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SOLID WASTE LANDFILL TRENCHING

09-29-92

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ATTACHMENT 2

SOLID WASTE LANDFILL TRENCHING

1.0 FIELD ACTIVITIES

All field activities were performed in accordance with the OU2 RI/FS Work Plan Addendum, dated February 13, 1992. A total of three trenches were completed, using a track-mounted backhoe, within the Solid Waste Landfill (SWL) to a maximum depth of 12 feet below surface grade. Soil samples were collected from each end and the midpoint of each trench, at three-foot intervals from the surface to the total depth of each trench. The soil samples were field-screened for volatile organic vapors and radiological activities using a photoionization detection device (PID) and a beta/gamma pancake frisker, respectively. A geologist was present during trench excavation activities to classify soil types, record PID and beta/gamma readings, and document the nature and distribution of the fill materials. Groundwater, when present, was collected and analyzed to determine the presence and concentration of leachable contaminants.

1.1 TRENCH EXCAVATION

Each trench was oriented north-south in areas corresponding to RI/FS boring locations where there had been poor sample recovery. The length of each trench was approximately 50 feet.

1.1.1 Trench No. 1

Trench excavation activities were completed on July 9 1992, for this trench. Trench No. 1 was oriented approximately 15 feet west of Boring 1719, with the north and south ends approximately 25 feet north and south of Boring 1719, respectively. The northern and southern ends of the trench were excavated to an approximate depth of 12 feet. The central portion of the trench was excavated to an approximate depth of 2.5 feet. Trench excavation activities were terminated at this location due to large volumes of bagged asbestos materials and schedule restrictions.

1.1.2 Trench No. 2

Trench excavation activities were completed on July 16, 1992, for this trench. Trench No. 2 was oriented approximately 15 feet west of Boring 1721, with the north and south ends approximately 25 feet north and south of Boring 1721, respectively. The southern portion of this trench was excavated to an approximate depth of 12 feet below surface grade. The central and northern

portions of this trench were excavated to approximately 6 feet below grade. Excavation in the central portion of the trench was terminated to mitigate potential health and safety concerns associated with biomedical waste. The trench was immediately backfilled to mitigate potential airborne releases. Lastly, excavation at the north end of the trench was terminated due to large volumes of leachate and the potential of enhancing contaminant migration with increased trench depths.

1.1.3 Trench No. 3

Trench excavation activities were completed on July 14, 1992, for Trench No. 3, which was oriented approximately 15 feet west of Boring 1722, with the north and south ends of the trench approximately 25 feet north and south of Boring 1722, respectively. The southern portion of this trench was excavated to an approximate depth of 12 feet below surface grade. Trench excavation was terminated 6 feet below grade at the central portion, due to health and safety concerns associated with radiological activities in excess of action levels provided in the Health and Safety Plan. Trench excavation was terminated at approximately 3 feet below surface grade due to health and safety concerns associated with volatile organic vapors in ambient air exceeding Health and Safety Plan action levels. The trench was backfilled immediately in both instances, to mitigate the potential airborne release of contaminants.

1.2 SOIL SAMPLING AND FIELD SCREENING

Soil samples were collected from each end and the center of each trench at three-foot intervals from the surface to the total depth. The samples were obtained from the backhoe bucket and retained in 4-ounce glass jars. Each sample was field-screened using a beta/gamma pancake frisker device and then sealed with an aluminum foil lid. The sample was then submitted to direct sunlight a period of at least 15 minutes for equilibrium of the volatile organic compounds prior to field-screen analyses using a PID (HNu Model HW-101). The samples were then stored for subsequent visual inspection and classification by the geologist. The results of the field screening analyses were documented in field logbooks and on the RI/FS Visual Classification of Soils records.

1.3 SOIL/MEDIA CLASSIFICATION AND DOCUMENTATION

A geologist was present to visually inspect and classify soils and waste media encountered during trench excavation activities. The geologist documented the type and relative thicknesses of soil strata, and type and extent of waste media contained within the soil units. In addition, the geologist was

portions of this trench were excavated to approximately 6 feet below grade. Excavation in the central portion of the trench was terminated to mitigate potential health and safety concerns associated with biomedical waste. The trench was immediately backfilled to mitigate potential airborne releases. Lastly, excavation at the north end of the trench was terminated due to large volumes of leachate and the potential of enhancing contaminant migration with increased trench depths.

1.1.3 Trench No. 3

Trench excavation activities were completed on July 14, 1992, for Trench No. 3, which was oriented approximately 15 feet west of Boring 1722, with the north and south ends of the trench approximately 25 feet north and south of Boring 1722, respectively. The southern portion of this trench was excavated to an approximate depth of 12 feet below surface grade. Trench excavation was terminated 6 feet below grade at the central portion, due to health and safety concerns associated with radiological activities in excess of action levels provided in the Health and Safety Plan. Trench excavation was terminated at approximately 3 feet below surface grade due to health and safety concerns associated with volatile organic vapors in ambient air exceeding Health and Safety Plan action levels. The trench was backfilled immediately in both instances, to mitigate the potential airborne release of contaminants.

1.2 SOIL SAMPLING AND FIELD SCREENING

Soil samples were collected from each end and the center of each trench at three-foot intervals from the surface to the total depth. The samples were obtained from the backhoe bucket and retained in 4-ounce glass jars. Each sample was field-screened using a beta/gamma pancake frisker device and then sealed with an aluminum foil lid. The sample was then submitted to direct sunlight a period of at least 15 minutes for equilibrium of the volatile organic compounds prior to field-screen analyses using a PID (HNu Model HW-101). The samples were then stored for subsequent visual inspection and classification by the geologist. The results of the field screening analyses were documented in field logbooks and on the RI/FS Visual Classification of Soils records.

