U-004-301.2

2030

ADDITIONAL SAMPLING ACTIVITIES FOR OPERABLE UNIT 2

10-01-90

9
REPORT

ADDITIONAL SAMPLING ACTIVITIES FOR OPERABLE UNIT 2

This work plan addendum presents an analysis of the current need for additional site characterization for Operable Unit 2 under the RI/FS. Operable Unit 2, Solid Waste Units, is comprised of five components: a Sanitary Landfill, an Inactive Fly Ash Disposal Area, an Active Fly Ash Pile, Lime Sludge Ponds; and the Southfield. This work plan addendum specifies the quantity and location of additional sampling locations and the type of analysis required. The justification for 18 soil borings is to adequately characterize the nature of contamination present and define the limits of the solid waste units within Operable Unit 2. Each solid waste unit was evaluated with data available from previous studies, primarily the CIS conducted by R. F. Weston (1986) and the present program. Additional sampling will increase the level of understanding of the volume, type, characteristics, and variability of the wastes. The specified analyses should be sufficient to characterize the source term for the geochemical modeling effort in support of the risk assessment for Operable Unit 2. This in turn increases the validity of the Risk Assessment and Feasibility Study.

Careful thought was given to placing the borings in order to minimize the number required while maximizing the usefulness of the information obtained. The locations were chosen due to the potential for the presence of contamination and to evaluate areas not characterized by previous borings. A summary of the sampling effort is outlined in Table 1. A detailed discussion and proposed sampling strategy is presented for each solid waste unit to be sampled.

SANITARY LANDFILL

Due to the heterogeneity of waste placed in the Sanitary Landfill, it is unreasonable to expect that any degree of sampling (short of excavation) would be sufficient to directly encounter all radiological and chemical constituents that may have been deposited in the landfill. Samples of the leachate from the wastes will provide an indicator of the migration of any soluble contaminants contained within the landfill. Soil samples will be taken from below the waste/till interface to determine if vertical migration of contamination from the landfill has occurred. It is proposed that four borings be completed within the landfill at locations shown on Figure 1. The landfill is composed of five excavated cells and an evaporation pond containing the disposed wastes. Two of the proposed boring locations are in the abandoned evaporation pond, where detectable concentrations of organics are expected to be found. One of the proposed borings is located in the vicinity of Weston CIS Borehole

TABLE 1

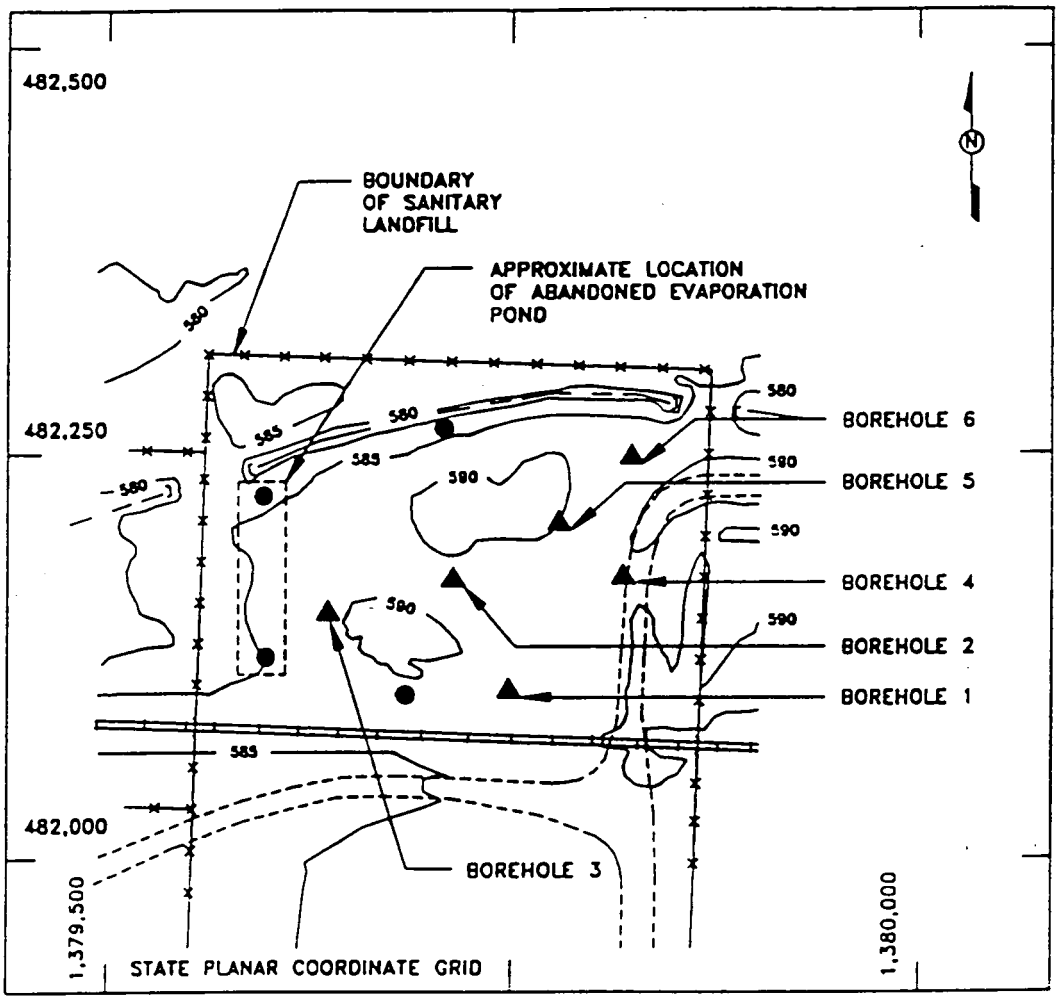
PROPOSED ADDITIONAL SAMPLING EFFORT, OPERABLE UNIT 2[a,b]

