8.93	43.60	0.30	6.35	< 0.1	25.60	< 0.10
21	0	< 1	6.46	74.50	0.35	5.75	< 0.1	53.50	0.29
	1	< 1	6.37	101.00	0.25	8.40	< 0.1	53.50	0.10
	2	< 1	4.34	71.00	0.20	7.30	< 0.1	9.45	< 0.10
22	0	< 1	6.26	236.00	0.20	6.65	< 0.1	14.40	< 0.10
	1	< 1	4.99	108.00	0.20	7.50	< 0.1	11.60	0.13
	2	< 1	3.25	75.00	0.25	7.95	< 0.1	13.80	0.16
23	0	< 1	4.32	1080.00	0.30	6.70	< 0.1	9.30	< 0.10
	1	< 1	4.95	186.00	0.20	7.40	< 0.1	17.80	0.14
	2	< 1	4.49	74.00	<.20	7.20	< 0.1	14.40	< 0.10
24	0	< 1	3.65	114.50	<.20	8.60	< 0.1	11.20	< 0.10
	1	< 1	4.34	61.50	0.35	9.55	< 0.1	9.90	< 0.10
	2	< 1	3.76	45.80	<.20	8.10	< 0.1	9.15	< 0.10
25	0	< 1	4.19	83.00	<.20	11.30	< 0.1	9.25	< 0.10
	1	< 1	7.64	92.50	0.20	12.10	< 0.1	15.00	< 0.10
	2	< 1	4.80	32.40	<.20	7.70	< 0.1	12.20	< 0.10
26	0	< 1	4.92	103.50	<.20	8.45	< 0.1	11.50	< 0.10
	1	< 1	5.40	67.50	<.20	9.70	< 0.1	11.10	< 0.10
	2	< 1	4.82	74.00	<.20	11.40	< 0.1	11.10	< 0.10
27	0	< 1	3.62	124.50	<.20	20.00	< 0.1	32.00	< 0.10
	1	< 1	5.68	101.00	<.20	14.10	< 0.1	15.10	< 0.10
	2	< 1	5.20	97.00	<.20	12.10	< 0.1	13.40	< 0.10
28	0	< 1	< 1	91.50	0.90	14.70	< 0.1	83.00	< 0.10
	1	< 1	< 1	103.00	0.40	12.00	< 0.1	69.80	0.14
	2	< 1	5.86	76.50	0.20	8.60	0.10	10.13	0.10

I = Analysis Incomplete
N = Not Analyzed
R = Instrumentation problem - will have to be resampled and reanalyzed.

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TABLE A-2
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

Sample Location	Depth	E. P. TOXICITY E.P. Tox. Ag (mg/l)	E.P. Tox. As (mg/l)	E.P. Tox. Ba (mg/l)	E.P. Tox. Cd (mg/l)	E.P. Tox. Cr (mg/l)	E.P. Tox. Hg (mg/l)	E.P. Tox. Pb (mg/l)	E.P. Tox. Se (mg/l)
1	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
2	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
3	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
6	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
11	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
12	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
13	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
14	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
15	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
16	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
17	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
18	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
19	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
20	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1

TABLE A-3
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

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ORGANICS

SAMPLE Loctn	Depth	Acetone (ug/Kg)	Qual	Methylene Chloride (ug/Kg)	Qual	Xylene (ug/Kg)	Qual	Carbon Disulfide (ug/Kg)	Qual	UNKNOWNS
1	0 --	A		A		A		A		
	1 --	A		A		A		A		
	2 --	A		A		A		A		
4	0 --	13	U	7	U	7	U	7	U	
	1 --	4	J	38		6	U	6	U	
	2 --	12	U	20		6	U	6	U	
5	0 --	8	J	26		7	U	7	U	
	1 --	36	B	5	U	1	J	5	U	2 ? 7J,9J
	2 --	54	B	5	U	2	J	5	U	4 ? 15J,8J,8J,7J
6	0 --	57	B	5	U	4	J	5	U	
	1 --	24	B	5	U	0.9	J	5	U	2 ? 10J,13J
	2 --	29	B	5	U	1	J	5	U	
7	0 --	28	B	5	U	2	J	2	J	2 ? 12J,15J
	1 --	95	B	5	U	2	J	5	U	2 ? 8J,38J
	2 --	27	B	5	U	2	J	5	U	
8	0 --	57	B	5	U	1	J	5	U	
	1 --	12	B	2	JB	5	U	5	U	
	2 --	14	B	5	U	5	U	5	U	
9	0 --	21	B	3	JB	5	U	5	U	
	1 --	16	B	3	JB	5	U	5	U	
	2 --	18	B	3	JB	5	U	5	U	3 ? 5J,14J,23J
10	0 --	32	B	4	JB	5	U	12		
	1 --	31	B	7	B	5	U	5	U	
	2 --	20	B	7	B	5	U	5	U	
11	0 --	41	B	3	JB	1	JB	5	U	
	1 --	160	B	3	JB	12	B	5	U	
	2 --	52	B	3	JB	20	B	5	U	
12	0 --	5	JB	3	JB	55	B	5	U	
	1 --	140	B	3	JB	7	B	5	U	
	2 --	950	BE	4	JB	27	B	5	U	
13	0 --	22	B	4	JB	7	B	5	U	ETHANOL 15J
	1 --	150	B	3	JB	5	U	5	U	
	2 --	49	B	2	JB	3	JB	5	U	
14	0 --	62	B	1	JB	7	B	5	U	
	1 --	12	B	2	JB	5	U	5	U	
	2 --	8	JB	3	JB	8		5	U	
15	0 --	40	B	3	JB	15		5	U	
	1 --	19	B	5	U	18		5	U	
	2 --	22	B	3	JB	10		5	U	
16	0 --	120	B	3	JB	6		5	U	
	1 --	7	JB	3	JB	3	J	5	U	
	2 --	18	B	26		4	JB	5	U	
17	0 --	57	B	4	JB	2	JB	5	U	4 ? 12J,4J,10J,10J
	1 --	24	B	9		3	JB	5	U	
	2 --	22	B	40		5	JB	5	U	
18	0 --	26	B	15		3	JB	5	U	1? 17J
	1 --	22	B	9		3	JB	11		2 ? 120J,18J
	2 --	7	JB	7		3	JB	5	J	1 ? 10J
19	0 --	8	JB	2	JB	5	U	5	U	
	1 --	18	B	2	JB	5	U	5	U	
	2 --	14	B	5	U	5	U	5	U	

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TABLE A-3
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

ORGANICS

SAMPLE Loctn	Depth	Acetone (ug/Kg)	Qual	Methylene Chloride (ug/Kg)	Qual	Xylene (ug/Kg)	Qual	Carbon Disulfide (ug/Kg)	Qual	UNKNOWNS
20	0 --	13	B	2	B	18		5	U	
	1 --	28	B	2	JB	5	U	5	U	
	2 --	14	B	2	JB	10		5	U	
21	0 --	R		R		R		R		
	1 --	R		R		R		R		
	2 --	R		R		R		R		
22	0 --	R		R		R		R		
	1 --	R		R		R		R		
	2 --	R		R		R		R		
23	0 --	R		R		R		R		
	1 --	R		R		R		R		
	2 --	R		R		R		R		
24	0 --									
	1 --									
	2 --									
25	0 --									
	1 --									
	2 --									
26	0 --									
	1 --									
	2 --									
27	0 --									
	1 --									
	2 --									
28	0 --									
	1 --									
	2 --									

U = Not detected. Quantitation limit is listed.

J = Estimated value below quantitation limit.

B = Compound was detected in both the sample and it's associated blank

E = Concentration of the compound exceeded the calibration range of of the instrument.

R = Has been resampled. Original samples analyzed by Enwright Labs reported low limits 125x

A = Has been resampled. Initial samples analyzed by Oak Ridge National Labs reported low

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TABLE A-4
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

Sample Location	Depth	RADIONUCLIDES Pu-238 (pCi/g)	Pu-239 (pCi/g)	Ra-226 (pCi/g)	Ra-228 (pCi/g)	Total Th (ppm)	Calc. Th (pCi/g)	Th-228 (pCi/g)	Total U (ppm)	Calc. U (pCi/g)	U-235 (wt. %)
1	0	N	N	N	N	I	I	I	I	I	I
	1	N	N	N	N	I	I	I	I	I	I
	2	N	N	N	N	I	I	I	I	I	I
2	0	N	N	N	N	<18	9.9	3.8	138	83	0.53
	1	N	N	N	N	<18	13.0	6.9	66	38	0.47
	2	N	N	N	N	<18	6.0	3.3	36	21	0.50
3	0	N	N	N	N	<18	23.0	7.0	1220	920	0.92
	1	N	N	N	N	<18	18.0	5.3	338	220	0.64
	2	N	N	N	N	<18	12.0	6.2	61	37	0.56
4	0	<.3	<.2	3.7	<.92	<18	17.0	3.3	364	200	0.39
	1	I	I	N	N	<18	25.0	6.5	157	87	0.41
	2	I	I	N	N	<18	9.4	5.4	28	15	0.38
5	0	N	N	N	N	21	49.0	6.6	435	250	0.47
	1	N	N	N	N	<23	7.3	2.3	25	15	0.56
	2	N	N	N	N	<23	3.4	1.3	<11	<7.0	0.62
6	0	N	N	N	N	44	100.0	7.3	606	410	0.71
	1	N	N	N	N	<23	<9.5	<2.4	39	16	0.70
	2	N	N	N	N	<23	<9.0	<2.3	15	10	0.69
7	0	N	N	N	N	26	<9.4	<2.3	164	110	0.70
	1	N	N	N	N	<23	11.0	2.2	118	79	0.70
	2	N	N	N	N	<23	<9.4	<2.4	11	7.1	0.65
8	0	0.66	<0.20	3.3	1.9	<23	7.9	2.8	70	45	0.63
	1	0.61	<0.20	N	N	<23	7.9	4.1	26	16	0.57
	2	<0.30	<0.20	N	N	<23	9.5	5.1	<11	<7.0	0.61
9	0	N	N	N	N	<23	16.0	6.4	40	26	0.64
	1	N	N	N	N	<23	9.9	5.3	34	23	0.73
	2	N	N	N	N	<23	8.4	3.5	13	8.8	0.73
10	0	N	N	N	N	29	17.0	4.8	184	120	0.68
	1	N	N	N	N	<23	12.0	7.2	24	17	0.75
	2	N	N	N	N	<23	9.4	6.2	<11	<7.4	0.72
11	0	N	N	N	N	<23	18.0	7.4	274	180	0.64
	1	N	N	N	N	<18	12.0	6.4	23	15	0.68
	2	N	N	N	N	<18	5.0	2.3	<11	7.3	0.69
12	0	<0.30	0.35	3.0	2.4	<18	15.0	4.1	133	88	0.68
	1	<.0.30	<0.20	N	N	<18	5.2	2.5	58	40	0.74
	2	<0.30	<0.20	N	N	<18	5.4	2.8	37	25	0.71
13	0	N	N	N	N	<18	20.0	5.5	323	190	0.51
	1	N	N	N	N	<18	10.0	3.7	132	83	0.60
	2	N	N	N	N	<18	5.9	2.8	44	27	0.57
14	0	N	N	N	N	27	20.0	6.5	419	270	0.63
	1	N	N	N	N	<18	14.0	3.3	110	74	0.71
	2	N	N	N	N	<18	9.3	4.6	26	17	0.67
15	0	N	N	N	N	94	18.0	5.4	345	210	0.54
	1	N	N	N	N	25	19.0	7.4	122	81	0.69
	2	N	N	N	N	<18	10.0	4.6	24	16	0.71
16	0	0.48	0.23	1.1	1.7	<18	9.3	3.8	34	34	0.74
	1	0.76	0.33	N	N	<18	14.0	6.0	70	49	0.78
	2	e.3	<.2	N	N	<18	9.5	5.1	25	18	0.79
17	0	N	N	N	N	37	240.0	9.7	375	270	0.85
	1	N	N	N	N	<18	17.0	7.4	86	59	0.74
	2	N	N	N	N	<18	7.6	3.5	12	8.2	0.75
18	0	N	N	N	N	31	75.0	6.0	414	310	0.90
	1	N	N	N	N	<18	14.0	4.0	123	91	0.88
	2	N	N	N	N	<18	11.0	4.1	32	24	0.88
19	0	N	N	N	N	18	48.0	4.8	294	230	0.96
	1	N	N	N	N	<18	21.0	4.2	122	89	0.87
	2	N	N	N	N	<18	8.6	4.2	16	12	0.85
20	0	<.3	<.2	16	2.2	<18	40.0	4.4	152	120	0.99
	1	<.3	<.2	N	N	<18	28.0	4.5	115	88	0.95
	2	e.3	<.2	N	N	<18	12.0	5.6	19	14	0.85
21	0	N	N	N	N	<18	23.0	3.2	553	380	0.73
	1	N	N	N	N	<18	8.1	3.8	68	46	0.72
	2	N	N	N	N	<18	8.0	4.6	11	7.4	0.72

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TABLE A-4
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

Sample Location	Depth	RADIONUCLIDES Pu-238 (pCi/g)	Pu-239 (pCi/g)	Ra-226 (pCi/g)	Ra-228 (pCi/g)	Total Th (ppm)	Calc. Th (pCi/g)	Th-228 (pCi/g)	Total U (ppm)	Calc. U (pCi/g)	U-235 (wt. %)
22	0	N	N	N	N	18	8.2	4.4	187	130	0.83
	1	N	N	N	N	<18	11.0	5.0	18	11	0.58
	2	N	N	N	N	<18	5.6	3.2	<11	<7.5	0.73
23	0	N	N	N	N	<18	8.3	4.0	91	57	0.58
	1	N	N	N	N	<18	9.7	5.0	20	14	0.72
	2	N	N	N	N	<18	10.0	5.2	<11	<7.6	0.76
24	0	<.3	<.2	0.39	3.1	<18	6.5	1.6	318	210	0.67
	1	<0.14	0.11	N	N	<18	6.2	2.3	<11	<7.6	0.76
	2	<0.14	<0.10	N	N	<18	5.1	1.9	<11	<7.3	0.70
25	0	N	N	N	N	<18	9.2	5.2	209	140	0.66
	1	N	N	N	N	<18	7.8	3.9	29	19	0.66
	2	N	N	N	N	<18	9.9	5.3	11	7.3	0.69
26	0	N	N	N	N	18	16.0	6.2	152	100	0.67
	1	N	N	N	N	<18	8.8	4.0	15	10	0.72
	2	N	N	N	N	<18	12.0	5.8	<11	<7.4	0.71
27	0	N	N	N	N	<18	9.9	5.1	959	630	0.66
	1	N	N	N	N	<18	12.0	6.7	25	17	0.69
	2	N	N	N	N	<18	7.4	2.6	<11	<8.4	0.94
28	0	1.5	0.49	75	11	113	160.0	15.0	813	560	0.76
	1	0.28	<0.14	N	N	27	37.0	6.3	210	140	0.69
	2	<0.23	<0.14	N	N	<18	6.6	3.4	11	7.3	0.73

FIGURE 3

ADDITIONAL SOIL SAMPLING

● SURFACE SAMPLE + 18 DEPTH SAMPLE

XXX / YYY = SURFACE SAMPLE NO / 18 DEPTH SAMPLE NO.