1.3 SOIL/MEDIA CLASSIFICATION AND DOCUMENTATION

A geologist was present to visually inspect and classify soils and waste media encountered during trench excavation activities. The geologist documented the type and relative thicknesses of soil strata, and type and extent of waste media contained within the soil units. In addition, the geologist was

responsible for visual characterizations for the soil samples collected during trench excavation activities. Visual classification of soil samples included a description of the soil's relative consistency, color, and sediment content (e.g., sand, silty clay, clay, etc.).

The relative consistency of the soil was determined using a Pocket Penetrometer®, which estimates the unconfined compressive strength in units of tons per square foot. The tip of the Pocket Penetrometer® device was inserted into the soil sample to a depth of approximately 0.25 inches (marked by a scribed line on the tip's shaft). The force required to insert the tip to the prescribed depth (unconfined compressive strength) was indicated on a spring-loaded graduated shaft. The measured unconfined compressive strength was then compared to tabulated values to determine the relative consistency.

The soil color was determined using a Munsel Soil Color Chart, which contains a variety of distinct hues, values, and chromas. Each distinct hue, value, and chromo combination correlates to a descriptive designator. For example, a hue of 10YR, value of 4, and a chromo of 6 (10 YR 4/6) corresponds to a dark yellowish brown color designation.

1.4 GROUNDWATER SAMPLE COLLECTION

Groundwater, when present, was sampled and analyzed for HSL (Extended List) and General Water Quality parameters. Groundwater samples were collected by lowering a clean gallon jar, suspended by polypropylene rope, from a manlift platform to the groundwater pool at the base of the trench. The water was then decanted from the gallon jar to the appropriate sample containers. In addition, a minimum of 3 gallons of water were taken to the FEMP laboratory for filtering prior to filling sample containers for HSL Inorganics, Full Radiological, and Gross Alpha/Beta analyses. The containerized groundwater samples were then placed in coolers with ice, for preservation at 4 degrees Celsius, and transported to ASI with appropriate Chain-of-Custody documentation. ASI then processed, packaged, and shipped the groundwater samples to the IT Oak Ridge, Tennessee laboratory facility for analysis.

A total of four groundwater samples were collected from the trench excavations within the SWL. One sample was collected from the north end of Trench No. 1 on July 7, 1992; one sample was collected from the south end of Trench No. 3 on July 13, 1992; one sample was collected from the south end of Trench No. 2 on July 15, 1992; and one sample was collected from the north end of Trench No. 2 on July 16, 1992.

2.0 RESULTS

This section provides the results of the trench excavation activities conducted for the SWL. In general, a variety of solid and liquid wastes were deposited within the SWL. Approximately 25 percent of these wastes could be considered as "burnables", which can be removed and disposed of by incineration. The remainder of the wastes can be considered as "possible burnables", or wastes that may be incinerated, but will probably require air emission filtering or treatment; and "nonburnables", which cannot be decomposed by incineration.

A total of four distinct lithologic units were encountered during trench excavation activities. The units, in order of increasing depth are as follows:

- Unit 1: 1.5 to 3.5 feet of medium stiff to very stiff, dark brown sandy clay, which thins towards the east and southeast.
- Unit 2: 7.0 feet of very soft to very stiff, olive gray sandy clays and silty clays. Unweathered surfaces exhibited a dark grayish brown color.
- Unit 3: 1.0 foot of soft to stiff, very dark gray clays, and silty clays. This unit is similar in appearance to flyash materials.
- Unit 4: 0.5 to 2.5 feet of very soft to medium stiff, mottled brown and gray sandy clays and silty clays, which thickens towards the east and southeast.

Figure 2.1 illustrates the geologic environment of the SWL trench excavation areas.

In general, the waste materials were dispersed within Units 1 and 2, at depths ranging from less than 0.5 to 10 feet. Unit 3 did not exhibit any evidence of waste materials; and Unit 4, at the south end of Trench No. 3, contained minor quantities of copper tubing.