Location	Number of Borings	Approximate Depth (ft)	Purpose	Sample Type	Number of Samples per Boring	Sample Parameters
Sanitary Landfill, Near Periphery	4	15-20	Sample waste; determine depth of landfill, sample leachate	Soil/waste	3	Full Rad/Extended HSL, Dioxins, Furans, TOC[c], TCLP[b]
				Liquid/leachate	1	Extended Full RAD, General Groundwater[c]
Active Fly Ash Pile	4	15-20	Evaluate horizonal and vertical distribution and variability, sample leachate	Fly Ash/soil	3	Full RAD/Full HSL/TOC[c], TCLP[b], EP Tox
				Liquid/leachate	1 (if encountered)	Full HSL/Full RAD/General Groundwater[c]
Inactive Fly Ash Pile	4	25-35	As above	Fly Ash/soil	3	Full Rad/Full HSL, TOC[c], TCLP[b], EP Tox
				Liquid/leachate	1 (if encountered)	Full HSL/Full RAD/General Groundwater[c]
Lime Sludge Ponds	2	2	Sample lime sludge and standing water	Lime Sludge Standing Water	1 (per pond) 1 (per pond)	TCLP[b] Full RAD/Full HSL, General Water Quality[c]
Southfield	4	2	Sample fill	Waste/soil	1	TCLP[b]

[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.

[b]A composite of borehole materials (excluding samples submitted for other analyses and those samples collected below the waste/till interface) from each boring drilled in the Sanitary Landfill and Flyash Piles will be subjected to a TCLP test. Lime Sludge Pond and Southfield samples will also undergo a TCLP test. A composite of each boring in the Fly Ash Piles and Southfield will be tested for the characteristics of reactivity, corrosivity and ignitability.

[c]These parameters, added to further characterize geochemical properties.



NOTE:

BORING LOCATIONS MAY BE RELOCATED TO AREAS OF KNOWN SEEPS AS DIRECTED BY THE SITE GEOLOGIST.

SCALE

50 0 50 100 150 FEET

LEGEND:

▲ BOREHOLE (WESTON CIS)

● APPROXIMATE BORING LOCATIONS

FIGURE 1. APPROXIMATE SAMPLING LOCATIONS, SANITARY LANDFILL

49-03, where high concentrations of radionuclides were detected. Two of the proposed borings will be located on the southern bank of the drainage channel to the north of the landfill. The potential exists for lateral transport of contaminants found in shallow subsurface landfill material through the southern bank of the drainage channel via seepage. In addition, boring locations in the Sanitary Landfill attempt to complete an even spatial distribution of sampling across the landfill.