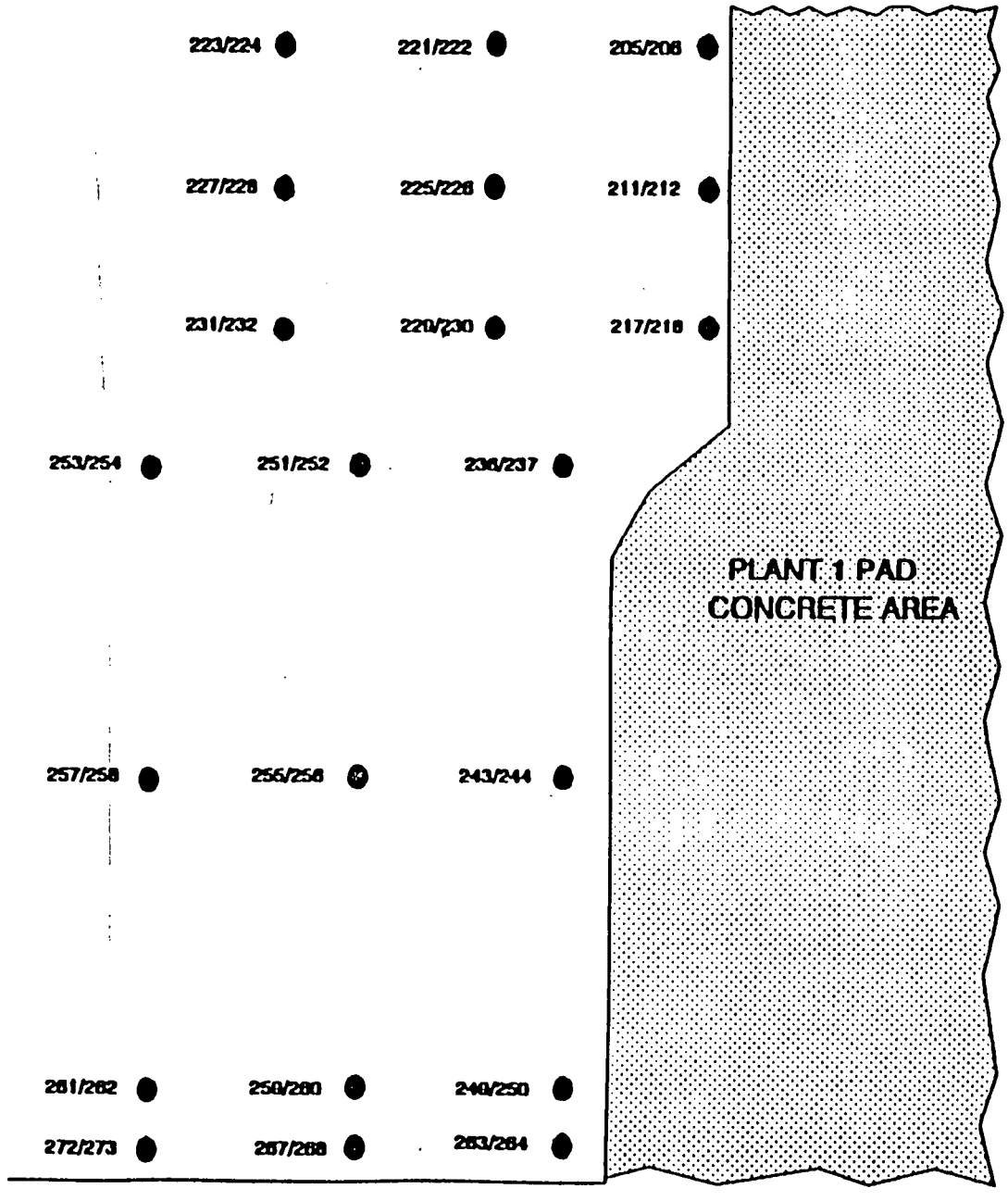

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TABLE A-5

CONTROLLED STORAGE PAD, PLANT 1
ANALYTICAL RESULTS

SAMPLE NUMBER	TOTAL U(ppm)	TOTAL Th(ppm)	U pCi/g	Th pCi/g	Th-228 pCi/g	WEIGHT % (U) U-234	U-235	U-236	U-238
205	46	<23	28.0	<3.5	1.0	0.004	0.52	0.005	99.47
206	30	<23							
207	51	<23	31.0	<4.5	2.0	0.002	0.55	0.001	99.45
208	115	<23	69.0	<6.4	3.9	0.001	0.52	0.005	99.47
209	278	29	160.0	4.9	1.8	0.002	0.45	0.005	99.54
210	751	32	530.0	5.7	2.3	0.005	0.80	0.014	99.18
211	751	26	380.0	6.3	3.5	0.005	0.29	0.005	99.70
212	305	<45							
213	2460	25	1400.0	<7.9	3.1	0.007	0.45	0.005	99.54
214	238	28	140.0	6.5	3.8	0.004	0.48	0.008	99.51
215	245	28	160.0	7.2	4.2	0.001	0.60	0.001	99.40
216	216	45	140.0	5.7	2.7	0.007	0.68	0.006	99.31
217	649	<23	440.0	8.2	3.4	0.002	0.72	0.004	99.27
218	83	29							
219	326	32	220.0	6.1	3.0	0.005	0.70	0.004	99.29
220	471	40	300.0	5.9	2.5	0.004	0.62	0.004	99.37
221	596	<23	430.0	7.2	2.9	0.005	0.82	0.005	99.17
222	39	<23							
223	49	<23	33.0	<3.8	1.3	0.008	0.70	0.013	99.28
224	45	<23							
225	57	<23	35.0	<4.1	1.6	0.004	0.55	0.007	99.44
226	20	<23							
227	60	<23	41.0	<4.3	1.8	0.008	0.59	0.010	99.39
228	31	<23							
229	86	<23	50.0	<3.9	1.4	0.002	0.47	0.005	99.52
230	19	<23							
231	40	<23	26.0	<3.4	0.9	0.008	0.65	0.009	99.33
232	15	<23							
233	71	<23	44.0	<3.7	1.2	0.001	0.59	0.005	99.40
234	133	23	87.0	4.4	1.9	0.004	0.66	0.005	99.33
235	101	<23	66.0	<4.1	1.6	0.004	0.65	0.008	99.34
236	150	39	98.0	8.6	4.4	0.008	0.66	0.011	99.32
237	35	<23							
238									
239	3840	<45	2500.0	<7.9	3.1	0.005	0.65	0.007	99.34
240	72	<23	48.0	3.9	0.9	0.010	0.71	0.010	99.27
241	39	<23	25.0	4.4	0.9	0.002	0.63	0.005	99.36
242	204	24	150.0	7.0	2.1	0.005	0.87	0.007	99.12
243	130	24	86.0	10.2	1.4	0.003	0.69	0.003	99.30
244	106	<23							
245	83	<23	58.0	7.3	1.5	0.001	0.68	0.003	99.32
246	250	35	150.0	11.7	3.4	0.002	0.49	0.007	99.50
247	404	325	240.0	90.3	30.4	0.002	0.52	0.006	99.47
248	278	184	170.0	36.3	14.2	0.007	0.60	0.011	99.38
249	316	42	230.0	14.6	2.8	0.006	0.86	0.007	99.13
250	63	24							
251	88	24	53.0	9.8	1.1	0.005	0.54	0.005	99.45
252	16	<23							
253	87	<23	55.0	8.0	1.1	0.005	0.61	0.005	99.38
254	41	<23							
255	43	<23	28.0	5.1	1.1	0.005	0.68	0.007	99.31
256	16	<23							
257	65	<23	43.0	<2.1	<.7	2.000	0.70	0.007	97.29
258	29	<23							
259	182	26	130.0	16.1	1.4	0.007	0.85	0.008	99.14
260	48	<23							
261	133	<23	100.0	15.5	1.7	0.005	0.92	0.007	99.07
262	24	<23							
263	358	41	260.0	33.1	3.2	0.005	0.82	0.006	99.17
264	107	24							
265	347	35	260.0	30.3	2.8	0.008	0.91	0.004	99.08
266	467	39	350.0	49.1	2.9	0.007	0.91	0.007	99.08
267									
268	365	30	270.0	26.5	1.9	0.005	0.92	0.005	99.07
269	102	<23							
270	266	<23	210.0	29.9	1.4	0.009	0.99	0.006	99.00
271	89	<23	67.0	<4.0	1.5	0.002	0.93	0.003	99.06
272	219	25	170.0	5.1	2.4	0.008	0.93	0.006	99.06
273	53	<23							

PLANT 1 STORAGE PAD

FIGURE 4

UNDER-PAD SAMPLING LOCATIONS

FT.	FT - IN EAST	FT - IN NORTH
1	234	25 - 0
2	245 - 0	25 - 0
3	257 - 4	25 - 0
4	270	25 - 0
5	281 - 0	25 - 0
6	306 - 3	25 - 0
7	331 - 3	25 - 0
9	200	54 - 7
8	200	31 - 0
10	200	23 - 0
11	331 - 3	5 - 0

FT.	FT - IN EAST	FT - IN SOUTH
12	175	7
13	151	12 - 5
14	140	30 - 5
15	118	33
16	118	18 - 0
17	80	24
18	77	22
19	80	13 - 0
20	60	18 - 4
21	50	36 - 7
22	35	34 - 0
23	38	54 - 0

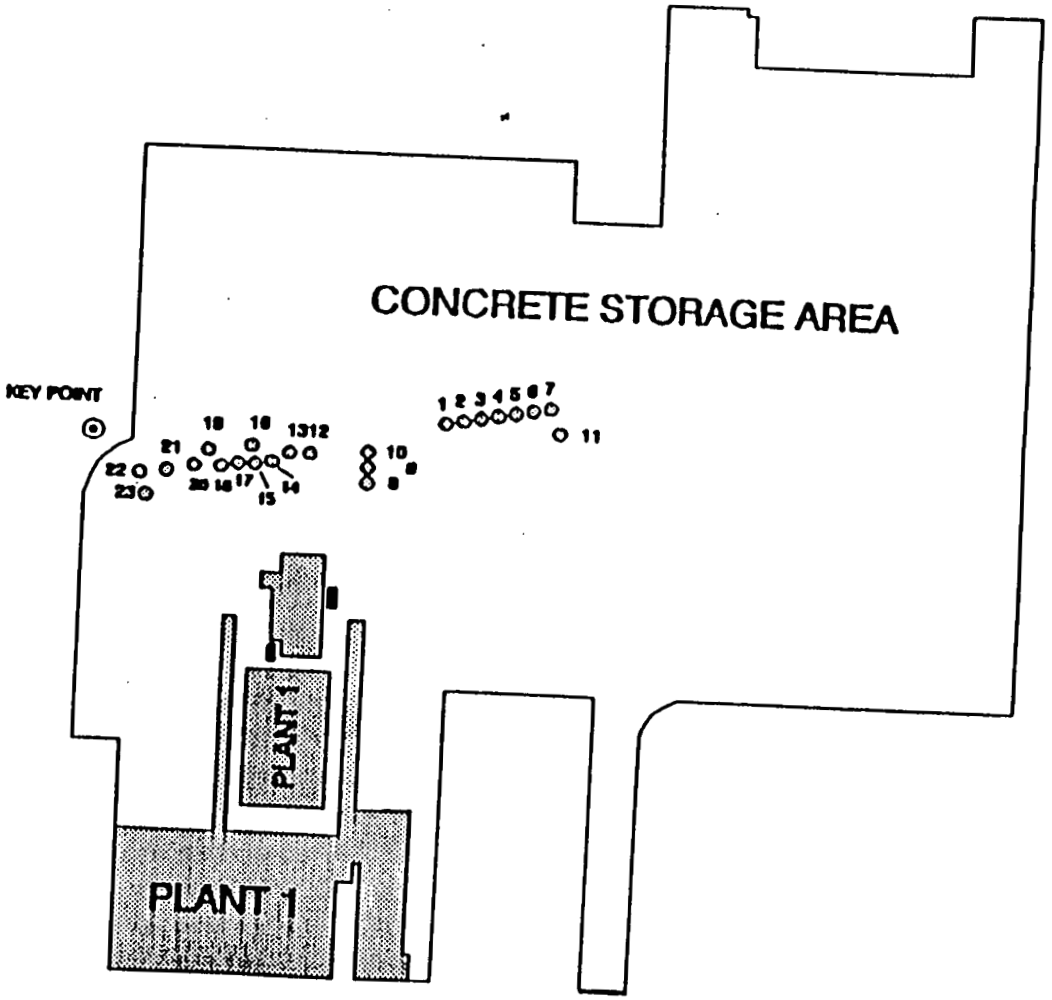

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Table A-6

Thorium and Uranium Measurements
at 23 Additional Sampling Locations
Directly Under Plant 1 Pad

Fig. 4 Sample Location	Beneath Pad Surface Soil Th (ppm)	Beneath Pad Surface Soil U (ppm)	Soil at 1 ft. Depth Beneath Surface Th (ppm)	Soil at 1 ft. Depth Beneath Surface U (ppm)
1			< 18	16
2			< 18	13
3			< 18	15
4			< 18	13
5			< 18	11
6			< 18	25
7			< 18	< 11
8			< 18	18
9			< 18	< 11
10				
11			< 18	97
12			< 18	< 11
13			< 18	18
14			< 18	11
15			< 18	14
16				
17				
18			< 18	30
19			< 18	17
20			< 18	19
21			< 18	31
22			< 18	47
23			< 18	11

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FIGURE 5
BORINGS AT PLANT 1 PAD

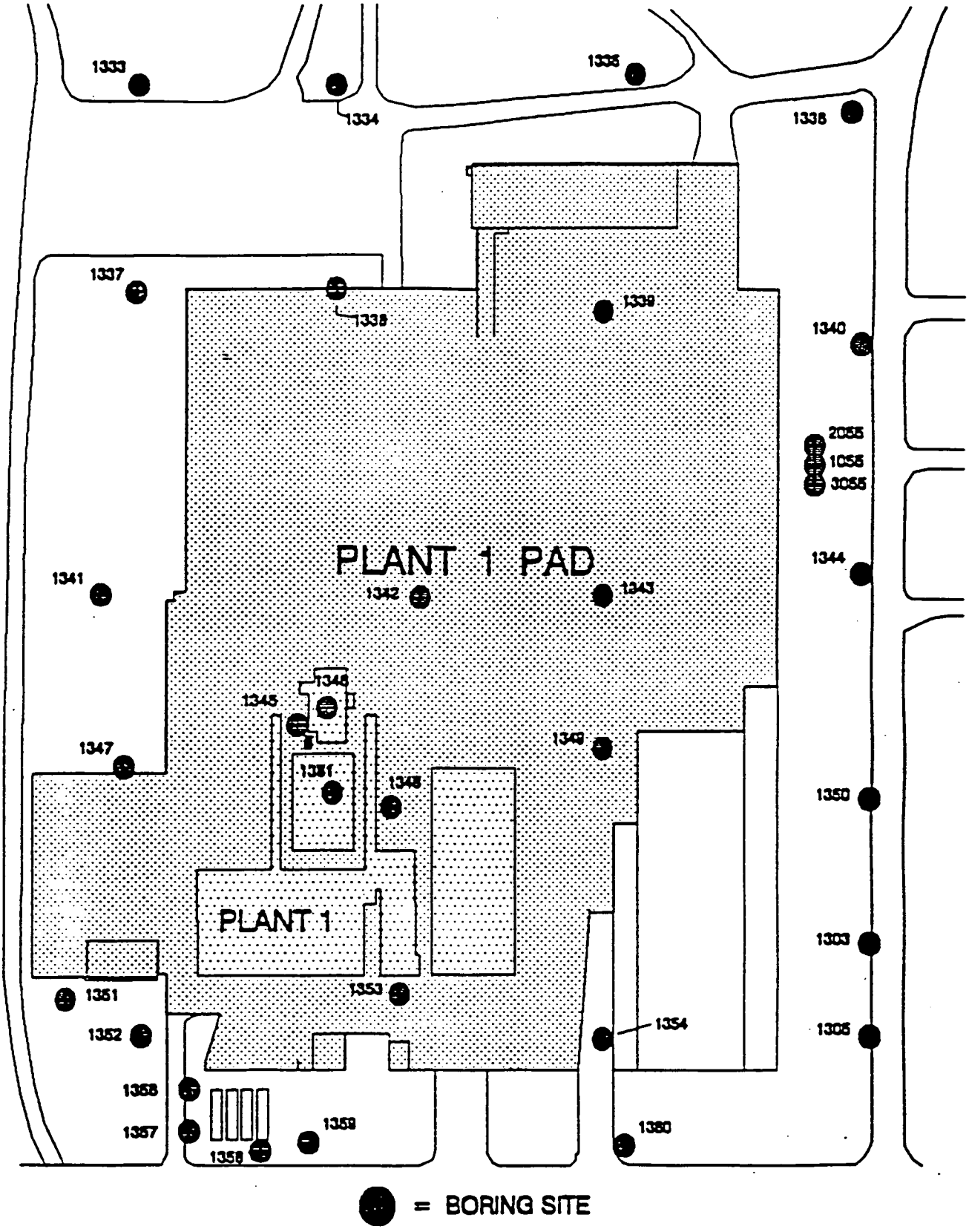

TABLE A-7

PLANT 1 PAD BORING DATA

BORINGS THROUGH PLANT 1 PAD

BORING NUMBER	DEPTH (ft)	TOTAL u (ppm)	TOTAL Th (ppm)
1339	1.0 TO 1.5	26.2	5.0
	2.0 TO 2.5	< 3.1	8.6
	4.5 TO 5.0	6.6	< 4.4
	10.5 TO 11.0	2.4	< 4.0
	GROUNDWATER	441.0 ug/l @ 5 ft	
	NITRATES	0.1 & 0.12 mg/l	
1342	1.0 TO 1.5	15.0	7.8
	4.0 TO 4.5	4.0	< 4.0
	5.0 TO 5.5	3.0	12.0
	10.5 TO 11.0	4.0	7.4
	16.5 TO 17.0	4.0	< 4.1
	GROUNDWATER	26.0 ug/l @ 13.5 ft	
	NITRATES	< 0.1 mg/l	
1343	1.0 TO 1.5	75.1	< 4.6
	3.0 TO 3.5	2.6	< 5.4
	6.0 TO 6.5	2.8	< 3.0
	10.0 TO 10.5	2.3	3.7
	GROUNDWATER	40.6 ug/l @ 8.0 ft	
	NITRATES	< 0.1 mg/l	
1345	1.0 TO 1.5	27.5	10.3
	2.0 TO 2.5	3.7	--
	3.5 TO 4.0	2.9	< 3.5
	5.0 TO 5.5	4.5	10.8
	10.5 TO 11.0	13.7	8.3
	GROUNDWATER	2.0 ug/l @ 13.5 ft	
1346	0.0 TO 0.5	28.9	7.0
	3.0 TO 3.5	10.2	6.7
	5.0 TO 5.5	4.5	8.7
	10.0 TO 10.5	5.2	4.2
	15.0 TO 15.5	6.1	6.6
	GROUNDWATER	ug/l @ 15.0 ft	

BORINGS OFF THE PAD'S EDGE

BORING NUMBER	DEPTH (ft)	TOTAL u (ppm)	TOTAL Th (ppm)
1338	0.0 TO 0.5	211.0	25.0
	3.0 TO 3.5	49.0	23.0
	5.0 TO 5.5	73.0	<23.0
	10.0 TO 10.5	< 11.0	<23.0
	GROUNDWATER	40.0 ug/l @ 6.5 ft	
	NITRATES	0.1 mg/l	
1347	RESULTS NOT RECEIVED		
1349	0.0 TO 0.5	7.0	7.0
	2.0 TO 2.5	5.0	14.0
	5.0 TO 5.5	4.0	14.0
	10.0 TO 10.5	3.0	4.0
	15.0 TO 15.5	5.0	< 8.0
	GROUNDWATER	NONE	