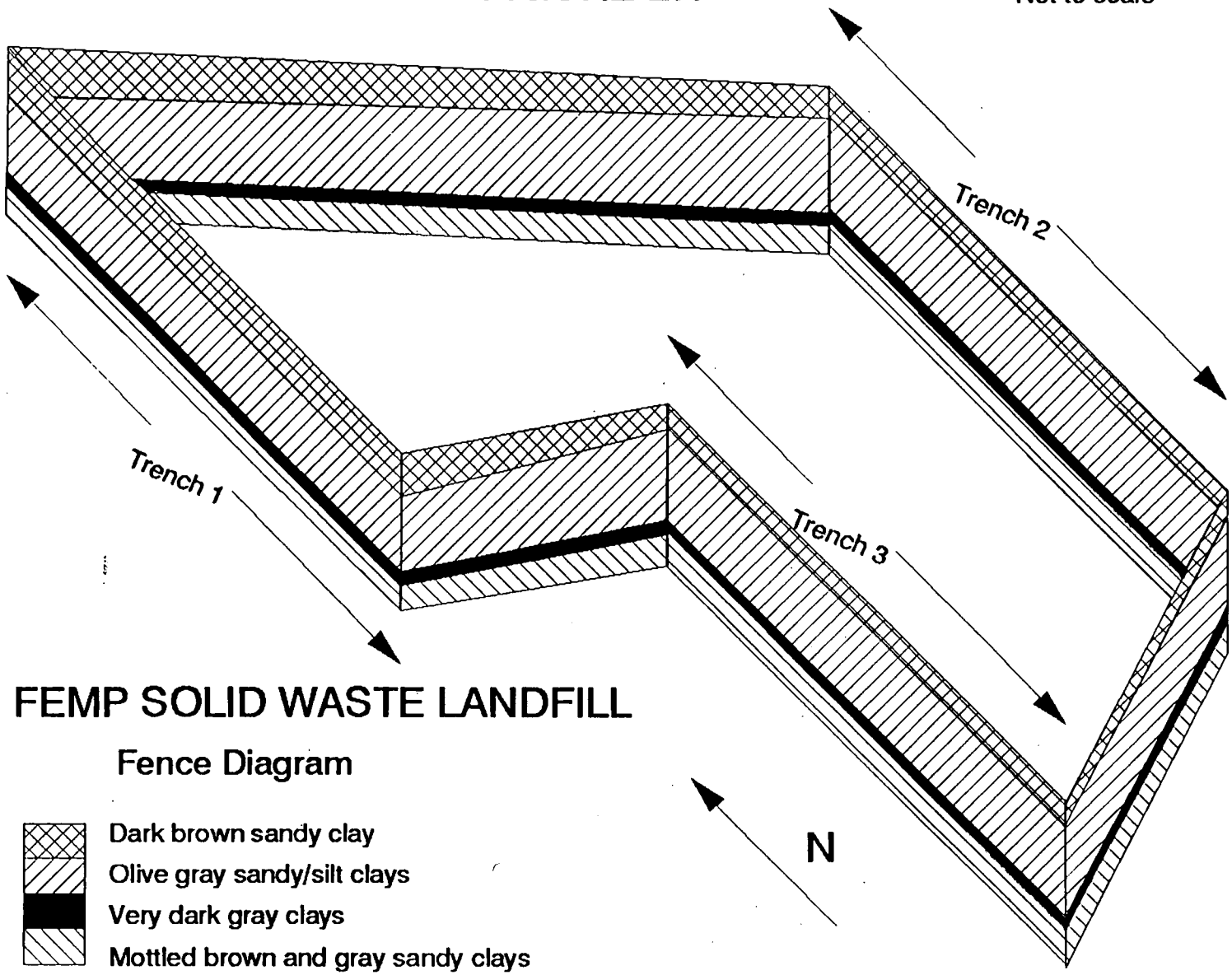
2.1 TRENCH NO. 1

2.1.1 Waste Characterization

Trench No. 1 contained a variety of solid wastes dispersed throughout soil units 1 and 2 to maximum depths of 10 to 11 feet as illustrated by Figure 4.2. Soil Unit 1 contained respirator cartridges, bagged and loose asbestos materials, medicine vials, and ceramic tiles at the southern and central portions of the trench; and a lens of white, loose clay-like material (possibly magnesium

FIGURE 2.1

Not to scale



FEMP SOLID WASTE LANDFILL

Fence Diagram

- Dark brown sandy clay
- Olive gray sandy/silt clays
- Very dark gray clays
- Mottled brown and gray sandy clays

fluoride) at the northern end of the trench. Soil Unit 2 contained bagged trash and asphalt roofing materials at the southern end of the trench (at depths of 6 to 9.5 feet); and bagged/burnt trash and glass acid bottles (at depths of 5.5 to 10.5 feet).

The wastes contained within Trench No. 1 can be classified as follows:

Waste Description	Type of Waste
Bagged trash	Burnable
Respirator cartridges	Possible burnable
Asphalt roofing materials	Possible burnable
Medicine vials	Non-burnable
Bagged Asbestos	Non-burnable
Ceramic tiles	Non-burnable
Magnesium fluoride	Non-burnable
Glass acid bottles	Non-burnable

2.1.2 Soils

Soil Units 1 through 4 were observed during trench excavation activities as illustrated by Figure 2.2.

The results of field screening analyses and visual characterizations for soil samples collected from Trench No. 1 are provided by Figure 2.3. In general, the soil samples exhibited beta/gamma activities of 70 to 130 cpm (background = 70 cpm) and volatile organic vapor concentrations of 1.9 to 15.9 ppm (background = 0.5 to 1.3 ppm). The upper 6 to 9 feet of soil was found to have relative consistencies of medium stiff to very stiff; while the soils from 9 to 12 feet in depth had relative consistencies of soft to very soft.

2.1.3 Groundwater

Groundwater (perched water) seepage was observed at a depth of approximately 9.0 feet below surface grade at the northern end of Trench No. 1. Water samples were collected and analyzed for HSL extended list and general water quality parameters. The results of the groundwater analyses for Trench No. 1 are provided in Table 2.1.

2.2 TRENCH NO. 2

2.2.1 Waste Characterization

Trench No. 2 contained a variety of solid wastes dispersed throughout soil units 1 and 2 to maximum depths of 6 feet as illustrated by Figure 4.4. Soil Unit 1 contained rubber hoses and bagged trash at the southern portion of the trench; and roofing materials and burnt wood at the northern end of the trench.