Each boring will be continuously sampled as specified in the RI/FS Sampling Plan, Section 4.0, such that materials encountered can be visually characterized. At approximate intervals of five feet, or when field instruments detect the presence of radiological or organic constituents, samples will be collected and retained for full radiological, TOC, and extended HSL including PCBs, Dioxin, and Furans. Three soil samples, one from the shallow and one from the deeper portions of the landfill as well as a sample from below the waste/till interface will be analyzed from each borehole, as shown in Table 1. In addition, a composite sample of each boring (excluding samples scheduled for other analyses and those collected below the waste/till interface) will be subjected to a TCLP test. Each boring should fully penetrate the landfill and be advanced approximately five feet past the waste/till interface. One of the samples obtained below the waste/till interface will be analyzed for full radiological, TOC, and extended HSL parameters, as shown in Table 1. This will determine if vertical migration of contaminants into the native soils below the landfill has occurred at the specified boring locations. Criteria for selection of sample to be analyzed will be field instrument readings. If no elevated readings are observed then the sample selected will be immediately below the waste/till interface.

Four-inch stainless steel piezometers will be installed in all the boreholes as specified in the RI/FS QAPP, Section 5.0, if leachate or groundwater is present. The leachate or groundwater will be collected and analyzed for extended HSL parameters, including PCBs, dioxin and furans, as well as general groundwater and full radiological components, as shown in Table 1. Standard operating procedures (SOPs) for sampling equipment and procedures, sample handling, chain-of-custody and documentation will be as specified in the RI/FS QAPP, Section 5.0, 6.0, and 7.0.

FLY ASH PILES

As part of the Weston CIS, two borings were placed within the Inactive Fly Ash Disposal Area and none were placed within the Active Fly Ash Pile. One composite sample per boring was analyzed for HSL pesticides/PCBs, HSL inorganics, and radiological constituents. Incremental depth

profile samples from each borehole were also tested for U-238, Th-232, and Ra-226 to access the vertical distribution of these radionuclides. In order to more fully characterize the vertical and horizontal distribution of contaminants contained within each fly ash pile, four additional borings within the Inactive Fly Ash Disposal Area and four additional borings within the Active Fly Ash Pile are proposed. Figures 2 and 3, respectively, show the proposed locations.

Each boring will fully penetrate the fly ash and be advanced approximately five feet past the pile/till soil interface. All borings will be sampled and samples submitted for analyses will be selected using protocols specified for the Sanitary Landfill borings. If a saturated zone is detected near the pile/till interface, piezometers will be installed as specified in section 5.0 of the RI/FS QAPP. The leachate or groundwater, if encountered, will be collected and analyzed for full HSL parameters including PCBs, as well as general groundwater, and full radiological components as shown in Table I.

The three discreet solid samples from each boring sent to the laboratory for analysis will be tested for a full suite of radionuclides, full HSL constituents, including PCBs and TOC. In addition, a composite sample (excluding samples below the pile/till interface and those submitted for other analyses) will be subjected to both an EP-Tox Test and a TCLP Test. Boring composite samples will also be tested for characteristics of ignitability, corrosivity, and reactivity.

The geotechnical testing program will be conducted to provide physical data to be used for development of selected alternatives. During the drilling of two borings, one at each pile, Shelby tube samples will be collected. One sample from each borehole, at an approximate depth of 10 feet below grade, will be subjected to geotechnical testing specified in Table 2. The choice of borings to obtain samples from is arbitrary, and shall be determined in the field. The choice of the sample interval is based on an average representation of the strength parameters and index properties of the fly ash.