BORINGS IN THE VICINITY OF THE PAD

BORING NUMBER	DEPTH (ft)	TOTAL u (ppm)	TOTAL Th (ppm)
1333	0.0 TO 0.5	82.0	<23.0
	2.0 TO 2.5	< 11.0	<23.0
	5.0 TO 5.5	11.0	<23.0
	10.0 TO 10.5	20.0	<23.0
	15.0 TO 15.5	< 11.0	<23.0
1334	0.0 TO 0.5	< 11.0	<23.0
	1.5 TO 2.0	< 11.0	<23.0
	5.0 TO 5.5	11.0	<23.0
1335	0.0 TO 0.5	27.0	<23.0
	2.0 TO 2.5	< 11.0	<23.0
	5.0 TO 5.5	< 11.0	<23.0
	10.0 TO 10.5	< 11.0	<23.0
	15.0 TO 15.5	< 11.0	<23.0
1336	0.0 TO 0.5	< 11.0	<23.0
	3.0 TO 3.5	< 11.0	<23.0
	6.0 TO 6.5	< 11.0	<23.0
	10.0 TO 10.5	< 11.0	<23.0
	15.0 TO 15.5	< 11.0	<23.0
	GROUNDWATER	127.0 ug/l	
1337	0.0 TO 0.5	33.0	<23.0
	3.0 TO 3.5	< 11.0	<23.0
	5.0 TO 5.5	< 11.0	<23.0
	10.0 TO 10.5	16.0	<23.0
	GROUNDWATER	689.0 ug/l	
1340	0.0 TO 0.5	98.0	24.0
	3.0 TO 3.5	< 11.0	<23.0
	5.0 TO 5.5	< 11.0	<23.0
	10.0 TO 10.5	< 11.0	<23.0
	GROUNDWATER	32.0 ug/l	
1341	0.0 TO 0.5	30.8	7.6
	3.0 TO 3.5	6.9	8.0
	5.0 TO 5.5	5.0	9.9
	10.0 TO 10.5	3.7	11.8
	GROUNDWATER	28.0 ug/l	
1344	0.0 TO 0.5	28.0	<23.0
	3.0 TO 3.5	17.0	<23.0
	5.0 TO 5.5	< 11.0	<23.0
	5.0 TO 5.5	5.0	9.9
	10.0 TO 10.5	3.7	11.8
	GROUNDWATER	28.0 ug/l	
1350	0.0 TO 0.5	15.0	<23.0
	3.0 TO 3.5	< 11.0	<23.0
	5.0 TO 5.5	< 11.0	<23.0
	GROUNDWATER	40.9 ug/l	
1351	0.0 TO 0.5	25.0	<23.0
	2.0 TO 2.5	< 11.0	<23.0
	5.0 TO 5.5	< 11.0	<23.0
	10.5 TO 11.0	< 11.0	<23.0
	15.0 TO 15.5	< 11.0	<23.0
	GROUNDWATER	11.0 ug/l	
1352	0.0 TO 0.5	29.0	<23.0
	3.0 TO 3.5	13.0	<23.0
	6.0 TO 6.5	< 11.0	<23.0
	10.0 TO 10.5	< 11.0	<23.0
	15.0 TO 15.5	12.0	<23.0
	GROUNDWATER	226.0 ug/l	
1353	1.0 TO 1.5	< 11.0	--
	2.0 TO 2.5	< 11.0	--
	5.0 TO 5.5	< 11.0	--
	10.5 TO 11.0	< 11.0	--
	15.0 TO 15.5	< 11.0	--
	GROUNDWATER	24.0 ug/l	
1354	1.0 TO 1.5	< 11.0	--
	3.0 TO 3.5	21.0	--
	5.0 TO 5.5	< 11.0	--
	10.0 TO 10.5	12.0	--
	15.0 TO 15.5	< 11.0	--
	GROUNDWATER	93.0 ug/l	

TABLE A-7 (cont'd)

PLANT 1 PAD BORING DATA

BORINGS THROUGH PLANT 1 PAD

BORING NUMBER	DEPTH (ft)	TOTAL u (ppm)	TOTAL Th (ppm)
1348	0.0 TO 0.5	28.0	4.0
	1.5 TO 2.0	11.0	6.0
	4.5 TO 5.0	3.0	12.0
	10.0 TO 10.5	6.0	9.0
	14.5 TO 15.0	3.0	7.0
	GROUNDWATER	20.5 ug/l @ 16.0 ft	
	NITRATES	< 0.1 mg/l	
1361	1.0 TO 1.5	22.7	2.9
	2.0 TO 2.5	49.4	1.9
	3.0 TO 3.5	6.8	7.6
	6.0 TO 6.5	3.1	8.8
	7.0 TO 7.5	3.1	4.9
	GROUNDWATER	38.6 ug/l @ 13.5 ft	
	NITRATES	< 0.1 mg/l	

BORINGS OFF THE PAD'S EDGE

BORING NUMBER	DEPTH (ft)	TOTAL u (ppm)	TOTAL Th (ppm)

BORINGS IN THE VICINITY OF THE PAD

BORING NUMBER	DEPTH (ft)	TOTAL u (ppm)	TOTAL Th (ppm)
1356	0.0 TO 0.5	<46.0	<23.0
	2.0 TO 2.5	< 11.0	<23.0
	5.0 TO 5.5	< 11.0	<23.0
	10.5 TO 11.0	119.0	30.0
	15.0 TO 15.5	14.0	<23.0
	GROUNDWATER	240.0 ug/l	
1357	0.0 TO 0.5	41.0	<23.0
	3.0 TO 3.5	20.0	<23.0
	5.0 TO 5.5	22.0	<23.0
	10.5 TO 11.0	29.0	<23.0
	15.0 TO 15.5	17.0	<23.0
	GROUNDWATER	748.0 ug/l	
1358	0.0 TO 0.5	78.0	<23.0
	2.0 TO 2.5	< 11.0	<23.0
	5.0 TO 5.5	13.0	<23.0
	10.0 TO 10.5	< 11.0	<23.0
	GROUNDWATER	205.0 ug/l	
1359	0.0 TO 0.5	57.0	<23.0
	2.0 TO 2.5	< 11.0	<23.0
	5.0 TO 5.5	< 11.0	<23.0
	10.0 TO 10.5	< 11.0	<23.0
	14.5 TO 15.0	< 11.0	<23.0
	GROUNDWATER	405.0 ug/l	

Table A-8

Metals Concentrations

Constituent	1345 mg/kg	1346 mg/kg
Aluminum	13300	9730
Arsenic	5.6	3.9 (single value)
Barium	115	96
Beryllium	1.1	1.4
Cadmium	4.0	4.4
Calcium	35115	67170
Chromium	20.0	23.2
Cobalt	15.9	17.4
Copper	18.3	20.6
Iron	25375	26940
Lead	16.3	16.2
Magnesium	8860	18060
Manganese	683	984
Mercury	<0.062	1.5
Nickel	37.3	48.1
Potassium	1390	870
Silver	2.8	<2.4
Sodium	108	340
Vanadium	22.1	23.5
Zinc	61.9	58.9

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Table A-9

NON-ORGANICS & METALS in Groundwater from Monitor Wells 1055,2055, and 3055

Concentrations (mg/l)

Analyte	1055 (5/18/88)	1055 (2/26/89)	2055 (6/1/89)	2055 (6/28/89)	3055 (5/18/88)	3055 (8/3/88)	3055 (11/2/88)	3055 (3/1/89)
Aluminum			0.227	0.132				
Ammonia	0.01	0.01	1.48	0.48	<0.05	4.80	5.06	4.70
Arsenic	<0.002	<0.003	<0.002	<0.002	<0.002	<0.010	<0.002	<0.003
Barium	0.043	0.040	0.969	0.098	0.067	0.200	0.076	0.087
Cadmium	<0.002	<0.005	0.045	0.004	<0.002	<0.005	<0.002	<0.005
Calcium	118.000	130.000	110.000	123.000	104.000	160.000	197.000	200.000
Chloride	9.60	5.10	32.00	26.70	51.50	58.00	54.80	56.00
Chromium	<0.020	0.030	0.038	0.040	<0.020	<0.010	<0.020	0.030
Copper	<0.010	<0.010	<0.010	<0.010	<0.010	<0.030	<0.010	<0.010
Fluoride	0.65	0.30	0.20	0.17	0.53	<0.10	0.11	0.10
Iron	0.083	0.050	2.590	2.630	1.870	5.500	7.730	7.300
Kjeldahl N		0.70	7.18	0.58			5.71	3.90
Lead	0.002	<0.002	0.002	<.002	0.002	<0.005	<0.002	<0.002
Magnesium	36.200	38.000	27.500	29.400	29.600	28.000	34.400	34.000
Manganese	0.079	0.012	0.208	0.259	0.078	0.230	0.325	0.330
Mercury	<0.0002	0.000	0.000	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	0.033	0.010	<0.01	0.010	0.033	<0.050	<0.020	<0.010
Nickle	<0.02	<0.03	<0.02	<0.020	<0.020	<0.040	<0.020	<0.030
Nitrate	0.10	0.42	<0.10	<0.1	0.10	<2.50	<0.10	0.05
Organic Carbon			<1.00	0.45				
Organic Halides			0.02	<0.01			<0.05	
Organic N		0.60	5.70	0.10	5.95	1.80	0.65	
Phenol	0.01	0.01	0.02	<0.01	0.02	<0.01	<0.01	0.17
Phosphorous	7.40	0.13	18.90	0.09	0.13	0.03	<0.02	0.08
Potassium	1.360	1.700	4.270	3.300	53.200	3.500	17.800	24.000
Selenium	0.019	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005
Silicon			4.853	4.950				
Silver	<0.01	<0.001	0.013	0.011	<0.010	<0.010	<0.001	<0.010
Sodium	15.100	30.000	13.600	13.400	56.800	53.000	38.700	43.000
Sulfates	259.00	250.00	123.00	133.00	159.00	340.00	217.00	360.00
Sulfides			30.20	<0.5				
Vanadium			0.019	0.018				

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Table A-10

Radionuclides in Water & Core Samples
at Well Monitoring Station 55

Analyte	1055 Water (pCi/L)	2055 Water (pCi/L)	2055 Core (pCi/g)	3055 Water (pCi/L)
Strontium-90	<5.00	<5.00	<0.50	<5.00
Technetium-99	<30.00	<30.00	<0.90	<30.00
Radium-228	<3.00	<3.00	<0.80	<3.00
Thorium-228	3.70	<1.00	0.70	<1.00
	1.20			
	1.90			
Thorium-232	1.80	<1.00	<0.60	1.00
	1.00			
	1.50			
Radium-226	1.50	<1.00	0.60	1.30
Thorium-230	3.10	<1.00	1.30	1.10
			0.70	1.60
Uranium-234	9.20	1.10	0.70	<1.00
	5.90	1.50		
	4.70	0.79		
	4.80	0.71		
	4.70			
Uranium-235	<1.00	<1.00	<0.60	<1.00
	0.32			
Uranium-238	4.90	1.20	0.90	<1.00
	3.70	1.40		
	3.50	0.46		
	8.60			
	4.60			
	ug/l	ug/l	ug/l	ug/l
Total Uranium	13.00	5.00		<1.00
	22.00	2.00		
	9.00	4.00		
	9.00	3.00		
	13.80	3.00		
		2.60		
Total Thorium	7.00	<5.00		<5.00
	1.40			
	9.00			