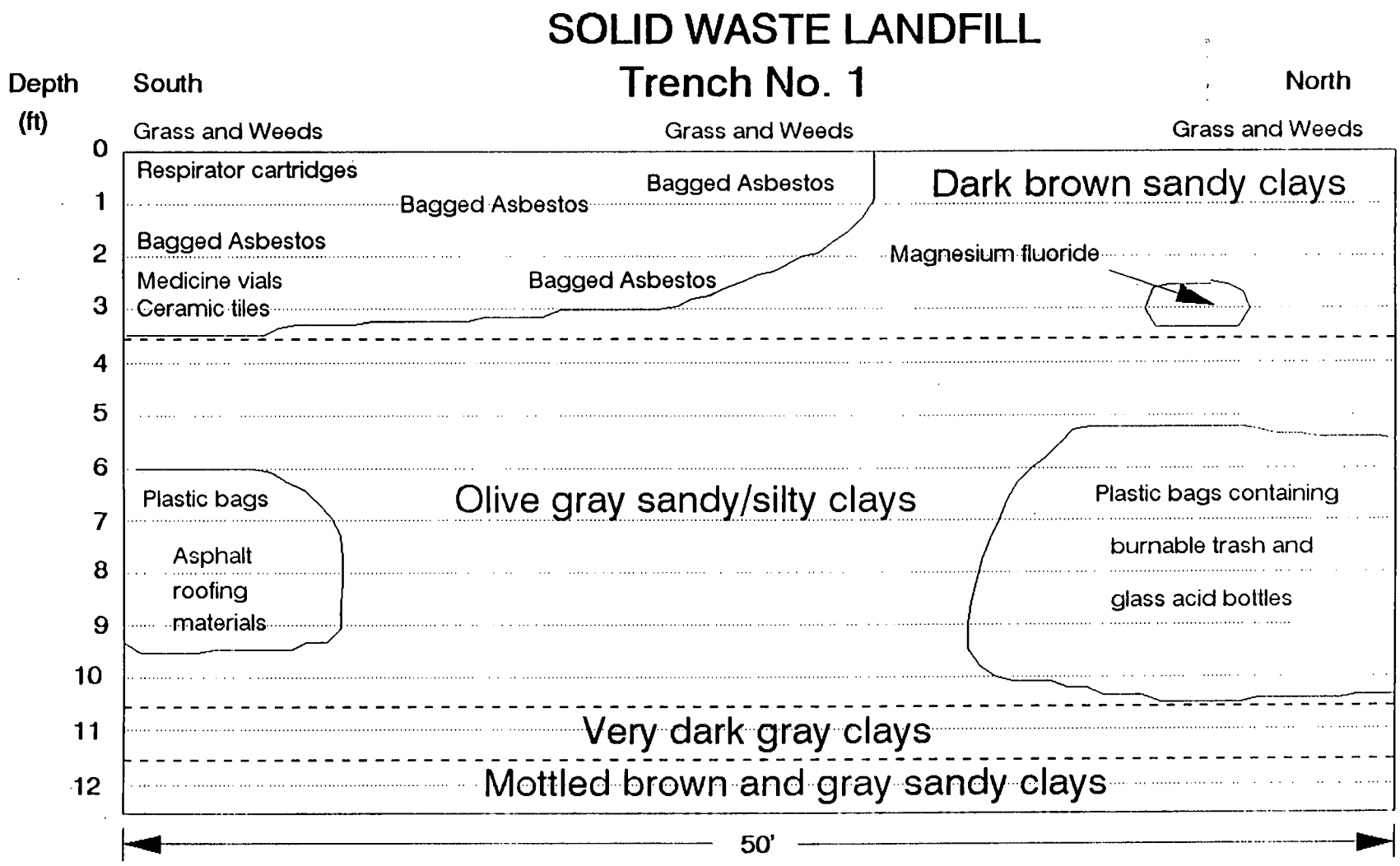

SOLID WASTE LANDFILL
Trench No. 1
Depth (ft)
South
North
Grass and Weeds
Grass and Weeds
Grass and Weeds
0
1
2
3
4
5
6
7
8
9
10
11
12
Respirator cartridges
Bagged Asbestos
Bagged Asbestos
Bagged Asbestos
Medicine vials
Ceramic tiles
Bagged Asbestos
Dark brown sandy clays
Magnesium fluoride
Plastic bags
Asphalt roofing materials
Olive gray sandy/silty clays
Plastic bags containing burnable trash and glass acid bottles
Very dark gray clays
Mottled brown and gray sandy clays
50'

FIGURE 2.2

SOLID WASTE LANDFILL

Trench No. 1

Depth (ft)	South			North
0	PID = 3.1 ppm b/g = 70 cpm	Med. stiff, dark brown, gravel-bearing sandy clay (10YR 4/3)	PID = 15.9 ppm b/g = 70 cpm	Very stiff, dark brown, gravel-bearing sandy clay (10YR 4/3)	PID = 7.0 ppm b/g = 70 cpm
1					
2					
3	PID = 1.9 ppm b/g = 70 cpm	Med. stiff, dark grayish brown, silty clay (10YR 4/3)		Med. stiff, dark grayish brown, sandy clay (10YR 3/2)	PID = 1.2 ppm b/g = 70 cpm
4					
5					
6	PID = 5.0 ppm b/g = 130 cpm	Very stiff, olive grey, gravel-bearing silty clay (5Y 5/2)		Med. stiff, dark grayish brown, silty/sandy clay (10YR 4/2)	PID = 30.0 ppm b/g = 70 cpm
7					
8					
9	PID = 12.6 ppm b/g = 70 cpm	Soft olive grey, gravel-bearing silty/sandy clay (5Y 4/2)		Very soft olive brown, silty/sandy clay (5Y 5/2)	PID = 1.2 ppm b/g = 70 cpm
10					
11					
12	PID = 1.9 ppm b/g = 70 cpm	Soft, mottled dark yellowish brown and grey silty/sandy clay		Very soft, dark grayish brown, silty/sandy clay (2.5Y 3/2)	PID = 2.8 ppm b/g = 90 cpm

50'

FIGURE 2.3

TABLE WILL BE FORWARDED
WHEN ALL OF THE DATA BECOMES AVAILABLE

TRENCH NO.1 GROUNDWATER ANALYSIS

TABLE 2.1

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Soil Unit 2 contained bagged trash and medical wastes at the center of the trench (at depths of 3 to 6 feet); and roofing materials and burnt wood at the northern end of the trench (at depths of 1.5 to 6 feet).

The wastes contained within Trench No. 2 can be classified as follows:

Waste Description	Type of Waste
Bagged trash	Burnable
Asphalt roofing materials	Possible burnable
Medical wastes	Possible burnable

2.2.2 Soils

Soil Units 1 through 4 were observed during trench excavation activities as illustrated by Figure 2.4.

The results of field screening analyses and visual characterizations for soil samples collected from Trench No. 2 are provided by Figure 2.5. In general, the soil samples exhibited beta/gamma activities of 50 to 70 cpm (background = 50 to 70 cpm) and volatile organic vapor concentrations of 1.9 to 8.0 ppm (background = 1.9 to 2.0 ppm). The upper 6 to 9 feet of soil was found to have relative consistencies of soft to stiff; while the soils from 9 to 12 feet in depth had relative consistencies of soft.

2.2.3 Groundwater

Groundwater (perched water) seepage was observed at a depth of approximately 2.5 feet below surface grade at the northern end of Trench No. 2 and 5.0 feet below surface grade at the southern end of the trench. Water samples were collected and analyzed for HSL extended list and general water quality parameters. The results of the groundwater analyses for Trench No. 2 are provided in Table 2.2.