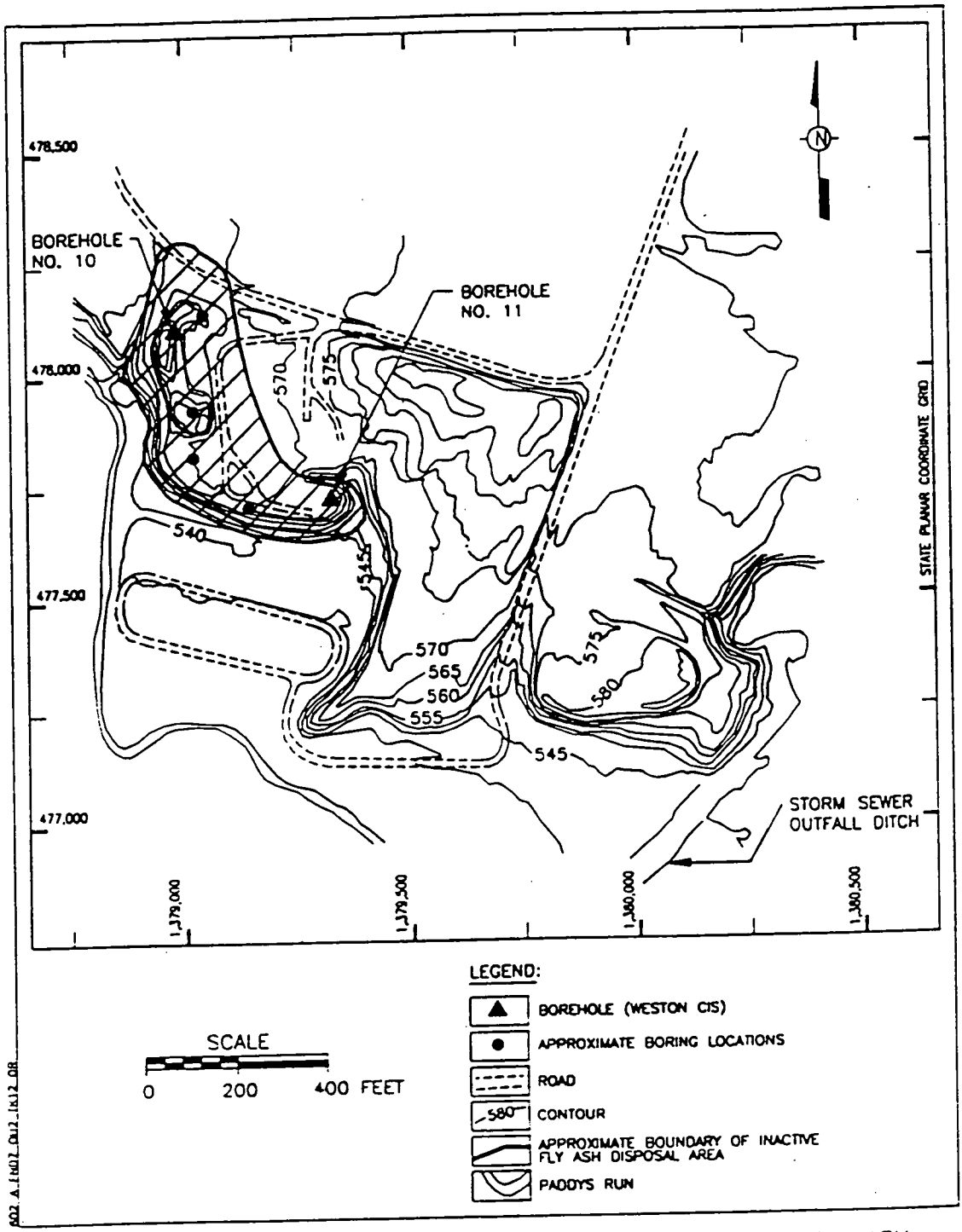


FIGURE 2. APPROXIMATE SAMPLING LOCATIONS, INACTIVE FLY ASH

2030

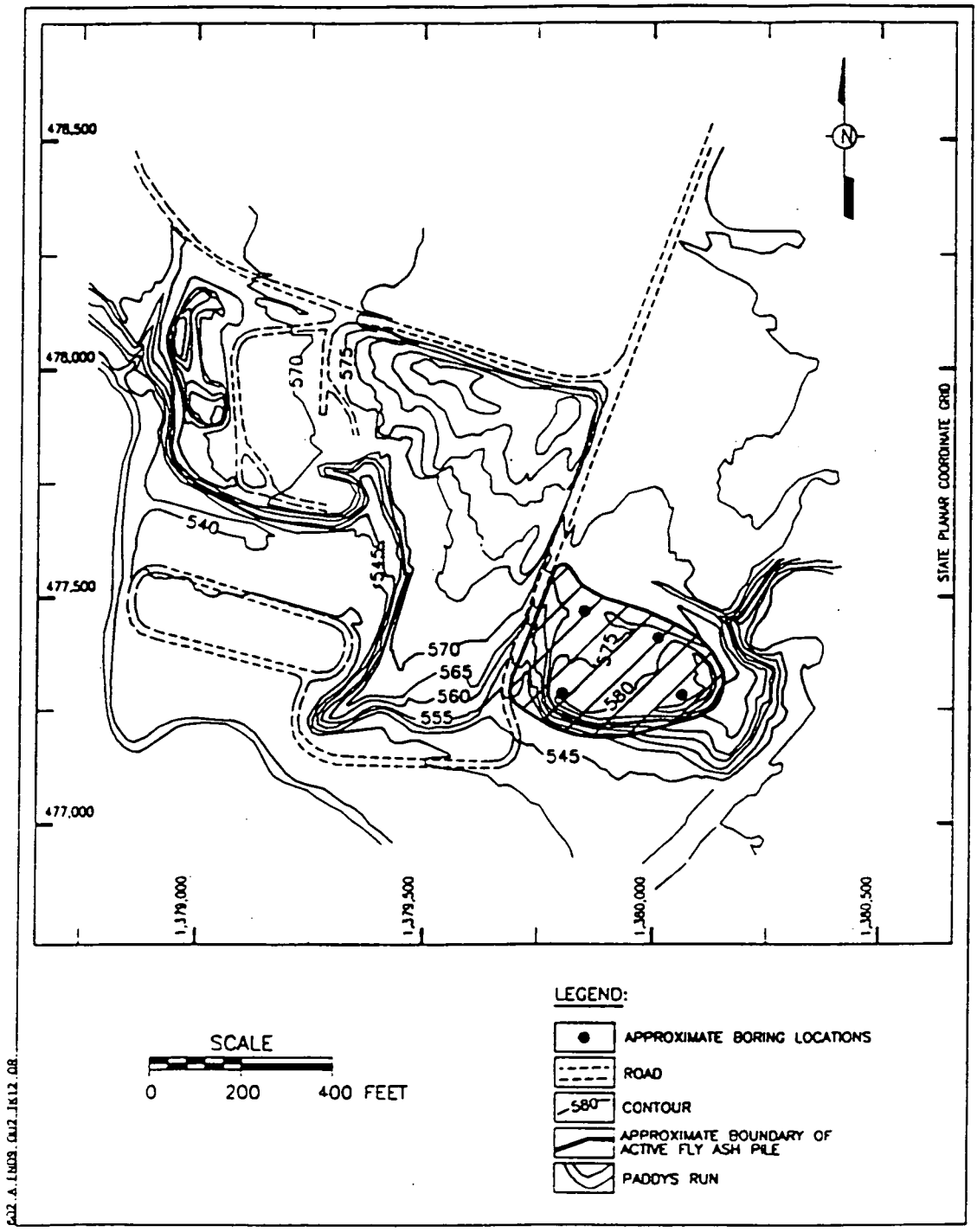


FIGURE 3. APPROXIMATE SAMPLING LOCATIONS, ACTIVE FLY ASH

TABLE 2

PROPOSED GEOTECHNICAL TESTING PROGRAM FOR THE FLY ASH PILES[a]

PER SAMPLE

Test	Method
Grain Size/Hydrometer	ASTM D-422
Atterberg Limits	ASTM D-4318
Moisture Content	ASTM D-2216
Specific Gravity	ASTM D-854
Standard Proctor	ASTM D-698
Relative Density[b]	ASTM D-2049
1-D Consolidation	ASTM D-2435
Permeability	ASTM D-2434
In-Place Density	ASTM D-2922 or ASTM D-2167 or ASTM D-1556

[a]One additional test is required to determine the quantities of major chemical constituents contained in the fly ash. This test is ASTM C 311, "Sampling and Testing Fly Ash for Use as an Admixture in Portland Cement Concrete." This test should be performed on a sample from both the Active Fly Ash Pile and Inactive Fly Ash Disposal Area.

[b]Due to the properties of fly ash, it is desirable to modify test apparatus to specifications outlined in the Electric Power Research Institute (EPRI) report EA-1281. This test will be completed as outlined in the report.

LIME SLUDGE PONDS

Additional borings are required in both the North and South Lime Sludge Ponds to obtain samples for TCLP tests mandated by current regulations. One sample from each Lime Sludge Pond will be obtained for analysis. A hand auger will be used to collect these samples. Grab samples will be taken approximately two feet below the surface of each pond. In addition, one grab sample of standing water from each of the ponds will be obtained and analyzed for full HSL including PCBs, full radiological, and general water quality parameters. Sampling locations are arbitrary, and shall be determined in the field. Sampling protocols are as specified in Section 6.0 of the QAPP. Data obtained from this additional sampling, along with data available from previous investigation will sufficiently characterize the wastes in the Lime Sludge Ponds.

SOUTHFIELD

Additional borings are required to obtain samples for RCRA characteristic analysis (TCLP-toxicity, ignitability, corrosivity, reactivity). Four samples will be obtained for analysis. The field supervisor will determine the location of each sample such that each quadrant (northeast, northwest, etc.) of the Southfield is represented. These locations will be surveyed in order to document sampling locations. A hand auger will be used to drill each hole. Grab samples will be taken approximately two feet below the surface of the fill material. Sampling protocols are as specified in Section 6.0 of the QAPP. Results of this sampling in addition to data collected in the CIS, Environmental Baseline Survey, and RI/FS trenching will be adequate to characterize the waste in the Southfield.