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FIGURE 6

CROSSECTIONAL OF BORING NUMBER 1339 ON PLANT 1 PAD

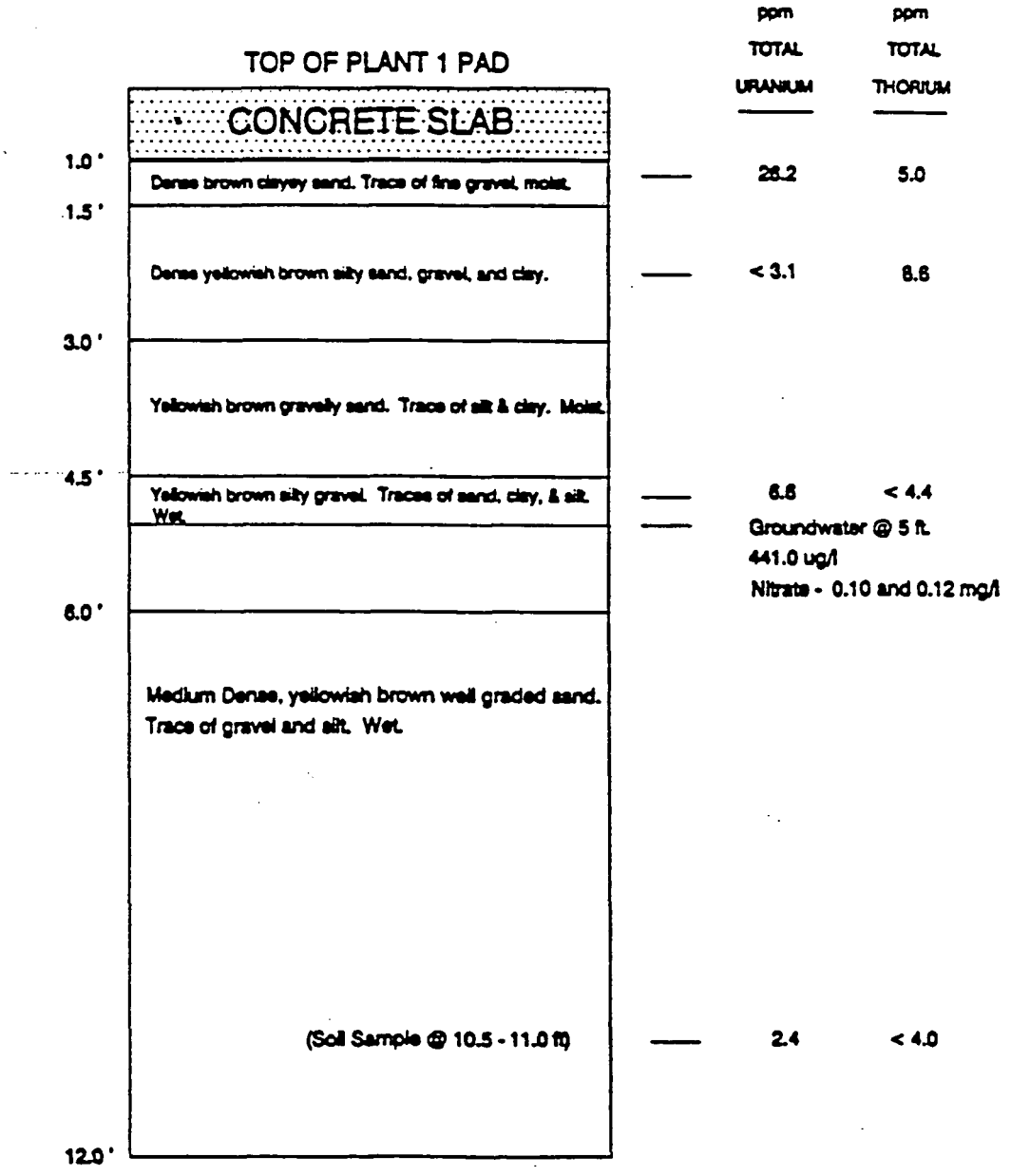

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FIGURE 7

CROSSECTIONAL OF BORING NUMBER 1342 ON PLANT 1 PAD

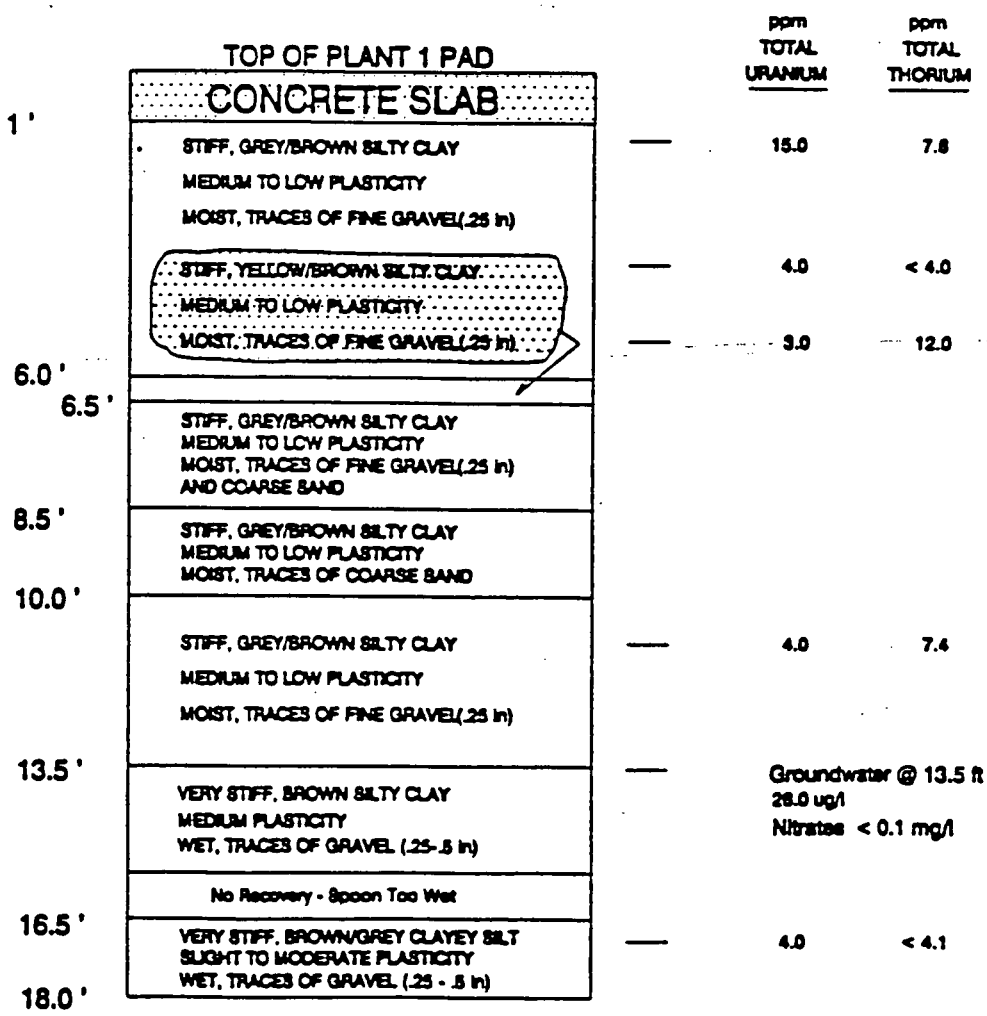

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FIGURE 8

CROSSECTIONAL OF BORING NUMBER 1343 ON PLANT 1 PAD

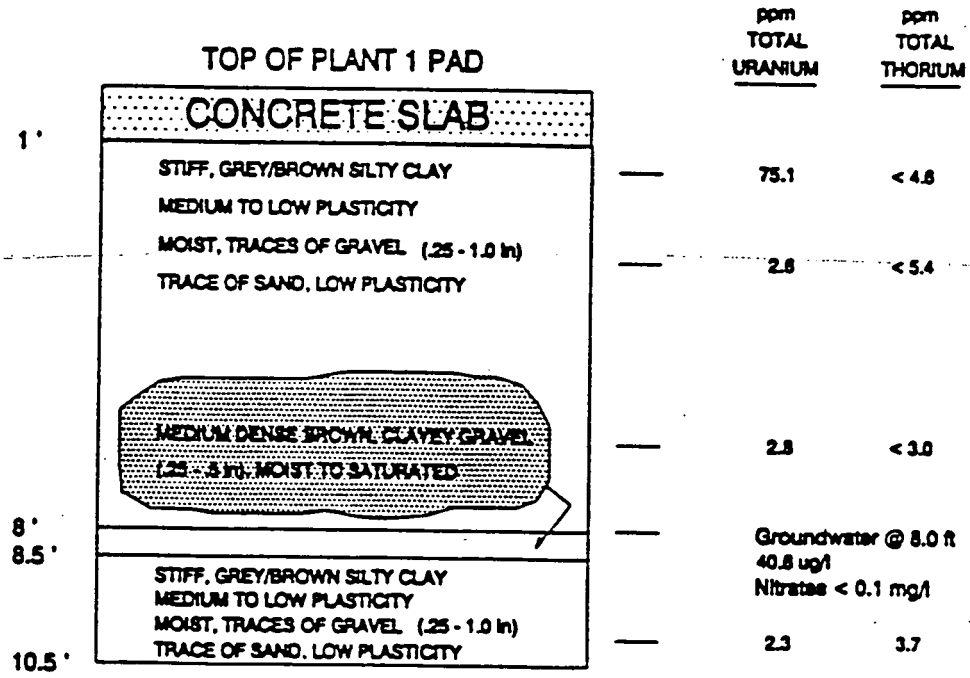

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FIGURE 9

CROSSECTIONAL OF BORING NUMBER 1345 ON PLANT 1 PAD

TOP OF PLANT 1 PAD

		ppm TOTAL URANIUM	ppm TOTAL THORIUM
	CONCRETE SLAB		
1.0'	Stiff, yellow/brown silty clay, with sand and trace of fine gravel. Plastic & moist.	27.5	10.3
1.5'	Stiff dark gray clay. Some silt, low plasticity, moist.	3.7	—
3.0'	Soft olive gray silty clay. Medium plasticity, moist.	2.9	< 3.5
4.5'	Dark olive to black clay. Some silt and sand. Fine to medium gravel, medium plasticity, moist.	4.5	10.8
6.0'	Very soft yellowish brown silty clay. Medium plasticity, moist.		
6.5'	Stiff black clay, some silt. Medium plasticity, moist.		
7.5'	Very soft, olive brown sandy clay. Traces of fine gravel Low plasticity, very moist.		
9.0'	Very soft dark grayish brown sandy clay. Trace of fine gravel, medium plasticity. very moist.		
10.5'	Very soft yellowish brown sandy clay, very moist.	13.7	8.3
11.0'	Dark gray clay, trace of silt, medium plasticity, moist.		
12.0'	Stiff light gray clay, trace of silt and sand. Medium plasticity, moist.		
13.5'	Light olive brown clayey silt with sand and gravel. Moist	Groundwater @ 13.5 ft. 2.0 ug/l	
14.0'	Light gray silty clay. Trace of fine gravel. Medium plasticity, moist.		
16.0'			

** Average of two samples plus one duplicate

FIGURE 10

CROSSECTIONAL OF BORING NUMBER 1346 ON PLANT 1 PAD

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TOP OF PLANT 1 PAD

		ppm TOTAL URANIUM	ppm TOTAL THORIUM
	CONCRETE SLAB		
1.0' – 1.5'	Stiff olive brown clay, with trace of sand & fine gravel. Low Plasticity, moist.	28.9	7.0
	NO RECOVERY		
3.0' – 4.0'	Stiff olive gray silty clay with a trace of sand Low plasticity, moist.	10.2	8.7
	Soft to stiff olive brown silty clay with trace of sand. Medium plasticity, moist.		
5.0' – 5.5'	Med. stiff olive silty clay/trace sand. Med Plas. moist.	4.5	8.7
	NO RECOVERY		
6.0' – 6.5'	Med. stiff olive silty clay/trace sand. Med Plas. moist.		
	NO RECOVERY		
7.5' – 8.5'	Stiff light olive brown silth clay, trace sand/fine gravel. Medium Plasticity, moist.		
	NO RECOVERY		
9.0' – 10.0'	Med stiff yellow brown silty clay, trace sand/fine gravel. Medium plasticity, moist.		
10.0' – 10.5'	Stiff dark gray silty clay, trace sand. Low plasticity, moist.	5.2	4.2
10.5' – 12.5'	Stiff dark gray silty clay, trace sand. Low plasticity, moist.		
12.5' – 14.5'	Med stiff yellow brown silty clay, trace sand/fine gravel. Medium plasticity, moist.		
14.5' – 15.0'	Very soft olive gray clay, trace silt, med. plast., moist.	Groundwater @ 15.00 ft.	
15.0' – 19.5'	Dense light brown silt and sand. Very wet.	6.1	6.8
19.5' – 20.0'	Medium dense olive gray sandy silt. Moist.		

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FIGURE 11

CROSSECTIONAL OF BORING NUMBER 1348 OFF PLANT 1 PAD

TOP OF PLANT 1 PAD

CONCRETE SLAB

		ppm TOTAL URANIUM	ppm TOTAL THORIUM
1.0'	Stiff gray gravelly clay. Low Plasticity. Moist	28.0	4.0
1.5'	Stiff dark gray clay. Low plasticity. Moist	11.0	6.0
3.0'	Medium stiff brown gray silty clay. Trace of sand. Moist.		
4.5'	Stiff dark brown silty clay. Low plasticity. Moist.	3.0	12.0
6.0'	Stiff grayish brown silty clay. Low plasticity. Moist.		
7.5'	Medium stiff gray silty clay. Low plasticity. Moist.		
9.5'	Stiff dark gray clay. Trace of sand. Low plasticity. Moist.	6.0	9.0
12.0'	Stiff gray clay. Trace of gravel. Medium plasticity. Moist.		
14.5'	Grayish brown clay. Trace of gravel. Medium plasticity. Moist.	3.0	7.0
16.0'	Gray clayey silt. Trace of gravel. Wet	Groundwater @ 16 ft. 20.5 ug/l Nitrate < 0.1 mg/l	
	Gray brown clayey sand. Non Cohesive. Wet		
19.0'	Gray clay. Medium Plasticity. Moist.		
20.0'			

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FIGURE 12

CROSSECTIONAL OF BORING NUMBER 1361 ON PLANT 1 PAD

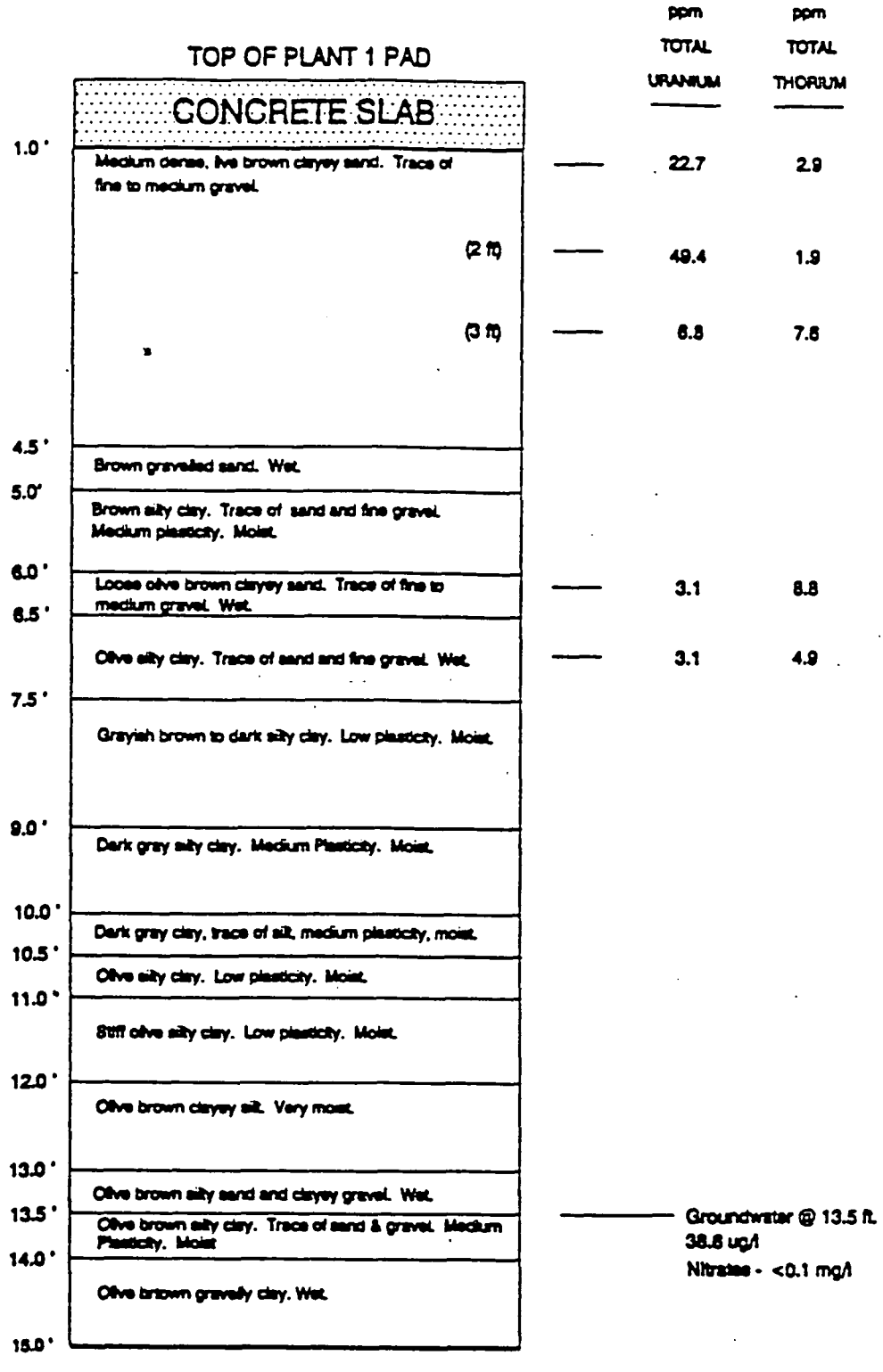

FIGURE 13

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CROSSECTIONAL OF BORING NUMBER 1338 AT THE EDGE OF PLANT 1 PAD (OFF-PAD)

TOP OF PLANT 1 PAD

		ppm TOTAL URANIUM	ppm TOTAL THORIUM
	CONCRETE SLAB		
1.0'	Dark brown silt. Some clay. Trace of gravel. Moist to dry.	211.0	25.0
1.5'	Brown silt. Trace of clay Moist. (3.0 - 3.5')	49.0	23.0
3.0'	Soft yellowish brown, silty clay. Some fine sand. Low plasticity Moist to saturated. (5.0 - 5.5')	73.0	<23.0
5.0'	Very loose dark brown clayey sand. Moist to saturated.		
7.0'	Medium dense, brown, poorly graded sand. Trace of fine gravel. Saturated.	Groundwater @ 6.5 ft 40.0 ug/l Nitrates - 0.10 mg/l	
9.5'	Very stiff gray clay. Medium p;asticity. Moist.		
10.5'		<11.0	<23.0

FIGURE 14

CROSSECTIONAL OF BORING NUMBER 1347 OFF PLANT 1 PAD

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		ppm TOTAL URANIUM	ppm TOTAL THORIUM
	Very stiff, brown silty clay, with trace of .25 - .50 in gravel & some rootlets. Damp.		
1.0'			
	NO RECOVERY		
1.5'			
	Very stiff, brown silty clay, with trace of .25 - .50 in gravel. Damp.		
2.5'			
	NO RECOVERY		
3.0'			
	Very stiff, brown silty clay, with trace of .25 - .50 in gravel. Damp.		
4.0'			
	NO RECOVERY		
4.5'			
	Very stiff, brown silty clay, with trace of .25 - .50 in gravel. Damp.		
5.5'			
	NO RECOVERY		
7.5'			
	Very stiff, brown silty clay, with trace of .25 - .50 in gravel. Damp.		
8.0'			
	NO RECOVERY		
9.0'			
	Very stiff, brown silty clay, with trace of .25 - .50 in gravel. Damp.		
10.0'			
	NO RECOVERY		
10.5'			
	Very stiff, brown silty clay, with trace of .25 - .50 in gravel. Damp.		
12.0'			
	Very stiff, gray silty clay, with trace of .25 - .50 in gravel. Damp.		
13.0'			
	NO RECOVERY		
13.5'			
	Very stiff, gray silty clay, with trace of .25 - .50 in gravel. Damp.		
14.5'			
	NO RECOVERY		
15.0'			
	Very stiff, gray silty clay, with trace of .25 - .50 in gravel. Damp.		
16.0'			
	NO RECOVERY		
16.5'			Groundwater @ 16.25 ft.
	Very stiff, gray sand-clay mixture, with trace of .25 - .50 in grave. WET.		
20.0'			Piezometer installed @ 20 ft.

FIGURE 15

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CROSSECTIONAL OF BORING NUMBER 1349 AT THE EDGE OF PLANT 1 PAD (OFF-PAD)

TOP OF PLANT 1 PAD

CONCRETE SLAB

		ppm TOTAL URANIUM	ppm TOTAL THORIUM
	Stiff olive silty clay. Trace of gravel. Low plasticity. Moist.	7.0	7.0
2.5'	(2.0 - 2.5')	5.0	14.0
	Olive silty clay. Some sand. Low plasticity. Moist.		
	(5.0 - 5.5')	4.0	14.0
6.0'	Gray brown silty clay. Medium plasticity. Moist.		
7.5'	Stiff, grayish brown clay. Low plasticity. Moist		
	(10.0 - 10.5')	3.0	4.0
12.0'	Soft brown silty clay. Low plasticity. Moist to Wet.		
14.5'	Grayish brown clayey sand. Trace of fine gravel. Moist. (15.0 - 15.5')	5.0	< 8.0
16.5'	Clay. Trace of fine gravel and coarse sand. Medium plasticity. Moist	NO GROUNDWATER AVAILABLE	
20.0'			

TABLE A-11
PLANT 1 PAD
PRELIMINARY MONITORING WELL DATA

Detections in Wells 1336, 1338, 1339, 1340, 1342, 1343, 1344, 1345, 1348, 1353, & 1361

Parameter	Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339						
Sample date - 10-11-90						
1,1-Dichloroethane	1.1000	ug/l	N/A	< 1.	N/A	NET
Aluminum	42.0000	mg/l	N/A	< 0.50	N/A	NET
Ammonia, as nitrogen	0.0900	mg/l	N/A	< 0.02	N/A	NET
Arsenic	0.0690	mg/l	N/A	< 0.0025	N/A	NET
Barium	0.5620	mg/l	N/A	< 0.200	N/A	NET
Cadmium	0.0010	mg/l	N/A	< 0.001	N/A	NET
Calcium	307.0000	mg/l	N/A	< 1.00	N/A	NET
Calcium, (Dissd.)	61.1000	mg/l	N/A	N/A	N/A	NET
Chloride	114.0000	mg/l	N/A	< 1.	N/A	NET
Chromium, Total	0.1270	mg/l	N/A	< 0.005	N/A	NET
Cobalt	0.0280	mg/l	N/A	< 0.025	N/A	NET
Copper	0.1690	mg/l	N/A	< 0.025	N/A	NET
Fluoride	3.0300	mg/l	N/A	0.10	N/A	NET
Iron	223.0000	mg/l	N/A	< 0.050	N/A	NET
Iron, (Dissd.)	0.1000	mg/l	N/A	N/A	N/A	NET
Lead	0.1270	mg/l	N/A	< 0.005	N/A	NET
Magnesium	133.0000	mg/l	N/A	< 1.00	N/A	NET
Magnesium, (Dissd.)	10.0000	mg/l	N/A	N/A	N/A	NET
Manganese	3.6100	mg/l	N/A	< 0.020	N/A	NET
Manganese, (Dissd.)	0.2820	mg/l	N/A	N/A	N/A	NET
Nickel	0.1390	mg/l	N/A	< 0.005	N/A	NET
Nitrogen, Nitrate+Nitrite	0.3200	mg/l	N/A	0.05	N/A	NET
Phosphorus, Total	3.4200	mg/l	N/A	< 0.20	N/A	NET
Potassium	15.3000	mg/l	N/A	< 1.00	N/A	NET
Potassium, (Dissd.)	2.6800	mg/l	N/A	N/A	N/A	NET
Selenium	0.0040	mg/l	N/A	< 0.0025	N/A	NET
Sodium	120.0000	mg/l	N/A	< 1.00	N/A	NET
Sodium, (Dissd.)	41.6000	mg/l	N/A	N/A	N/A	NET
Sulfate	46.0000	mg/l	N/A	< 1.	N/A	NET
Vanadium	0.2500	mg/l	N/A	< 0.050	N/A	NET
Zinc	0.7150	mg/l	N/A	< 0.020	N/A	NET
Sample date - 02-27-91						
Alkalinity at CaCO3	300.0000	mg/l	N/A	2.0	2.0	NET
Aluminum	57.1000	mg/l	N/A	< 0.50	< 0.50	NET
Ammonia, as nitrogen	0.0700	mg/l	N/A	< 0.02	< 0.02	NET
Arsenic	0.0380	mg/l	N/A	< 0.0025	< 0.0025	NET

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** PRELIMINARY Data **

Printed: 09/30/92 14:34

Detections in Wells 1336, 1338, 1339, 1340, 1342, 1343, 1344, 1345, 1348, 1353, & 1361