2.3 TRENCH NO. 3

2.3.1 Waste Characterization

Trench No. 3 contained a variety of solid wastes dispersed throughout soil units 1 and 2 to maximum depths of 6.5 feet as illustrated by Figure 2.6. Soil Unit 1 contained rubber hoses/belts and fire hoses at the southern portion of the trench. Soil Unit 2 contained bagged trash, wood, steel cables, steel cans and yellow-cake at the southern and central portions of the trench (at depths of 3 to 6.5 feet); and full paint cans at the northern end of the trench (at depths of 1.5 to 3 feet). Soil Unit 4 contained copper tubing at the southern end of the trench (at depths of 10 to 11.5 feet).

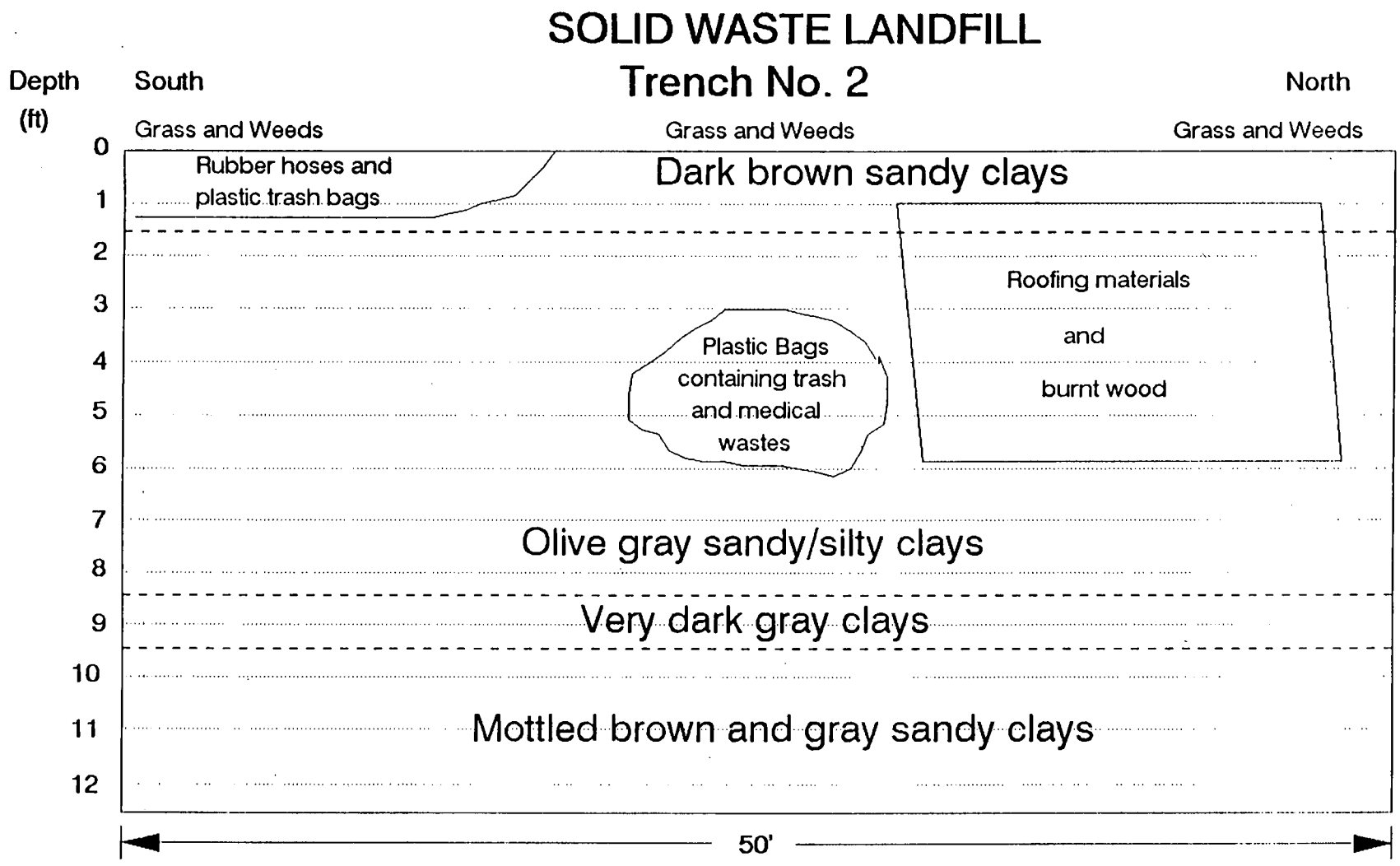
SOLID WASTE LANDFILL
Trench No. 2
Depth (ft)
South
North
Grass and Weeds
Grass and Weeds
Grass and Weeds
0
1
2
3
4
5
6
7
8
9
10
11
12
Rubber hoses and plastic trash bags
Dark brown sandy clays
Roofing materials and burnt wood
Plastic Bags containing trash and medical wastes
Olive gray sandy/silty clays
Very dark gray clays
Mottled brown and gray sandy clays
50'

FIGURE 2.4

SOLID WASTE LANDFILL

Trench No. 2

Depth (ft)	South			North
0	PID = 2.8 ppm b/g = 70 cpm	Soft, dark brown, gravel-bearing sandy clay (10YR 3/3)	Stiff, dark brown, gravel-bearing sandy clay (10YR 3/3)	PID = 2.0 ppm b/g = 50 cpm
1				
2				
3	PID = 4.4 ppm b/g = 70 cpm	Soft, olive gray, sandy/silty clay (5Y 4/2)	PID = 2.3 ppm b/g = 50 cpm Med. stiff, olive gray, silty/sandy clay (5Y 5/2)	PID = 2.0 ppm b/g = 50 cpm
4				
5				
6	PID = 2.2 ppm b/g = 70 cpm	Soft, olive grey, sandy/silty clay (5Y 5/2)	PID = 8.0 ppm b/g = 50 cpm Med. stiff, olive gray, silty sandy clay (5Y 5/2)	PID = 2.0 ppm b/g = 50 cpm
7				
8				
9	PID = 2.0 ppm b/g = 70 cpm	Soft, very dark grey, silty clay (10YR 3/1)		
10				
11				
12	PID = 1.9 ppm b/g = 70 cpm	Soft, mottled dark yellowish brown and grey silty/sandy clay		

50'

FIGURE 2.5

TABLE WILL BE FORWARDED
WHEN ALL OF THE DATA BECOMES AVAILABLE

TRENCH NO.2 GROUNDWATER ANALYSIS

TABLE 2.2

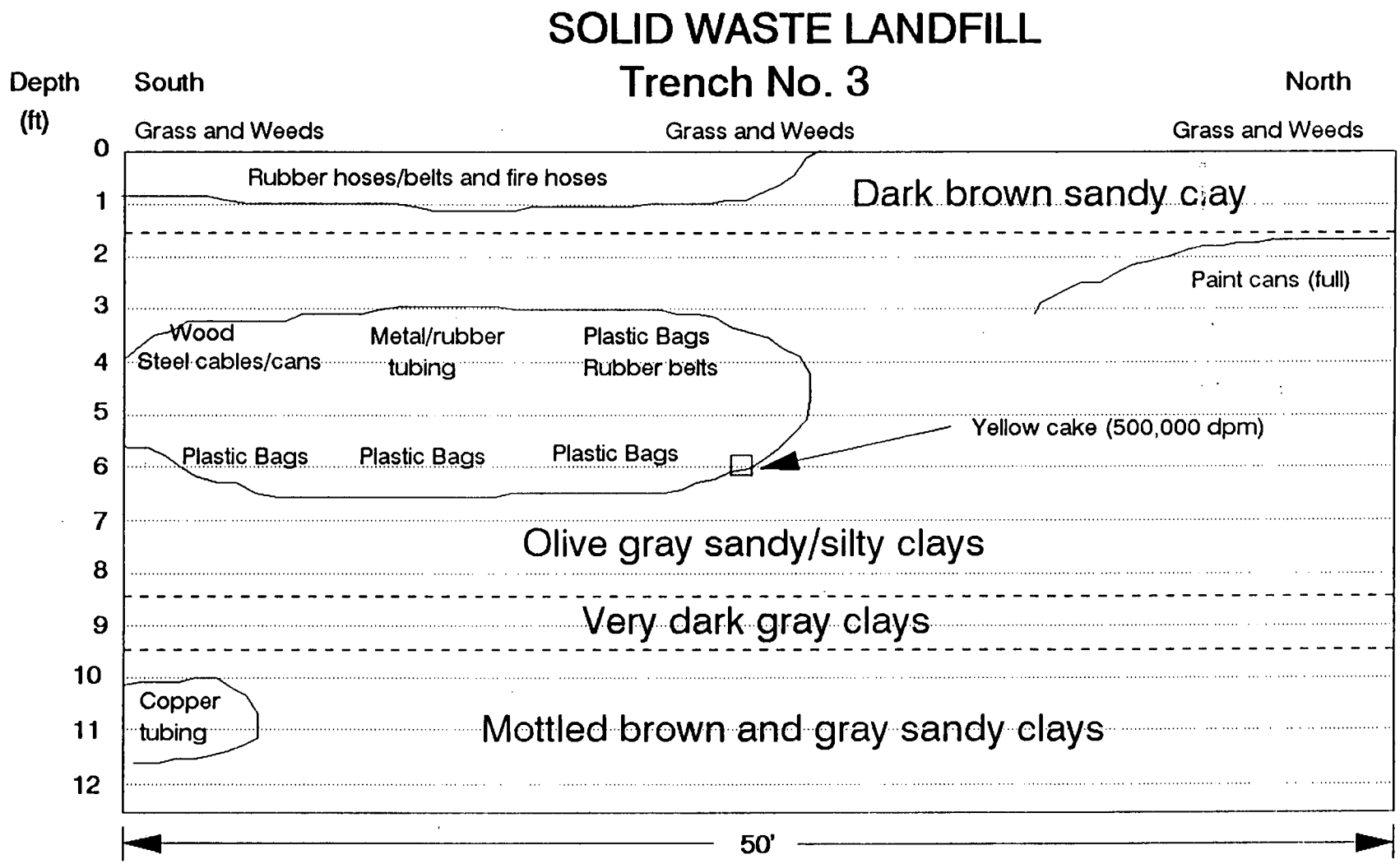
SOLID WASTE LANDFILL
Trench No. 3
Depth (ft)
South
North
Grass and Weeds
Grass and Weeds
Grass and Weeds
0
1
2
3
4
5
6
7
8
9
10
11
12
Rubber hoses/belts and fire hoses
Dark brown sandy clay
Paint cans (full)
Wood
Steel cables/cans
Metal/rubber tubing
Plastic Bags
Rubber belts
Yellow cake (500,000 dpm)
Plastic Bags
Plastic Bags
Plastic Bags
Olive gray sandy/silty clays
Very dark gray clays
Copper tubing
Mottled brown and gray sandy clays
50'

FIGURE 2.6

The wastes contained within Trench No. 3 can be classified as follows:

Waste Description	Type of Waste
Bagged trash	Burnable
Wood	Burnable
Fire hoses	Possible burnable
Rubber hoses/belts	Possible burnable
Steel cables/cans	Non-burnable
Paint cans	Non-burnable
Copper tubing	Non-burnable

2.3.2 Soils

Soil Units 1 through 4 were observed during trench excavation activities as illustrated by Figure 2.6.