Parameter	Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339						
Sample date - 02-27-91						
Barium	0.3850	mg/l	N/A	< 0.200	< 0.200	NET
Calcium	287.0000	mg/l	N/A	< 1.00	< 1.00	NET
Calcium, (Dissd.)	63.7000	mg/l	N/A	< 1.00	< 1.00	NET
Chloride	78.0000	mg/l	N/A	< 1.	< 1.	NET
Chromium, Total	0.1760	mg/l	N/A	< 0.005	< 0.005	NET
Copper	0.1010	mg/l	N/A	< 0.025	< 0.025	NET
Fluoride	0.2700	mg/l	N/A	< 0.05	< 0.05	NET
GROSS ALPHA	368.0000	pCi/l	N/A	< 1.6E-1	4.3E-1	IT
GROSS BETA	304.0000	pCi/l	N/A	< 1.0E+0	1.0E+0	IT
Iron	110.0000	mg/l	N/A	< 0.050	< 0.050	NET
Lead	0.0290	mg/l	N/A	< 0.005	< 0.005	NET
Magnesium	88.0000	mg/l	N/A	< 1.00	< 1.00	NET
Magnesium, (Dissd.)	21.0000	mg/l	N/A	< 1.00	< 1.00	NET
Manganese	3.0100	mg/l	N/A	< 0.020	< 0.020	NET
Manganese, (Dissd.)	0.1330	mg/l	N/A	< 0.020	< 0.020	NET
Nickel	0.1030	mg/l	N/A	< 0.005	< 0.005	NET
Nitrogen, Nitrate	0.5800	mg/l	N/A	< 0.02	< 0.02	NET
pH	7.3200	S.U.	N/A	5.49	4.91	NET
Phenols	0.0060	mg/l	N/A	< 0.005	0.005	NET
Phosphorus, Total	1.6700	mg/l	N/A	< 0.10	< 0.10	NET
Potassium	11.5000	mg/l	N/A	< 1.00	< 1.00	NET
Potassium, (Dissd.)	1.3700	mg/l	N/A	< 1.00	< 1.00	NET
RA-226	3.4200	pCi/l	N/A	< 1.6E-1	2.0E-1	IT
RA-228	3.0900	pCi/l	N/A	1.99E+0	1.9E+0	IT
Sodium	83.0000	mg/l	N/A	< 1.00	< 1.00	NET
Sodium, (Dissd.)	81.0000	mg/l	N/A	< 1.00	< 1.00	NET
Specific conductance	871.0000	umhos/cm	N/A	2.40	1.30	NET
Sulfate	70.0000	mg/l	N/A	< 1.	< 1.	NET
TC-99	44.5000	pCi/l	N/A	< 1.7E+1	2.0E+1	IT
TH-228	2.0700	pCi/l	N/A	6.35E-1	5.00E-1	IT
TH-230	1.8700	pCi/l	N/A	< 2.0E-1	2.50E-1	IT
TH-232	1.0700	pCi/l	N/A	< 2.0E-1	1.8E-1	IT
TH-TOTAL	9.6200	ug/l	N/A	< 1.8E+0	1.6E+0	IT
TOC	30.0000	mg/l	N/A	< 1.	< 1.	NET
Total dissolved solids	510.0000	mg/l	N/A	< 10.	< 10.	NET
U-234	177.0000	pCi/l	N/A	7.41E-1	2.89E-1	IT
U-235/236	8.1100	pCi/l	N/A	< 2.2E-1	2.6E-1	IT

TABLE A-11 (Continued)

TABLE A-11 (Continued)

Detections in Wells 1336, 1338, 1339, 1340, 1342, 1343, 1344, 1345, 1348, 1353, & 1361

Parameter	Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339						
Sample date - 02-27-91						
U-238	189.0000	pCi/l	N/A	< 2.2E-1	3.27E-1	IT
U-TOTAL	533.0000	ug/l	N/A	< 1.7E-1	4.0E-1	IT
Vanadium	0.4160	mg/l	N/A	< 0.050	< 0.050	NET
Zinc	0.4640	mg/l	N/A	< 0.020	< 0.020	NET
Zinc, (Dissd.)	0.0270	mg/l	N/A	0.145	< 0.020	NET
Well #1342						
Sample date - 10-11-90						
Aluminum	205.0000	mg/l	N/A	< 0.50	N/A	NET
Ammonia, as nitrogen	0.4600	mg/l	N/A	< 0.02	N/A	NET
Arsenic	0.4320	mg/l	N/A	< 0.0025	N/A	NET
Arsenic, (Dissd.)	0.0080	mg/l	N/A	N/A	N/A	NET
Barium	2.7100	mg/l	N/A	< 0.200	N/A	NET
Barium, (Dissd.)	0.2510	mg/l	N/A	N/A	N/A	NET
Cadmium	0.0120	mg/l	N/A	< 0.001	N/A	NET
Calcium	1490.0000	mg/l	N/A	< 1.00	N/A	NET
Calcium, (Dissd.)	113.0000	mg/l	N/A	N/A	N/A	NET
Chloride	84.0000	mg/l	N/A	< 1.	N/A	NET
Chromium, Total	0.4920	mg/l	N/A	< 0.005	N/A	NET
Cobalt	0.0570	mg/l	N/A	< 0.025	N/A	NET
Copper	0.5720	mg/l	N/A	< 0.025	N/A	NET
Fluoride	0.6000	mg/l	N/A	0.10	N/A	NET
Iron	860.0000	mg/l	N/A	< 0.050	N/A	NET
Iron, (Dissd.)	1.9000	mg/l	N/A	N/A	N/A	NET
Lead	0.3320	mg/l	N/A	< 0.005	N/A	NET
Magnesium	390.0000	mg/l	N/A	< 1.00	N/A	NET
Magnesium, (Dissd.)	21.0000	mg/l	N/A	N/A	N/A	NET
Manganese	39.7000	mg/l	N/A	< 0.020	N/A	NET
Manganese, (Dissd.)	9.0300	mg/l	N/A	N/A	N/A	NET
Nickel	0.6160	mg/l	N/A	< 0.005	N/A	NET
Phosphorus, Total	3.6600	mg/l	N/A	< 0.20	N/A	NET
Potassium	31.8000	mg/l	N/A	< 1.00	N/A	NET
Potassium, (Dissd.)	1.7700	mg/l	N/A	N/A	N/A	NET
Silver	0.0010	mg/l	N/A	< 0.001	N/A	NET
Sodium	34.7000	mg/l	N/A	< 1.00	N/A	NET
Sodium, (Dissd.)	39.8000	mg/l	N/A	N/A	N/A	NET

** PRELIMINARY Data **

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TABLE A-11 (Continued)

Detections in Wells 1336, 1338, 1339, 1340, 1342, 1343, 1344, 1345, 1348, 1353, & 1361

Parameter	Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1342						
Sample date - 10-11-90						
Sulfate	14.0000	mg/l	N/A	< 1.	N/A	NET
Vanadium	0.6200	mg/l	N/A	< 0.050	N/A	NET
Zinc	2.2900	mg/l	N/A	< 0.020	N/A	NET
Zinc, (Dissd.)	0.0250	mg/l	N/A	N/A	N/A	NET
Well #1343						
Sample date - 10-11-90						
Aluminum	1.9800	mg/l	N/A	< 0.50	N/A	NET
Ammonia, as nitrogen	0.0600	mg/l	N/A	< 0.02	N/A	NET
Calcium	125.0000	mg/l	N/A	< 1.00	N/A	NET
Calcium, (Dissd.)	136.0000	mg/l	N/A	N/A	N/A	NET
Chloride	322.0000	mg/l	N/A	< 1.	N/A	NET
Chromium, Total	0.0070	mg/l	N/A	< 0.005	N/A	NET
Fluoride	0.5900	mg/l	N/A	0.10	N/A	NET
Iron	4.6400	mg/l	N/A	< 0.050	N/A	NET
Magnesium	65.0000	mg/l	N/A	< 1.00	N/A	NET
Magnesium, (Dissd.)	22.0000	mg/l	N/A	N/A	N/A	NET
Manganese	0.3630	mg/l	N/A	< 0.020	N/A	NET
Manganese, (Dissd.)	0.2660	mg/l	N/A	N/A	N/A	NET
Nickel	0.0070	mg/l	N/A	< 0.005	N/A	NET
Nitrogen, Nitrate+Nitrite	0.0200	mg/l	N/A	0.05	N/A	NET
Phosphorus, Total	0.6400	mg/l	N/A	< 0.20	N/A	NET
Potassium	4.1600	mg/l	N/A	< 1.00	N/A	NET
Potassium, (Dissd.)	2.5600	mg/l	N/A	N/A	N/A	NET
Sodium	65.0000	mg/l	N/A	< 1.00	N/A	NET
Sodium, (Dissd.)	61.9000	mg/l	N/A	N/A	N/A	NET
Sulfate	72.0000	mg/l	N/A	< 1.	N/A	NET
Zinc	0.0220	mg/l	N/A	< 0.020	N/A	NET
Well #1345						
Sample date - 10-11-90						
Aluminum	20.3000	mg/l	N/A	< 0.50	N/A	NET
Ammonia, as nitrogen	2.1900	mg/l	N/A	< 0.02	N/A	NET
Arsenic	0.0500	mg/l	N/A	< 0.0025	N/A	NET
Arsenic, (Dissd.)	0.0070	mg/l	N/A	N/A	N/A	NET

Parameter	Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1345						
Sample date - 10-11-90						
Barium	0.4290	mg/l	N/A	< 0.200	N/A	NET
Barium, (Dissd.)	0.2260	mg/l	N/A	N/A	N/A	NET
Cadmium	0.0050	mg/l	N/A	< 0.001	N/A	NET
Calcium	202.0000	mg/l	N/A	< 1.00	N/A	NET
Calcium, (Dissd.)	108.0000	mg/l	N/A	N/A	N/A	NET
Chloride	68.0000	mg/l	N/A	< 1.	N/A	NET
Chromium, Total	0.0730	mg/l	N/A	< 0.005	N/A	NET
Copper	0.0680	mg/l	N/A	< 0.025	N/A	NET
Fluoride	0.5800	mg/l	N/A	0.10	N/A	NET
Iron	97.4000	mg/l	N/A	< 0.050	N/A	NET
Iron, (Dissd.)	2.4000	mg/l	N/A	N/A	N/A	NET
Lead	0.0790	mg/l	N/A	< 0.005	N/A	NET
Magnesium	83.0000	mg/l	N/A	< 1.00	N/A	NET
Magnesium, (Dissd.)	14.0000	mg/l	N/A	N/A	N/A	NET
Manganese	2.1600	mg/l	N/A	< 0.020	N/A	NET
Manganese, (Dissd.)	1.1400	mg/l	N/A	N/A	N/A	NET
Nickel	0.0510	mg/l	N/A	< 0.005	N/A	NET
Phosphorus, Total	1.6700	mg/l	N/A	< 0.20	N/A	NET
Potassium	10.6000	mg/l	N/A	< 1.00	N/A	NET
Potassium, (Dissd.)	4.8600	mg/l	N/A	N/A	N/A	NET
Sodium	60.0000	mg/l	N/A	< 1.00	N/A	NET
Sodium, (Dissd.)	17.4000	mg/l	N/A	N/A	N/A	NET
Vanadium	0.0890	mg/l	N/A	< 0.050	N/A	NET
Zinc	0.2130	mg/l	N/A	< 0.020	N/A	NET
Well #1353						
Sample date - 10-29-90						
Lead	0.0880	mg/l	N/A	0.022	N/A	NET

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TABLE A-11 (Continued)

TABLE A-11 (Continued)

Sampling of Wells 1336, 1338, 1339, 1340, 1342, 1343, 1344, 1345, 1348, 1353, & 1361

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339							
Sample date - 10-11-90							
1,1,1-Trichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1,2,2-Tetrachloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1,2-Trichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1-Dichloroethane		1.1000	ug/l	N/A	< 1.	N/A	NET
1,1-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,2,4-Trichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
1,2-Dichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,2-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,2-Dichloropropane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
2,4,5-Trichlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4,6-Trichlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dichlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dimethylphenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dinitrophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dinitrotoluene	<	15.0000	ug/l	N/A	< 15.	N/A	NET
2,6-Dinitrotoluene	<	15.0000	ug/l	N/A	< 15.	N/A	NET
2-Chloroethyl vinyl ether	<	10.0000	ug/l	N/A	< 10.	N/A	NET
2-Chloronaphthalene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2-Chlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2-Hexanone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
2-Methylnaphthalene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2-Nitroaniline	<	15.0000	ug/l	N/A	< 15.	N/A	NET
2-Nitrophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
3,3'-Dichlorobenzidine	<	15.0000	ug/l	N/A	< 15.	N/A	NET
3-Nitroaniline	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4,4'-DDD	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
4,4'-DDE	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
4,4'-DDT	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
4,6-Dinitro-2-methylphenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
4-Bromophenyl phenyl ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4-Chloro-3-methylphenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
4-Chlorophenylphenyl ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4-Methyl-2-pentanone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
4-Nitroaniline	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4-Nitrophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Acenaphthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Acenaphthylene	<	4.0000	ug/l	N/A	< 4.	N/A	NET

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** PRELIMINARY Data **

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Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339							
Sample date - 10-11-90							
Acetone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
Aldrin	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
alpha-BHC	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aluminum		42.0000	mg/l	N/A	< 0.50	N/A	NET
Aluminum, (Dissd.)	<	0.5000	mg/l	N/A	N/A	N/A	NET
Ammonia, as nitrogen		0.0900	mg/l	N/A	< 0.02	N/A	NET
Anthracene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Antimony	<	0.0250	mg/l	N/A	< 0.025	N/A	NET
Antimony, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
Aroclor 1016	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1221	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1232	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1242	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1248	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1254	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1260	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Arsenic		0.0690	mg/l	N/A	< 0.0025	N/A	NET
Arsenic, (Dissd.)	<	0.0025	mg/l	N/A	N/A	N/A	NET
Barium		0.5620	mg/l	N/A	< 0.200	N/A	NET
Barium, (Dissd.)	<	0.2000	mg/l	N/A	N/A	N/A	NET
Benzene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Benzo(a)anthracene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(a)pyrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(b)fluoranthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(ghi)perylene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(k)fluoranthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzoic acid	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzyl alcohol	<	40.0000	ug/l	N/A	< 40.	N/A	NET
Beryllium	<	0.0100	mg/l	N/A	< 0.010	N/A	NET
Beryllium, (Dissd.)	<	0.0100	mg/l	N/A	N/A	N/A	NET
beta-BHC	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
bis(2-Chloroethoxy)methane	<	15.0000	ug/l	N/A	< 15.	N/A	NET
bis(2-Chloroethyl)ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
bis(2-Chloroisopropyl)ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
bis(2-Ethylhexyl)phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Bromodichloromethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Bromoform	<	1.0000	ug/l	N/A	< 1.	N/A	NET

TABLE A-11 (Continued)

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** PRELIMINARY Data **

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Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339							
Sample date - 10-11-90							
Bromomethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Butyl benzyl phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Cadmium		0.0010	mg/l	N/A	< 0.001	N/A	NET
Cadmium, (Dissd.)	<	0.0010	mg/l	N/A	N/A	N/A	NET
Calcium		307.0000	mg/l	N/A	< 1.00	N/A	NET
Calcium, (Dissd.)		61.1000	mg/l	N/A	N/A	N/A	NET
Carbon disulfide	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Carbon tetrachloride	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chlordane	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Chloride		114.0000	mg/l	N/A	< 1.	N/A	NET
Chlorobenzene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chloroform	<	1.0000	ug/l	N/A	17.1	N/A	NET
Chloromethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chromium, Total		0.1270	mg/l	N/A	< 0.005	N/A	NET
Chromium, Total (Dissd.)	<	0.0050	mg/l	N/A	N/A	N/A	NET
Chrysene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
cis-1,3-Dichloropropene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Cobalt		0.0280	mg/l	N/A	< 0.025	N/A	NET
Cobalt, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
Copper		0.1690	mg/l	N/A	< 0.025	N/A	NET
Copper, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
Cyanide	<	0.0050	mg/l	N/A	< 0.005	N/A	NET
delta-BHC	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Di-n-butylphthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Di-n-octylphthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dibenzo(a,h)anthracene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dibenzofuran	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dibromochloromethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Dieldrin	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Diethyl phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dimethyl phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Endosulfan I	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endosulfan II	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endosulfan sulfate	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endrin	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endrin aldehyde	<	0.2000	ug/l	N/A	< 0.2	N/A	NET

TABLE A-11 (Continued)

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339							
Sample date - 10-11-90							
Ethyl benzene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Fluoranthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Fluorene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Fluoride		3.0300	mg/l	N/A	0.10	N/A	NET
gamma-BHC (Lindane)	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Heptachlor	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Heptachlor epoxide	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Hexachlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Hexachlorobutadiene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Hexachlorocyclopentadiene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Hexachloroethane	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Indeno(1,2,3-cd)pyrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Iron		223.0000	mg/l	N/A	< 0.050	N/A	NET
Iron, (Dissd.)		0.1000	mg/l	N/A	N/A	N/A	NET
Isophorone	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Lead		0.1270	mg/l	N/A	< 0.005	N/A	NET
Lead, (Dissd.)	<	0.0050	mg/l	N/A	N/A	N/A	NET
m-Dichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
m-Methylphenol (Cresol)	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Magnesium		133.0000	mg/l	N/A	< 1.00	N/A	NET
Magnesium, (Dissd.)		10.0000	mg/l	N/A	N/A	N/A	NET
Manganese		3.6100	mg/l	N/A	< 0.020	N/A	NET
Manganese, (Dissd.)		0.2820	mg/l	N/A	N/A	N/A	NET
Mercury	<	0.0002	mg/l	N/A	< 0.0002	N/A	NET
Mercury, (Dissd.)	<	0.0002	mg/l	N/A	N/A	N/A	NET
Methyl ethyl ketone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
Methylene chloride	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Molybdenum	<	0.0250	mg/l	N/A	< 0.025	N/A	NET
Molybdenum, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
N-Nitrosodi-n-propylamine	<	4.0000	ug/l	N/A	< 4.	N/A	NET
N-Nitrosodiphenylamine	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Naphthalene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Nickel		0.1390	mg/l	N/A	< 0.005	N/A	NET
Nickel, (Dissd.)	<	0.0050	mg/l	N/A	N/A	N/A	NET
Nitrobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Nitrogen, Nitrate+Nitrite		0.3200	mg/l	N/A	0.05	N/A	NET
o-Dichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET

TABLE A-11 (Continued)

** PRELIMINARY Data **

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339							
Sample date - 10-11-90							
o-Methylphenol (Cresol)	<	4.0000	ug/l	N/A	< 4.	N/A	NET
p-Chloroaniline	<	4.0000	ug/l	N/A	< 4.	N/A	NET
p-Dichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Pentachlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Phenanthrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Phenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Phosphorus, Total		3.4200	mg/l	N/A	< 0.20	N/A	NET
Potassium		15.3000	mg/l	N/A	< 1.00	N/A	NET
Potassium, (Dissd.)		2.6800	mg/l	N/A	N/A	N/A	NET
Pyrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Selenium		0.0040	mg/l	N/A	< 0.0025	N/A	NET
Selenium, (Dissd.)	<	0.0025	mg/l	N/A	N/A	N/A	NET
Silver	<	0.0010	mg/l	N/A	< 0.001	N/A	NET
Silver, (Dissd.)	<	0.0010	mg/l	N/A	N/A	N/A	NET
Sodium		120.0000	mg/l	N/A	< 1.00	N/A	NET
Sodium, (Dissd.)		41.6000	mg/l	N/A	N/A	N/A	NET
Styrene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Sulfate		46.0000	mg/l	N/A	< 1.	N/A	NET
Tetrachloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Thallium	<	0.0100	mg/l	N/A	< 0.010	N/A	NET
Thallium, (Dissd.)	<	0.0100	mg/l	N/A	N/A	N/A	NET
Toluene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Toxaphene	<	0.5000	ug/l	N/A	< 0.5	N/A	NET
trans-1,2-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
trans-1,3-Dichloropropene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Trichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Vanadium		0.2500	mg/l	N/A	< 0.050	N/A	NET
Vanadium, (Dissd.)	<	0.0500	mg/l	N/A	N/A	N/A	NET
Vinyl acetate	<	2.0000	ug/l	N/A	< 2.	N/A	NET
Vinyl chloride	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Xylenes, Total	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Zinc		0.7150	mg/l	N/A	< 0.020	N/A	NET
Zinc, (Dissd.)	<	0.0200	mg/l	N/A	N/A	N/A	NET
Sample date - 02-27-91							
1,1,1,2-Tetrachloroethane	<	1.0000	ug/l	N/A	N/A	N/A	NET
1,1,1-Trichloroethane	<	1.0000	ug/l	N/A	< 1.	< 1.	NET

TABLE A-11 (Continued)

** PRELIMINARY Data **

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339							
Sample date - 02-27-91							
1,1,2,2-Tetrachloroethane	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
1,1,2-Trichloroethane	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
1,1-Dichloroethane	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
1,1-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
1,2,3-Trichloropropane	<	1.0000	ug/l	N/A	N/A	N/A	NET
1,2,4,5-Tetrachlorobenzene	<	4.0000	ug/l	N/A	N/A	N/A	NET
1,2,4-Trichlorobenzene	<	4.0000	ug/l	N/A	N/A	N/A	NET
1,2-Dibromo-3-Chloropropane	<	20.0000	ug/l	N/A	N/A	N/A	NET
1,2-Dibromoethane	<	20.0000	ug/l	N/A	N/A	N/A	NET
1,2-Dichloroethane	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
1,2-Dichloropropane	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
1,4-Naphthoquinone	<	15.0000	ug/l	N/A	N/A	N/A	NET
1-Naphthylamine	<	15.0000	ug/l	N/A	N/A	N/A	NET
2,4,5-T	<	2.5000	ug/l	N/A	N/A	N/A	NET
2,4,5-TP (Silvex)	<	2.5000	ug/l	N/A	N/A	N/A	NET
2,4,5-Trichlorophenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
2,4,6-Trichlorophenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
2,4-D	<	5.0000	ug/l	N/A	N/A	N/A	NET
2,4-Dichlorophenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
2,4-Dimethylphenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
2,4-Dinitrophenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
2,4-Dinitrotoluene	<	15.0000	ug/l	N/A	N/A	N/A	NET
2,6-Dichlorophenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
2,6-Dinitrotoluene	<	15.0000	ug/l	N/A	N/A	N/A	NET
2-Acetylaminofluorene	<	15.0000	ug/l	N/A	N/A	N/A	NET
2-Chloronaphthalene	<	4.0000	ug/l	N/A	N/A	N/A	NET
2-Chlorophenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
2-Hexanone	<	2.0000	ug/l	N/A	< 2.	< 2.	NET
2-Methylnaphthalene	<	4.0000	ug/l	N/A	N/A	N/A	NET
2-Naphthylamine	<	4.0000	ug/l	N/A	N/A	N/A	NET
2-Nitroaniline	<	15.0000	ug/l	N/A	N/A	N/A	NET
2-Nitrophenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
2-Picoline	<	15.0000	ug/l	N/A	N/A	N/A	NET
3,3'-Dichlorobenzidine	<	15.0000	ug/l	N/A	N/A	N/A	NET
3,3'-Dimethylbenzidine	<	15.0000	ug/l	N/A	N/A	N/A	NET
3-Methylcholanthrene	<	15.0000	ug/l	N/A	N/A	N/A	NET
3-Nitroaniline	<	15.0000	ug/l	N/A	N/A	N/A	NET

TABLE A-11 (Continued)

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** PRELIMINARY Data **

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339							
Sample date - 02-27-91							
4,4'-DDD	<	4.0000	ug/l	N/A	N/A	N/A	NET
4,4'-DDE	<	4.0000	ug/l	N/A	N/A	N/A	NET
4,4'-DDT	<	4.0000	ug/l	N/A	N/A	N/A	NET
4,6-Dinitro-2-methylphenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
4-Aminobiphenyl	<	15.0000	ug/l	N/A	N/A	N/A	NET
4-Bromophenyl phenyl ether	<	15.0000	ug/l	N/A	N/A	N/A	NET
4-Chloro-3-methylphenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
4-Chlorophenylphenyl ether	<	15.0000	ug/l	N/A	N/A	N/A	NET
4-Nitroaniline	<	15.0000	ug/l	N/A	N/A	N/A	NET
4-Nitrophenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
4-Nitroquinoline 1-oxide	<	15.0000	ug/l	N/A	N/A	N/A	NET
5-Nitro-o-toluidine	<	15.0000	ug/l	N/A	N/A	N/A	NET
a,a-Dimethylphenethylamine	<	15.0000	ug/l	N/A	N/A	N/A	NET
Acenaphthene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Acenaphthylene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Acetone	<	2.0000	ug/l	N/A	< 2.	< 1.	NET
Acetonitrile	<	1.0000	mg/l	N/A	N/A	N/A	NET
Acetophenone	<	15.0000	ug/l	N/A	N/A	N/A	NET
Acrolein	<	20.0000	ug/l	N/A	N/A	N/A	NET
Acrylonitrile	<	20.0000	ug/l	N/A	N/A	N/A	NET
Aldrin	<	0.2000	ug/l	N/A	N/A	N/A	NET
Alkalinity at CaCO3		300.0000	mg/l	N/A	2.0	2.0	NET
Allyl chloride	<	20.0000	ug/l	N/A	N/A	N/A	NET
alpha-BHC	<	0.2000	ug/l	N/A	N/A	N/A	NET
Aluminum		57.1000	mg/l	N/A	< 0.50	< 0.50	NET
Aluminum, (Dissd.)	<	0.5000	mg/l	N/A	< 0.50	< 0.50	NET
Ammonia, as nitrogen		0.0700	mg/l	N/A	< 0.02	< 0.02	NET
Aniline	<	4.0000	ug/l	N/A	N/A	N/A	NET
Anthracene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Antimony	<	0.0250	mg/l	N/A	< 0.025	< 0.025	NET
Antimony, (Dissd.)	<	0.0250	mg/l	N/A	< 0.025	< 0.025	NET
Aramite	<	15.0000	ug/l	N/A	N/A	N/A	NET
Aroclor 1016	<	0.2000	ug/l	N/A	N/A	N/A	NET
Aroclor 1221	<	0.2000	ug/l	N/A	N/A	N/A	NET
Aroclor 1232	<	0.2000	ug/l	N/A	N/A	N/A	NET
Aroclor 1242	<	0.2000	ug/l	N/A	N/A	N/A	NET
Aroclor 1248	<	0.2000	ug/l	N/A	N/A	N/A	NET

TABLE A-1 (Continued)

TABLE A-11 (Continued)

Sampling of Wells 1336, 1338, 1339, 1340, 1342, 1343, 1344, 1345, 1348, 1353, & 1361

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339							
Sample date - 02-27-91							
Aroclor 1254	<	0.2000	ug/l	N/A	N/A	N/A	NET
Aroclor 1260	<	0.2000	ug/l	N/A	N/A	N/A	NET
Arsenic		0.0380	mg/l	N/A	< 0.0025	< 0.0025	NET
Arsenic, (Dissd.)	<	0.0025	mg/l	N/A	< 0.0025	< 0.0025	NET
Barium		0.3850	mg/l	N/A	< 0.200	< 0.200	NET
Barium, (Dissd.)	<	0.2000	mg/l	N/A	< 0.200	< 0.200	NET
Benzene	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Benzo(a)anthracene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Benzo(a)pyrene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Benzo(b)fluoranthene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Benzo(ghi)perylene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Benzo(k)fluoranthene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Benzyl alcohol	<	40.0000	ug/l	N/A	N/A	N/A	NET
Beryllium	<	0.0100	mg/l	N/A	< 0.010	< 0.010	NET
Beryllium, (Dissd.)	<	0.0100	mg/l	N/A	< 0.010	< 0.010	NET
beta-BHC	<	0.2000	ug/l	N/A	N/A	N/A	NET
bis(2-Chloroethoxy)methane	<	15.0000	ug/l	N/A	N/A	N/A	NET
bis(2-Chloroethyl)ether	<	15.0000	ug/l	N/A	N/A	N/A	NET
bis(2-Ethylhexyl)phthalate	<	4.0000	ug/l	N/A	N/A	N/A	NET
Bromodichloromethane	<	1.0000	ug/l	N/A	7.1	6.3	NET
Bromoform	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Bromomethane	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Butyl benzyl phthalate	<	4.0000	ug/l	N/A	N/A	N/A	NET
Cadmium	<	0.0010	mg/l	N/A	< 0.001	< 0.001	NET
Cadmium, (Dissd.)	<	0.0010	mg/l	N/A	< 0.001	< 0.001	NET
Calcium		287.0000	mg/l	N/A	< 1.00	< 1.00	NET
Calcium, (Dissd.)		63.7000	mg/l	N/A	< 1.00	< 1.00	NET
Carbon disulfide	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Carbon tetrachloride	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Chlordane	<	0.2000	ug/l	N/A	N/A	N/A	NET
Chloride		78.0000	mg/l	N/A	< 1.	< 1.	NET
Chlorobenzene	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Chlorobenzilate	<	15.0000	ug/l	N/A	N/A	N/A	NET
Chloroethane	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Chloroform	<	1.0000	ug/l	N/A	20.8	27.2	NET
Chloromethane	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Chloroprene	<	20.0000	ug/l	N/A	N/A	N/A	NET

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Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339							
Sample date - 02-27-91							
Chromium, Total		0.1760	mg/l	N/A	< 0.005	< 0.005	NET
Chromium, Total (Dissd.)	<	0.0050	mg/l	N/A	< 0.005	< 0.005	NET
Chrysene	<	4.0000	ug/l	N/A	N/A	N/A	NET
cis-1,3-Dichloropropene	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Cobalt	<	0.0250	mg/l	N/A	< 0.025	< 0.025	NET
Cobalt, (Dissd.)	<	0.0250	mg/l	N/A	< 0.025	< 0.025	NET
Copper		0.1010	mg/l	N/A	< 0.025	< 0.025	NET
Copper, (Dissd.)	<	0.0250	mg/l	N/A	< 0.025	< 0.025	NET
CS-137	<	6.8000	pCi/l	N/A	< 8.3E+0	8.1E+0	IT
Cyanide	<	0.0050	mg/l	N/A	< 0.005	< 0.005	NET
delta-BHC	<	0.2000	ug/l	N/A	N/A	N/A	NET
Di-n-butylphthalate	<	4.0000	ug/l	N/A	N/A	N/A	NET
Di-n-octylphthalate	<	4.0000	ug/l	N/A	N/A	N/A	NET
Diallate	<	15.0000	ug/l	N/A	N/A	N/A	NET
Dibenzo(a,h)anthracene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Dibenzofuran	<	4.0000	ug/l	N/A	N/A	N/A	NET
Dibromochloromethane	<	1.0000	ug/l	N/A	1.9	< 1.	NET
Dibromomethane	<	1.0000	ug/l	N/A	N/A	N/A	NET
Dichlorodifluoromethane	<	1.0000	ug/l	N/A	N/A	N/A	NET
Dichlorodiisopropyl ether	<	4.0000	ug/l	N/A	N/A	N/A	NET
Dieldrin	<	0.2000	ug/l	N/A	N/A	N/A	NET
Diethyl phthalate	<	4.0000	ug/l	N/A	N/A	N/A	NET
Dimethoate	<	15.0000	ug/l	N/A	N/A	N/A	NET
Dimethyl phthalate	<	4.0000	ug/l	N/A	N/A	N/A	NET
Dimethylamino azobenene	<	15.0000	ug/l	N/A	N/A	N/A	NET
Dimethylbenz(a)anthracene	<	15.0000	ug/l	N/A	N/A	N/A	NET
Dinoseb	<	2.5000	ug/l	N/A	N/A	N/A	NET
Diphenylamine	<	15.0000	ug/l	N/A	N/A	N/A	NET
Disulfoton	<	15.0000	ug/l	N/A	N/A	N/A	NET
Endosulfan I	<	0.2000	ug/l	N/A	N/A	N/A	NET
Endosulfan II	<	0.2000	ug/l	N/A	N/A	N/A	NET
Endosulfan sulfate	<	0.2000	ug/l	N/A	N/A	N/A	NET
Endrin	<	0.2000	ug/l	N/A	N/A	N/A	NET
Endrin aldehyde	<	0.2000	ug/l	N/A	N/A	N/A	NET
Ethyl benzene	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Ethyl methacrylate	<	20.0000	ug/l	N/A	N/A	N/A	NET
Ethyl methanesulfonate	<	15.0000	ug/l	N/A	N/A	N/A	NET

TABLE A-11 (Continued)

** PRELIMINARY Data **

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TABLE A-11 (Continued)

Sampling of Wells 1336, 1338, 1339, 1340, 1342, 1343, 1344, 1345, 1348, 1353, & 1361

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339							
Sample date - 02-27-91							
Famphur	<	15.0000	ug/l	N/A	N/A	N/A	NET
Fluoranthene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Fluorene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Fluoride		0.2700	mg/l	N/A	< 0.05	< 0.05	NET
Fluorotrichloromethane	<	1.0000	ug/l	N/A	N/A	N/A	NET
gamma-BHC (Lindane)	<	0.2000	ug/l	N/A	N/A	N/A	NET
GROSS ALPHA		368.0000	pCi/l	N/A	< 1.6E-1	4.3E-1	IT
GROSS BETA		304.0000	pCi/l	N/A	< 1.0E+0	1.0E+0	IT
Heptachlor	<	0.2000	ug/l	N/A	N/A	N/A	NET
Heptachlor epoxide	<	0.2000	ug/l	N/A	N/A	N/A	NET
Hexachlorobenzene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Hexachlorobutadiene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Hexachlorocyclopentadiene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Hexachloroethane	<	4.0000	ug/l	N/A	N/A	N/A	NET
Hexachlorophene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Hexachloropropene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Indeno(1,2,3-cd)pyrene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Iodomethane	<	20.0000	ug/l	N/A	N/A	N/A	NET
Iron		110.0000	mg/l	N/A	< 0.050	< 0.050	NET
Iron, (Dissd.)	<	0.0500	mg/l	N/A	< 0.050	< 0.050	NET
Isobutyl alcohol	<	3.0000	mg/l	N/A	N/A	N/A	NET
Isodrin	<	4.0000	ug/l	N/A	N/A	N/A	NET
Isophorone	<	4.0000	ug/l	N/A	N/A	N/A	NET
Isosafrole	<	15.0000	ug/l	N/A	N/A	N/A	NET
Kepone	<	4.0000	ug/l	N/A	N/A	N/A	NET
Lead		0.0290	mg/l	N/A	< 0.005	< 0.005	NET
Lead, (Dissd.)	<	0.0050	mg/l	N/A	< 0.005	< 0.005	NET
m-Dichlorobenzene	<	4.0000	ug/l	N/A	N/A	N/A	NET
m-Dinitrobenzene	<	15.0000	ug/l	N/A	N/A	N/A	NET
m-Methylphenol (Cresol)	<	4.0000	ug/l	N/A	N/A	N/A	NET
Magnesium		88.0000	mg/l	N/A	< 1.00	< 1.00	NET
Magnesium, (Dissd.)		21.0000	mg/l	N/A	< 1.00	< 1.00	NET
Manganese		3.0100	mg/l	N/A	< 0.020	< 0.020	NET
Manganese, (Dissd.)		0.1330	mg/l	N/A	< 0.020	< 0.020	NET
Mercury	<	0.0002	mg/l	N/A	< 0.0002	< 0.0002	NET
Mercury, (Dissd.)	<	0.0002	mg/l	N/A	< 0.0002	< 0.0002	NET
Methacrylonitrile	<	20.0000	ug/l	N/A	N/A	N/A	NET