The results of field screening analyses and visual characterizations for soil samples collected from Trench No. 3 are provided by Figure 2.7. In general, the soil samples exhibited beta/gamma activities of 70 to 80 cpm (background = 70 to 80 cpm) and volatile organic vapor concentrations of 1.8 to 30.0 ppm (background = 1.8 to 3.3 ppm). An elevated beta/gamma reading of 900 cpm, attributed to the presence of yellow-cake material in the soil, was observed at the center of Trench No. 3 at a depth of 6 feet below surface grade. An elevated volatile organic vapor reading of 200 ppm, attributed to paint materials released during trench excavation activities, was observed at the northern end of the trench at a depth of 3 feet below surface grade.

The upper 6 to 9 feet of soil was found to have relative consistencies of very soft to stiff; while the soils from 9 to 12 feet in depth had relative consistencies of medium stiff to stiff.

2.3.3 Groundwater

Groundwater (perched water) seepage was observed at a depth of approximately 3.5 feet below surface grade at the southern end of Trench No. 3. Water samples were collected and analyzed for HSL extended list and general water quality parameters. The results of the groundwater analyses for Trench No. 3 are provided in Table 2.3.

SOLID WASTE LANDFILL

Trench No. 3

Depth (ft)	South			North
0	PID = 22.0 ppm b/g = 80 cpm	Stiff, dark brown, gravel-bearing sandy clay (10YR 4/3)	PID = 22.0 ppm b/g = 80 cpm	Stiff, dark brown, gravel-bearing sandy clay (10YR 3/3)	PID = 1.8 ppm b/g = 70 cpm
1					
2					
3	PID = 22.0 ppm b/g = 80 cpm	Stiff, olive gray, sandy/silty clay (5Y 4/2)	PID = 30.0 ppm b/g = 80 cpm	Med. stiff, olive gray, silty/sandy clay (5Y 5/2)	PID = 200.0 ppm b/g = 70 cpm
4					
5					
6	PID = 29.0 ppm b/g = 80 cpm	Very soft, olive grey, sandy/silty clay (5Y 4/2)	PID = N/A b/g = 900 cpm	Med. stiff, olive gray, silty sandy clay (5Y 5/2)	
7					
8					
9	PID = 13.2 ppm b/g = 80 cpm	Stiff, very dark grey, silty clay (7.5YR 3/0)			
10					
11					
12	PID = 6.2 ppm b/g = 80 cpm	Medium stiff, mottled brown and grey silty/sandy clay			

50'

FIGURE 2.7

TABLE WILL BE FORWARDED
WHEN ALL OF THE DATA BECOMES AVAILABLE

TRENCH NO.3 GROUNDWATER ANALYSIS

TABLE 2.3

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3.0 DISCUSSION AND CONCLUSIONS

The trench excavation activities were conducted to provide data for: 1) the type and horizontal/vertical delineation of wastes deposited within the SWL, 2) SWL geologic and hydrogeologic characterizations, 3) horizontal and vertical delineation of qualitative concentrations of radiological and volatile organic constituents in the waste materials and the associated soils, and 4) characterization of the quantitative concentrations of radiological and non-radiological constituents in the leachates (perched groundwater) associated with the SWL. The following subsections provide the conclusions, based on results of trench excavation activities, associated with these data objectives.

3.1 TYPE AND HORIZONTAL/VERTICAL EXTENT OF SWL WASTES

The wastes deposited in the SWL consist mainly of "non-burnable" materials, which accounted for approximately 75% of the wastes observed during trench excavation activities. These wastes include bagged and loose asbestos materials, ceramic tiles, medicine vials, glass acid bottles, magnesium fluoride, rubber hoses and tubing, medical wastes, fire hoses, steel cables and cans, yellow-cake, asphalt roofing materials, respirator cartridges and copper tubing. The remainder of the wastes observed at the SWL (approximately 25%) can be considered as "burnables". These wastes include bagged trash and wood materials.

The SWL waste materials were found to be dispersed within the upper 10 feet of soil. Each trench contained an unique assemblage of wastes, except for bagged trash which was observed throughout the SWL. The horizontal extent of these wastes on a localized scale (i.e., in areas of close proximity to each trench) or on a regional scale (within the SWL boundaries) cannot be accurately assessed based on the data provided by trench excavation activities.

3.2 SWL GEOLOGY AND HYDROGEOLOGY

A total of four distinct lithologic units were encountered during trench excavation activities. The units, in order of increasing depth are as follows:

- Unit 1: 1.5 to 3.5 feet of medium stiff to very stiff, dark brown sandy clay, which thins towards the east and southeast.
- Unit 2: 7.0 feet of very soft to very stiff, olive gray sandy clays and silty clays. Unweathered surfaces exhibited a dark grayish brown color.
- Unit 3: 1.0 foot of soft to stiff, very dark gray clays, and silty clays. This unit is similar in appearance to flyash materials.

- Unit 4: 0.5 to 2.5 feet of very soft to medium stiff, mottled brown and gray sandy clays and silty clays, which thickens towards the east and southeast.

The following perched water zones were encountered during trench excavation activities:

- The northern end of Trench No. 1 at a depth of approximately 9.0 feet below surface grade.
- The northern end of Trench No. 2 at a depth of approximately 2.5 feet below surface grade.
- The southern end of Trench No. 2 at a depth of approximately 5.0 feet below surface grade.
- The southern end of Trench No. 3 at a depth of approximately 3.5 feet below surface grade.

In general, the perched water zones were found in areas where waste materials were deposited in such a fashion to allow for significant void spaces or porosity. The relative amounts of water seepage from these perched zones varied between trench locations. In general, water seepage from the northern end of Trench No. 1, and the southern ends of Trench No. 2 and Trench No. 3 produced shallow pools in the trench base within a few hours. Water seepage from the northern end of Trench No. 2 was of a sufficient rate to completely fill the trench to a depth of approximately 3 feet below surface grade within a period of 10 to 15 minutes.

3.3. HORIZONTAL/VERTICAL EXTENT OF SOIL CONTAMINANTS

In general, beta/gamma activities and volatile organic vapor concentrations in soils were at or near background contaminant levels. However, a beta/gamma activity of 900 cpm was found for the soil sample collected from the center of Trench. No. 3 at a depth of 6 feet below surface grade. Yellow-cake materials, exhibiting a beta/gamma activity of approximately 50,000 cpm, were found in close proximity to this sample.