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Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339							
Sample date - 02-27-91							
Methapyriline	<	15.0000	ug/l	N/A	N/A	N/A	NET
Methoxychlor	<	0.2000	ug/l	N/A	N/A	N/A	NET
Methyl ethyl ketone	<	2.0000	ug/l	N/A	< 2.	< 2.	NET
Methyl isobutyl ketone	<	2.0000	ug/l	N/A	N/A	N/A	NET
Methyl methacrylate	<	20.0000	ug/l	N/A	N/A	N/A	NET
Methyl methanesulfonate	<	15.0000	ug/l	N/A	N/A	N/A	NET
Methyl parathion	<	15.0000	ug/l	N/A	N/A	N/A	NET
Methylene chloride	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Molybdenum	<	0.0250	mg/l	N/A	< 0.025	< 0.025	NET
Molybdenum, (Dissd.)	<	0.0250	mg/l	N/A	< 0.025	< 0.025	NET
N-Nitrosodi-n-butylamine	<	4.0000	ug/l	N/A	N/A	N/A	NET
N-Nitrosodi-n-propylamine	<	4.0000	ug/l	N/A	N/A	N/A	NET
N-Nitrosodiethylamine	<	4.0000	ug/l	N/A	N/A	N/A	NET
N-Nitrosodimethylamine	<	4.0000	ug/l	N/A	N/A	N/A	NET
N-Nitrosodiphenylamine	<	4.0000	ug/l	N/A	N/A	N/A	NET
N-Nitrosomethylethylamine	<	4.0000	ug/l	N/A	N/A	N/A	NET
N-Nitrosomorpholine	<	15.0000	ug/l	N/A	N/A	N/A	NET
N-Nitrosopiperidine	<	15.0000	ug/l	N/A	N/A	N/A	NET
N-Nitrosopyrrolidine	<	15.0000	ug/l	N/A	N/A	N/A	NET
Naphthalene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Nickel		0.1030	mg/l	N/A	< 0.005	< 0.005	NET
Nickel, (Dissd.)	<	0.0050	mg/l	N/A	< 0.005	< 0.005	NET
Nitrobenzene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Nitrogen, Nitrate		0.5800	mg/l	N/A	< 0.02	< 0.02	NET
NP-237	<	0.1400	pCi/l	N/A	< 1.5E-1	1.1E-1	IT
o-Dichlorobenzene	<	4.0000	ug/l	N/A	N/A	N/A	NET
o-Methylphenol (Cresol)	<	4.0000	ug/l	N/A	N/A	N/A	NET
o-Toluidine	<	15.0000	ug/l	N/A	N/A	N/A	NET
p-Chloroaniline	<	4.0000	ug/l	N/A	N/A	N/A	NET
p-Dichlorobenzene	<	4.0000	ug/l	N/A	N/A	N/A	NET
p-Dioxane	<	5.0000	mg/l	N/A	N/A	N/A	NET
p-Methylphenol (Cresol)	<	4.0000	ug/l	N/A	N/A	N/A	NET
p-Phenylenediamine	<	15.0000	ug/l	N/A	N/A	N/A	NET
Parathion	<	15.0000	ug/l	N/A	N/A	N/A	NET
Pentachlorobenzene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Pentachloroethane	<	20.0000	ug/l	N/A	N/A	N/A	NET
Pentachloronitrobenzene	<	4.0000	ug/l	N/A	N/A	N/A	NET

TABLE A-11 (Continued)

** PRELIMINARY Data **

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Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339							
Sample date - 02-27-91							
Pentachlorophenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
pH		7.3200	S.U.	N/A	5.49	4.91	NET
Phenacetin	<	4.0000	ug/l	N/A	N/A	N/A	NET
Phenanthrene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Phenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
Phenols		0.0060	mg/l	N/A	< 0.005	0.005	NET
Phorate	<	15.0000	ug/l	N/A	N/A	N/A	NET
Phosphorus, Total		1.6700	mg/l	N/A	< 0.10	< 0.10	NET
Potassium		11.5000	mg/l	N/A	< 1.00	< 1.00	NET
Potassium, (Dissd.)		1.3700	mg/l	N/A	< 1.00	< 1.00	NET
Pronamide	<	15.0000	ug/l	N/A	N/A	N/A	NET
Propionitrile	<	20.0000	ug/l	N/A	N/A	N/A	NET
PU-238	<	0.1800	pCi/l	N/A	< 1.6E-1	N/A	IT
PU-239/240	<	0.1400	pCi/l	N/A	< 1.3E-1	N/A	IT
Pyrene	<	4.0000	ug/l	N/A	N/A	N/A	NET
Pyridine	<	4.0000	ug/l	N/A	N/A	N/A	NET
RA-226		3.4200	pCi/l	N/A	< 1.6E-1	2.0E-1	IT
RA-228		3.0900	pCi/l	N/A	1.99E+0	1.9E+0	IT
RU-106	<	77.0000	pCi/l	N/A	< 7.8E+1	6.8E+1	IT
Safrole	<	15.0000	ug/l	N/A	N/A	N/A	NET
Selenium	<	0.0025	mg/l	N/A	< 0.0025	< 0.0025	NET
Selenium, (Dissd.)	<	0.0025	mg/l	N/A	< 0.0025	< 0.0025	NET
Silver	<	0.0010	mg/l	N/A	< 0.001	< 0.001	NET
Silver, (Dissd.)	<	0.0010	mg/l	N/A	< 0.001	< 0.001	NET
Sodium		83.0000	mg/l	N/A	< 1.00	< 1.00	NET
Sodium, (Dissd.)		81.0000	mg/l	N/A	< 1.00	< 1.00	NET
Specific conductance		871.0000	umhos/cm	N/A	2.40	1.30	NET
Styrene	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Sulfate		70.0000	mg/l	N/A	< 1.	< 1.	NET
Sulfide	<	0.2000	mg/l	N/A	N/A	N/A	NET
Sulfotepp	<	15.0000	ug/l	N/A	N/A	N/A	NET
sym-Trinitrobenzene	<	15.0000	ug/l	N/A	N/A	N/A	NET
t-1,4-Dichloro-2-butene	<	20.0000	ug/l	N/A	N/A	N/A	NET
TC-99		44.5000	pCi/l	N/A	< 1.7E+1	2.0E+1	IT
Tetrachloroethene	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Tetrachlorophenol	<	4.0000	ug/l	N/A	N/A	N/A	NET
TH-228		2.0700	pCi/l	N/A	6.35E-1	5.00E-1	IT

TABLE A-11 (Continued)

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1339							
Sample date - 02-27-91							
TH-230		1.8700	pCi/l	N/A	< 2.0E-1	2.50E-1	IT
TH-232		1.0700	pCi/l	N/A	< 2.0E-1	1.8E-1	IT
TH-TOTAL		9.6200	ug/l	N/A	< 1.8E+0	1.6E+0	IT
Thallium	<	0.0100	mg/l	N/A	< 0.010	< 0.010	NET
Thallium, (Dissd.)	<	0.0100	mg/l	N/A	< 0.010	< 0.010	NET
Thionazin	<	15.0000	ug/l	N/A	N/A	N/A	NET
Tin	<	1.0000	mg/l	N/A	N/A	N/A	NET
Tin, (Dissd.)	<	1.0000	mg/l	N/A	N/A	N/A	NET
TOC		30.0000	mg/l	N/A	< 1.	< 1.	NET
Toluene	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Total dissolved solids		510.0000	mg/l	N/A	< 10.	< 10.	NET
TOX	<	10.0000	ug/l Cl-	N/A	< 10.	< 10.	NET
Toxaphene	<	0.5000	ug/l	N/A	N/A	N/A	NET
trans-1,2-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
trans-1,3-Dichloropropene	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Trichloroethene	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Triethyl phosphorothioate	<	4.0000	ug/l	N/A	N/A	N/A	NET
U-234		177.0000	pCi/l	N/A	7.41E-1	2.89E-1	IT
U-235/236		8.1100	pCi/l	N/A	< 2.2E-1	2.6E-1	IT
U-238		189.0000	pCi/l	N/A	< 2.2E-1	3.27E-1	IT
U-TOTAL		533.0000	ug/l	N/A	< 1.7E-1	4.0E-1	IT
Vanadium		0.4160	mg/l	N/A	< 0.050	< 0.050	NET
Vanadium, (Dissd.)	<	0.0500	mg/l	N/A	< 0.050	< 0.050	NET
Vinyl acetate	<	2.0000	ug/l	N/A	< 2.	< 2.	NET
Vinyl chloride	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Xylenes, Total	<	1.0000	ug/l	N/A	< 1.	< 1.	NET
Zinc		0.4640	mg/l	N/A	< 0.020	< 0.020	NET
Zinc, (Dissd.)		0.0270	mg/l	N/A	0.145	< 0.020	NET
Well #1342							
Sample date - 10-11-90							
1,1,1-Trichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1,2,2-Tetrachloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1,2-Trichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1-Dichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET

TABLE A-11 (Continued)

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1342							
Sample date - 10-11-90							
1,2,4-Trichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
1,2-Dichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,2-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,2-Dichloropropane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
2,4,5-Trichlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4,6-Trichlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dichlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dimethylphenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dinitrophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dinitrotoluene	<	15.0000	ug/l	N/A	< 15.	N/A	NET
2,6-Dinitrotoluene	<	15.0000	ug/l	N/A	< 15.	N/A	NET
2-Chloroethyl vinyl ether	<	10.0000	ug/l	N/A	< 10.	N/A	NET
2-Chloronaphthalene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2-Chlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2-Hexanone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
2-Methylnaphthalene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2-Nitroaniline	<	15.0000	ug/l	N/A	< 15.	N/A	NET
2-Nitrophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
3,3'-Dichlorobenzidine	<	15.0000	ug/l	N/A	< 15.	N/A	NET
3-Nitroaniline	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4,4'-DDD	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
4,4'-DDE	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
4,4'-DDT	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
4,6-Dinitro-2-methylphenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
4-Bromophenyl phenyl ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4-Chloro-3-methylphenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
4-Chlorophenylphenyl ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4-Methyl-2-pentanone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
4-Nitroaniline	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4-Nitrophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Acenaphthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Acenaphthylene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Acetone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
Aldrin	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
alpha-BHC	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aluminum		205.0000	mg/l	N/A	< 0.50	N/A	NET
Aluminum, (Dissd.)	<	0.5000	mg/l	N/A	N/A	N/A	NET

TABLE A-11 (Continued)

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1342							
Sample date - 10-11-90							
Ammonia, as nitrogen		0.4600	mg/l	N/A	< 0.02	N/A	NET
Anthracene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Antimony	<	0.0250	mg/l	N/A	< 0.025	N/A	NET
Antimony, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
Aroclor 1016	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1221	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1232	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1242	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1248	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1254	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1260	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Arsenic		0.4320	mg/l	N/A	< 0.0025	N/A	NET
Arsenic, (Dissd.)		0.0080	mg/l	N/A	N/A	N/A	NET
Barium		2.7100	mg/l	N/A	< 0.200	N/A	NET
Barium, (Dissd.)		0.2510	mg/l	N/A	N/A	N/A	NET
Benzene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Benzo(a)anthracene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(a)pyrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(b)fluoranthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(ghi)perylene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(k)fluoranthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzoic acid	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzyl alcohol	<	40.0000	ug/l	N/A	< 40.	N/A	NET
Beryllium	<	0.0100	mg/l	N/A	< 0.010	N/A	NET
Beryllium, (Dissd.)	<	0.0100	mg/l	N/A	N/A	N/A	NET
beta-BHC	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
bis(2-Chloroethoxy)methane	<	15.0000	ug/l	N/A	< 15.	N/A	NET
bis(2-Chloroethyl)ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
bis(2-Chloroisopropyl)ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
bis(2-Ethylhexyl)phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Bromodichloromethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Bromoform	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Bromomethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Butyl benzyl phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Cadmium		0.0120	mg/l	N/A	< 0.001	N/A	NET
Cadmium, (Dissd.)	<	0.0010	mg/l	N/A	N/A	N/A	NET
Calcium		1490.0000	mg/l	N/A	< 1.00	N/A	NET

TABLE A-1 (Continued)

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** PRELIMINARY Data **

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Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1342							
Sample date - 10-11-90							
Calcium, (Dissd.)		113.0000	mg/l	N/A	N/A	N/A	NET
Carbon disulfide	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Carbon tetrachloride	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chlordane	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Chloride		84.0000	mg/l	N/A	< 1.	N/A	NET
Chlorobenzene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chloroform	<	1.0000	ug/l	N/A	17.1	N/A	NET
Chloromethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chromium, Total		0.4920	mg/l	N/A	< 0.005	N/A	NET
Chromium, Total (Dissd.)	<	0.0050	mg/l	N/A	N/A	N/A	NET
Chrysene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
cis-1,3-Dichloropropene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Cobalt		0.0570	mg/l	N/A	< 0.025	N/A	NET
Cobalt, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
Copper		0.5720	mg/l	N/A	< 0.025	N/A	NET
Copper, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
Cyanide	<	0.0050	mg/l	N/A	< 0.005	N/A	NET
delta-BHC	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Di-n-butylphthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Di-n-octylphthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dibenzo(a,h)anthracene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dibenzofuran	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dibromochloromethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Dieldrin	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Diethyl phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dimethyl phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Endosulfan I	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endosulfan II	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endosulfan sulfate	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endrin	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endrin aldehyde	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Ethyl benzene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Fluoranthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Fluorene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Fluoride		0.6000	mg/l	N/A	0.10	N/A	NET
gamma-BHC (Lindane)	<	0.2000	ug/l	N/A	< 0.2	N/A	NET

TABLE A-11 (Continued)

** PRELIMINARY Data **

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1342							
Sample date - 10-11-90							
Heptachlor	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Heptachlor epoxide	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Hexachlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Hexachlorobutadiene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Hexachlorocyclopentadiene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Hexachloroethane	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Indeno(1,2,3-cd)pyrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Iron		860.0000	mg/l	N/A	< 0.050	N/A	NET
Iron, (Dissd.)		1.9000	mg/l	N/A	N/A	N/A	NET
Isophorone	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Lead		0.3320	mg/l	N/A	< 0.005	N/A	NET
Lead, (Dissd.)	<	0.0050	mg/l	N/A	N/A	N/A	NET
m-Dichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
m-Methylphenol (Cresol)	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Magnesium		390.0000	mg/l	N/A	< 1.00	N/A	NET
Magnesium, (Dissd.)		21.0000	mg/l	N/A	N/A	N/A	NET
Manganese		39.7000	mg/l	N/A	< 0.020	N/A	NET
Manganese, (Dissd.)		9.0300	mg/l	N/A	N/A	N/A	NET
Mercury	<	0.0002	mg/l	N/A	< 0.0002	N/A	NET
Mercury, (Dissd.)	<	0.0002	mg/l	N/A	N/A	N/A	NET
Methyl ethyl ketone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
Methylene chloride	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Molybdenum	<	0.0250	mg/l	N/A	< 0.025	N/A	NET
Molybdenum, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
N-Nitrosodi-n-propylamine	<	4.0000	ug/l	N/A	< 4.	N/A	NET
N-Nitrosodiphenylamine	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Naphthalene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Nickel		0.6160	mg/l	N/A	< 0.005	N/A	NET
Nickel, (Dissd.)	<	0.0050	mg/l	N/A	N/A	N/A	NET
Nitrobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Nitrogen, Nitrate+Nitrite	<	0.0200	mg/l	N/A	0.05	N/A	NET
o-Dichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
o-Methylphenol (Cresol)	<	4.0000	ug/l	N/A	< 4.	N/A	NET
p-Chloroaniline	<	4.0000	ug/l	N/A	< 4.	N/A	NET
p-Dichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Pentachlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Phenanthrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET

TABLE A-11 (Continued)

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1342							
Sample date - 10-11-90							
Phenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Phosphorus, Total		3.6600	mg/l	N/A	< 0.20	N/A	NET
Potassium		31.8000	mg/l	N/A	< 1.00	N/A	NET
Potassium, (Dissd.)		1.7700	mg/l	N/A	N/A	N/A	NET
Pyrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Selenium	<	0.0025	mg/l	N/A	< 0.0025	N/A	NET
Selenium, (Dissd.)	<	0.0025	mg/l	N/A	N/A	N/A	NET
Silver		0.0010	mg/l	N/A	< 0.001	N/A	NET
Silver, (Dissd.)	<	0.0010	mg/l	N/A	N/A	N/A	NET
Sodium		34.7000	mg/l	N/A	< 1.00	N/A	NET
Sodium, (Dissd.)		39.8000	mg/l	N/A	N/A	N/A	NET
Styrene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Sulfate		14.0000	mg/l	N/A	< 1.	N/A	NET
Tetrachloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Thallium	<	0.0100	mg/l	N/A	< 0.010	N/A	NET
Thallium, (Dissd.)	<	0.0100	mg/l	N/A	N/A	N/A	NET
Toluene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Toxaphene	<	0.5000	ug/l	N/A	< 0.5	N/A	NET
trans-1,2-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
trans-1,3-Dichloropropene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Trichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Vanadium		0.6200	mg/l	N/A	< 0.050	N/A	NET
Vanadium, (Dissd.)	<	0.0500	mg/l	N/A	N/A	N/A	NET
Vinyl acetate	<	2.0000	ug/l	N/A	< 2.	N/A	NET
Vinyl chloride	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Xylenes, Total	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Zinc		2.2900	mg/l	N/A	< 0.020	N/A	NET
Zinc, (Dissd.)		0.0250	mg/l	N/A	N/A	N/A	NET
Well #1343							
Sample date - 10-11-90							
1,1,1-Trichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1,2,2-Tetrachloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1,2-Trichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1-Dichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET

TABLE A-11 (Continued)

** PRELIMINARY Data **

Printed: 09/30/92 15:04

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1343							
Sample date - 10-11-90							
1,2,4-Trichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
1,2-Dichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,2-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,2-Dichloropropane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
2,4,5-Trichlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4,6-Trichlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dichlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dimethylphenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dinitrophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dinitrotoluene	<	15.0000	ug/l	N/A	< 15.	N/A	NET
2,6-Dinitrotoluene	<	15.0000	ug/l	N/A	< 15.	N/A	NET
2-Chloroethyl vinyl ether	<	10.0000	ug/l	N/A	< 10.	N/A	NET
2-Chloronaphthalene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2-Chlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2-Hexanone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
2-Methylnaphthalene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2-Nitroaniline	<	15.0000	ug/l	N/A	< 15.	N/A	NET
2-Nitrophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
3,3'-Dichlorobenzidine	<	15.0000	ug/l	N/A	< 15.	N/A	NET
3-Nitroaniline	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4,4'-DDD	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
4,4'-DDE	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
4,4'-DDT	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
4,6-Dinitro-2-methylphenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
4-Bromophenyl phenyl ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4-Chloro-3-methylphenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
4-Chlorophenylphenyl ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4-Methyl-2-pentanone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
4-Nitroaniline	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4-Nitrophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Acenaphthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Acenaphthylene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Acetone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
Aldrin	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
alpha-BHC	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aluminum		1.9800	mg/l	N/A	< 0.50	N/A	NET
Aluminum, (Dissd.)	<	0.5000	mg/l	N/A	N/A	N/A	NET

TABLE A-11 (Continued)

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1343							
Sample date - 10-11-90							
Ammonia, as nitrogen		0.0600	mg/l	N/A	< 0.02	N/A	NET
Anthracene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Antimony	<	0.0250	mg/l	N/A	< 0.025	N/A	NET
Antimony, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
Aroclor 1016	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1221	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1232	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1242	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1248	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1254	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1260	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Arsenic	<	0.0025	mg/l	N/A	< 0.0025	N/A	NET
Arsenic, (Dissd.)	<	0.0025	mg/l	N/A	N/A	N/A	NET
Barium	<	0.2000	mg/l	N/A	< 0.200	N/A	NET
Barium, (Dissd.)	<	0.2000	mg/l	N/A	N/A	N/A	NET
Benzene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Benzo(a)anthracene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(a)pyrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(b)fluoranthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(ghi)perylene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(k)fluoranthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzoic acid	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzyl alcohol	<	40.0000	ug/l	N/A	< 40.	N/A	NET
Beryllium	<	0.0100	mg/l	N/A	< 0.010	N/A	NET
Beryllium, (Dissd.)	<	0.0100	mg/l	N/A	N/A	N/A	NET
beta-BHC	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
bis(2-Chloroethoxy)methane	<	15.0000	ug/l	N/A	< 15.	N/A	NET
bis(2-Chloroethyl)ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
bis(2-Chloroisopropyl)ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
bis(2-Ethylhexyl)phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Bromodichloromethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Bromoform	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Bromomethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Butyl benzyl phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Cadmium	<	0.0010	mg/l	N/A	< 0.001	N/A	NET
Cadmium, (Dissd.)	<	0.0010	mg/l	N/A	N/A	N/A	NET
Calcium		125.0000	mg/l	N/A	< 1.00	N/A	NET

TABLE A-11 (Continued)

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1343							
Sample date - 10-11-90							
Calcium, (Dissd.)		136.0000	mg/l	N/A	N/A	N/A	NET
Carbon disulfide	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Carbon tetrachloride	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chlordane	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Chloride		322.0000	mg/l	N/A	< 1.	N/A	NET
Chlorobenzene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chloroform	<	1.0000	ug/l	N/A	17.1	N/A	NET
Chloromethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chromium, Total		0.0070	mg/l	N/A	< 0.005	N/A	NET
Chromium, Total (Dissd.)	<	0.0050	mg/l	N/A	N/A	N/A	NET
Chrysene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
cis-1,3-Dichloropropene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Cobalt	<	0.0250	mg/l	N/A	< 0.025	N/A	NET
Cobalt, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
Copper	<	0.0250	mg/l	N/A	< 0.025	N/A	NET
Copper, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
Cyanide	<	0.0050	mg/l	N/A	< 0.005	N/A	NET
delta-BHC	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Di-n-butylphthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Di-n-octylphthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dibenzo(a,h)anthracene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dibenzofuran	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dibromochloromethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Dieldrin	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Diethyl phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dimethyl phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Endosulfan I	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endosulfan II	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endosulfan sulfate	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endrin	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endrin aldehyde	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Ethyl benzene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Fluoranthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Fluorene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Fluoride		0.5900	mg/l	N/A	0.10	N/A	NET
gamma-BHC (Lindane)	<	0.2000	ug/l	N/A	< 0.2	N/A	NET

TABLE A-11 (Continued)

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1343							
Sample date - 10-11-90							
Heptachlor	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Heptachlor epoxide	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Hexachlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Hexachlorobutadiene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Hexachlorocyclopentadiene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Hexachloroethane	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Indeno(1,2,3-cd)pyrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Iron		4.6400	mg/l	N/A	< 0.050	N/A	NET
Iron, (Dissd.)	<	0.0500	mg/l	N/A	N/A	N/A	NET
Isophorone	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Lead	<	0.0050	mg/l	N/A	< 0.005	N/A	NET
Lead, (Dissd.)	<	0.0050	mg/l	N/A	N/A	N/A	NET
m-Dichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
m-Methylphenol (Cresol)	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Magnesium		65.0000	mg/l	N/A	< 1.00	N/A	NET
Magnesium, (Dissd.)		22.0000	mg/l	N/A	N/A	N/A	NET
Manganese		0.3630	mg/l	N/A	< 0.020	N/A	NET
Manganese, (Dissd.)		0.2660	mg/l	N/A	N/A	N/A	NET
Mercury	<	0.0002	mg/l	N/A	< 0.0002	N/A	NET
Mercury, (Dissd.)	<	0.0002	mg/l	N/A	N/A	N/A	NET
Methyl ethyl ketone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
Methylene chloride	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Molybdenum	<	0.0250	mg/l	N/A	< 0.025	N/A	NET
Molybdenum, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
N-Nitrosodi-n-propylamine	<	4.0000	ug/l	N/A	< 4.	N/A	NET
N-Nitrosodiphenylamine	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Naphthalene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Nickel		0.0070	mg/l	N/A	< 0.005	N/A	NET
Nickel, (Dissd.)	<	0.0050	mg/l	N/A	N/A	N/A	NET
Nitrobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Nitrogen, Nitrate+Nitrite		0.0200	mg/l	N/A	0.05	N/A	NET
o-Dichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
o-Methylphenol (Cresol)	<	4.0000	ug/l	N/A	< 4.	N/A	NET
p-Chloroaniline	<	4.0000	ug/l	N/A	< 4.	N/A	NET
p-Dichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Pentachlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Phenanthrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET

TABLE A-11 (Continued)

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1343							
Sample date - 10-11-90							
Phenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Phosphorus, Total		0.6400	mg/l	N/A	< 0.20	N/A	NET
Potassium		4.1600	mg/l	N/A	< 1.00	N/A	NET
Potassium, (Dissd.)		2.5600	mg/l	N/A	N/A	N/A	NET
Pyrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Selenium	<	0.0025	mg/l	N/A	< 0.0025	N/A	NET
Selenium, (Dissd.)	<	0.0025	mg/l	N/A	N/A	N/A	NET
Silver	<	0.0010	mg/l	N/A	< 0.001	N/A	NET
Silver, (Dissd.)	<	0.0010	mg/l	N/A	N/A	N/A	NET
Sodium		65.0000	mg/l	N/A	< 1.00	N/A	NET
Sodium, (Dissd.)		61.9000	mg/l	N/A	N/A	N/A	NET
Styrene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Sulfate		72.0000	mg/l	N/A	< 1.	N/A	NET
Tetrachloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Thallium	<	0.0100	mg/l	N/A	< 0.010	N/A	NET
Thallium, (Dissd.)	<	0.0100	mg/l	N/A	N/A	N/A	NET
Toluene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Toxaphene	<	0.5000	ug/l	N/A	< 0.5	N/A	NET
trans-1,2-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
trans-1,3-Dichloropropene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Trichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Vanadium	<	0.0500	mg/l	N/A	< 0.050	N/A	NET
Vanadium, (Dissd.)	<	0.0500	mg/l	N/A	N/A	N/A	NET
Vinyl acetate	<	2.0000	ug/l	N/A	< 2.	N/A	NET
Vinyl chloride	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Xylenes, Total	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Zinc		0.0220	mg/l	N/A	< 0.020	N/A	NET
Zinc, (Dissd.)	<	0.0200	mg/l	N/A	N/A	N/A	NET
Well #1345							
Sample date - 10-11-90							
1,1,1-Trichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1,2,2-Tetrachloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1,2-Trichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1-Dichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,1-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET

TABLE A-11 (Continued)

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1345							
Sample date - 10-11-90							
1,2,4-Trichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
1,2-Dichloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,2-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
1,2-Dichloropropane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
2,4,5-Trichlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4,6-Trichlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dichlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dimethylphenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dinitrophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2,4-Dinitrotoluene	<	15.0000	ug/l	N/A	< 15.	N/A	NET
2,6-Dinitrotoluene	<	15.0000	ug/l	N/A	< 15.	N/A	NET
2-Chloroethyl vinyl ether	<	10.0000	ug/l	N/A	< 10.	N/A	NET
2-Chloronaphthalene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2-Chlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2-Hexanone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
2-Methylnaphthalene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
2-Nitroaniline	<	15.0000	ug/l	N/A	< 15.	N/A	NET
2-Nitrophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
3,3'-Dichlorobenzidine	<	15.0000	ug/l	N/A	< 15.	N/A	NET
3-Nitroaniline	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4,4'-DDD	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
4,4'-DDE	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
4,4'-DDT	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
4,6-Dinitro-2-methylphenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
4-Bromophenyl phenyl ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4-Chloro-3-methylphenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
4-Chlorophenylphenyl ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4-Methyl-2-pentanone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
4-Nitroaniline	<	15.0000	ug/l	N/A	< 15.	N/A	NET
4-Nitrophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Acenaphthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Acenaphthylene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Acetone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
Aldrin	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
alpha-BHC	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aluminum		20.3000	mg/l	N/A	< 0.50	N/A	NET
Aluminum, (Dissd.)	<	0.5000	mg/l	N/A	N/A	N/A	NET

TABLE A-11 (Continued)

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1345							
Sample date - 10-11-90							
Ammonia, as nitrogen		2.1900	mg/l	N/A	< 0.02	N/A	NET
Anthracene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Antimony	<	0.0250	mg/l	N/A	< 0.025	N/A	NET
Antimony, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
Aroclor 1016	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1221	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1232	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1242	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1248	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1254	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Aroclor 1260	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Arsenic		0.0500	mg/l	N/A	< 0.0025	N/A	NET
Arsenic, (Dissd.)		0.0070	mg/l	N/A	N/A	N/A	NET
Barium		0.4290	mg/l	N/A	< 0.200	N/A	NET
Barium, (Dissd.)		0.2260	mg/l	N/A	N/A	N/A	NET
Benzene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Benzo(a)anthracene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(a)pyrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(b)fluoranthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(ghi)perylene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzo(k)fluoranthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzoic acid	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Benzyl alcohol	<	40.0000	ug/l	N/A	< 40.	N/A	NET
Beryllium	<	0.0100	mg/l	N/A	< 0.010	N/A	NET
Beryllium, (Dissd.)	<	0.0100	mg/l	N/A	N/A	N/A	NET
beta-BHC	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
bis(2-Chloroethoxy)methane	<	15.0000	ug/l	N/A	< 15.	N/A	NET
bis(2-Chloroethyl)ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
bis(2-Chloroisopropyl)ether	<	15.0000	ug/l	N/A	< 15.	N/A	NET
bis(2-Ethylhexyl)phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Bromodichloromethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Bromoform	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Bromomethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Butyl benzyl phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Cadmium		0.0050	mg/l	N/A	< 0.001	N/A	NET
Cadmium, (Dissd.)	<	0.0010	mg/l	N/A	N/A	N/A	NET
Calcium		202.0000	mg/l	N/A	< 1.00	N/A	NET

TABLE A-11 (Continued)

** PRELIMINARY Data **

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1345							
Sample date - 10-11-90							
Calcium, (Dissd.)		108.0000	mg/l	N/A	N/A	N/A	NET
Carbon disulfide	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Carbon tetrachloride	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chlordane	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Chloride		68.0000	mg/l	N/A	< 1.	N/A	NET
Chlorobenzene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chloroethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chloroform	<	1.0000	ug/l	N/A	17.1	N/A	NET
Chloromethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Chromium, Total		0.0730	mg/l	N/A	< 0.005	N/A	NET
Chromium, Total (Dissd.)	<	0.0050	mg/l	N/A	N/A	N/A	NET
Chrysene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
cis-1,3-Dichloropropene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Cobalt	<	0.0250	mg/l	N/A	< 0.025	N/A	NET
Cobalt, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
Copper		0.0680	mg/l	N/A	< 0.025	N/A	NET
Copper, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
Cyanide	<	0.0050	mg/l	N/A	< 0.005	N/A	NET
delta-BHC	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Di-n-butylphthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Di-n-octylphthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dibenzo(a,h)anthracene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dibenzofuran	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dibromochloromethane	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Dieldrin	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Diethyl phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Dimethyl phthalate	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Endosulfan I	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endosulfan II	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endosulfan sulfate	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endrin	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Endrin aldehyde	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Ethyl benzene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Fluoranthene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Fluorene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Fluoride		0.5800	mg/l	N/A	0.10	N/A	NET
gamma-BHC (Lindane)	<	0.2000	ug/l	N/A	< 0.2	N/A	NET

TABLE A-11 (Continued)

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1345							
Sample date - 10-11-90							
Heptachlor	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Heptachlor epoxide	<	0.2000	ug/l	N/A	< 0.2	N/A	NET
Hexachlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Hexachlorobutadiene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Hexachlorocyclopentadiene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Hexachloroethane	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Indeno(1,2,3-cd)pyrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Iron		97.4000	mg/l	N/A	< 0.050	N/A	NET
Iron, (Dissd.)		2.4000	mg/l	N/A	N/A	N/A	NET
Isophorone	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Lead		0.0790	mg/l	N/A	< 0.005	N/A	NET
Lead, (Dissd.)	<	0.0050	mg/l	N/A	N/A	N/A	NET
m-Dichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
m-Methylphenol (Cresol)	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Magnesium		83.0000	mg/l	N/A	< 1.00	N/A	NET
Magnesium, (Dissd.)		14.0000	mg/l	N/A	N/A	N/A	NET
Manganese		2.1600	mg/l	N/A	< 0.020	N/A	NET
Manganese, (Dissd.)		1.1400	mg/l	N/A	N/A	N/A	NET
Mercury	<	0.0002	mg/l	N/A	< 0.0002	N/A	NET
Mercury, (Dissd.)	<	0.0002	mg/l	N/A	N/A	N/A	NET
Methyl ethyl ketone	<	2.0000	ug/l	N/A	< 2.	N/A	NET
Methylene chloride	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Molybdenum	<	0.0250	mg/l	N/A	< 0.025	N/A	NET
Molybdenum, (Dissd.)	<	0.0250	mg/l	N/A	N/A	N/A	NET
N-Nitrosodi-n-propylamine	<	4.0000	ug/l	N/A	< 4.	N/A	NET
N-Nitrosodiphenylamine	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Naphthalene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Nickel		0.0510	mg/l	N/A	< 0.005	N/A	NET
Nickel, (Dissd.)	<	0.0050	mg/l	N/A	N/A	N/A	NET
Nitrobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Nitrogen, Nitrate+Nitrite	<	0.0200	mg/l	N/A	0.05	N/A	NET
o-Dichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
o-Methylphenol (Cresol)	<	4.0000	ug/l	N/A	< 4.	N/A	NET
p-Chloroaniline	<	4.0000	ug/l	N/A	< 4.	N/A	NET
p-Dichlorobenzene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Pentachlorophenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Phenanthrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET

TABLE A-11 (Continued)

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1345							
Sample date - 10-11-90							
Phenol	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Phosphorus, Total		1.6700	mg/l	N/A	< 0.20	N/A	NET
Potassium		10.6000	mg/l	N/A	< 1.00	N/A	NET
Potassium, (Dissd.)		4.8600	mg/l	N/A	N/A	N/A	NET
Pyrene	<	4.0000	ug/l	N/A	< 4.	N/A	NET
Selenium	<	0.0025	mg/l	N/A	< 0.0025	N/A	NET
Selenium, (Dissd.)	<	0.0025	mg/l	N/A	N/A	N/A	NET
Silver	<	0.0010	mg/l	N/A	< 0.001	N/A	NET
Silver, (Dissd.)	<	0.0010	mg/l	N/A	N/A	N/A	NET
Sodium		60.0000	mg/l	N/A	< 1.00	N/A	NET
Sodium, (Dissd.)		17.4000	mg/l	N/A	N/A	N/A	NET
Styrene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Sulfate	<	1.0000	mg/l	N/A	< 1.	N/A	NET
Tetrachloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Thallium	<	0.0100	mg/l	N/A	< 0.010	N/A	NET
Thallium, (Dissd.)	<	0.0100	mg/l	N/A	N/A	N/A	NET
Toluene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Toxaphene	<	0.5000	ug/l	N/A	< 0.5	N/A	NET
trans-1,2-Dichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
trans-1,3-Dichloropropene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Trichloroethene	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Vanadium		0.0890	mg/l	N/A	< 0.050	N/A	NET
Vanadium, (Dissd.)	<	0.0500	mg/l	N/A	N/A	N/A	NET
Vinyl acetate	<	2.0000	ug/l	N/A	< 2.	N/A	NET
Vinyl chloride	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Xylenes, Total	<	1.0000	ug/l	N/A	< 1.	N/A	NET
Zinc		0.2130	mg/l	N/A	< 0.020	N/A	NET
Zinc, (Dissd.)	<	0.0200	mg/l	N/A	N/A	N/A	NET
Well #1353							
Sample date - 10-29-90							
Benzene	<	0.5000	ug/l	N/A	< 0.5	N/A	NET
Ethyl benzene	<	0.5000	ug/l	N/A	< 0.5	N/A	NET
Lead		0.0880	mg/l	N/A	0.022	N/A	NET
Toluene	<	0.5000	ug/l	N/A	2.21	N/A	NET
Total Petroleum Hydrocarbon	<	1.0000	mg/l	N/A	< 1.	N/A	NET

TABLE A-11 (Continued)

TABLE A-11 (Continued)

Sampling of Wells 1336, 1338, 1339, 1340, 1342, 1343, 1344, 1345, 1348, 1353, & 1361

Parameter		Result	Units	Duplicate	Trip Blank	Field Blank	Lab
Well #1353							
Sample date - 10-29-90							
Xylenes, Total	<	1.0000	ug/l	N/A	< 1.	N/A	NET

Records printed: 1019