Volatile organic vapor readings of approximately 10 to 30 parts per million were detected in soils containing plastic bags, rubber, and asphalt roofing materials. In addition, a sample collected from the north end of Trench. No. 3 exhibited volatile organic vapor concentrations of 200 ppm. This sample was collected from soil in close proximity to 1-quart steel paint cans that were disturbed during trench excavation activities.

ATTACHMENT 3

SOUTH FIELD AREA 2

1.0 FIELD ACTIVITIES

All field activities were performed in accordance with the Production Area and Other Additional Suspect Areas (PASA) Work Plan Addendum, dated October 4, 1989. A total of two trenches were completed, using a track-mounted backhoe, within the SFD-2 to a maximum total depth of 12 to 15 feet below surface grade. Soil samples were collected from each end and the midpoint of each trench, at five-foot intervals from the surface to the total depth of each trench. The soil samples were field-screened for volatile organic vapors and radiological activities using a photoionization detection device (PID) and a beta/gamma pancake frisker, respectively. Biased soil samples were submitted for laboratory determinations of radiological and chemical constituents. A geologist was present during trench excavation activities to classify soil types, record PID and beta/gamma readings, and document the nature and distribution of the fill materials.

1.1 TRENCH EXCAVATION

A total of two trenches were completed to an approximate total depth of 12 to 15 feet below surface grade within the SFD-2 boundaries using a track-mounted backhoe equipped with a 24-inch wide bucket. Each trench was oriented east-west in areas corresponding to suspect north-south trending trenches identified by a 1954 aerial photograph. The approximate total length of each trench was 100 feet.

1.1.1 Trench No. 1

Trench excavation activities were completed on July 30, 1992, for this trench. Trench No. 1 was oriented approximately at the center of a cleared area within the SFD-2 tree farm. The entire trench was excavated to an approximate total depth of 15 feet.

1.1.2 Trench No. 2

Trench excavation activities were completed on August 4, 1992, for this trench. Trench No. 2 was oriented approximately 50 feet south and parallel to Trench No. 1. The entire trench was excavated to an approximate total depth of 12 feet below surface grade.

1.2 SOIL SAMPLING AND FIELD SCREENING

Soil samples were collected from each end and the center of Trench No. 1 and from the western end and center of Trench No. 2 at five-foot intervals from the surface to the total depth. The samples were obtained from the backhoe bucket and retained in 4-ounce glass jars. Each sample was field-screened using a beta/gamma pancake frisker device and then sealed with an aluminum foil lid. The sample was then submitted to direct sunlight for a period of at least 15 minutes for equilibrium of the volatile organic compounds prior to field-screen analyses using a PID (HNu Model HW-101). The samples were then stored for subsequent visual inspection and classification by the Site Geologist. The results of the field screening analyses were documented in field logbooks and on the RI/FS Visual Classification of Soils records.

Biased soil samples were collected at Trench No.1 and submitted for laboratory determinations of radiological and chemical constituents. Table 1.1 provides details concerning samples submitted for laboratory analyses.

TABLE 1.1
SOIL SAMPLES SUBMITTED FOR LABORATORY ANALYSES

Sample No.	Depth/Area	PID/RAD*	Analysis Requested
4713	0'/West End	18.0/60	Full Radiological
4714	10'/West End	6.8/60	Full Radiological
4715	5'/West End	11.0/60	HSL Full LIst
4716	0'/Center	18.0/50	Full Radiological
4719	15'/Center	8.6/40	Full Radiological
4720	0'/East End	15.2/40	Full Radiological
4721	5'/East End	16.2/40	HSL Full List
4722	10'/East End	6.8/40	Full Radiological

Note: * - PID and RAD (beta/gamma activities) values are in parts per million (ppm) and counts per minute (cpm), respectively.

1.3 SOIL/MEDIA CLASSIFICATION AND DOCUMENTATION

A geologist was present to visually inspect and classify soils and waste media encountered during trench excavation activities. The geologist documented the type and relative thicknesses of soil strata, and type and extent of waste media, if present, contained within the soil units. In addition, the geologist was responsible for visual characterizations for the soil samples collected during trench excavation activities. Visual classification of soil samples included a description of the soil's relative consistency, color, and sediment content (e.g., sand, silty clay, clay, etc.).

The relative consistency of the soil was determined using a Pocket

Penetrometer®, which estimates the unconfined compressive strength in units of tons per square foot. The tip of the Pocket Penetrometer® device was inserted into the soil sample to a depth of approximately 0.25 inches (marked by a scribed line on the tip's shaft). The force required to insert the tip to the prescribed depth (unconfined compressive strength) was indicated on a spring-loaded graduated shaft. The measured unconfined compressive strength was then compared to tabulated values to determine the relative consistency.

The soil color was determined using a Munsel Soil Color Chart, which contains a variety of distinct hues, values, and chromas. Each distinct hue, value, and chroma combination correlates to a descriptive designator. For example, a hue of 10YR, value of 4, and a chroma of 6 (10 YR 4/6) corresponds to a dark yellowish brown color designation.

1.4 GROUNDWATER SAMPLE COLLECTION

Groundwater samples could not be collected due the relatively rapid slumping of the trench walls during excavation activities.

2.0 RESULTS

This section provides the results of the trench excavation activities conducted for the SFD-2. In general, the trenches were void of waste materials. The only evidence of waste materials was electrical wiring conduits within the upper 12 inches of soil at the center of Trench No. 1 and a concrete boulder within the upper 12 inches of soil at Trench No. 2.

A total of four distinct lithologic units were encountered during trench excavation activities. The units, in order of increasing depth are as follows:

- Unit 1: 1.0 to 3.5 feet of soft to medium stiff, yellowish brown sandy clay, which thins towards the east and southeast.
- Unit 2: 3.5 to 7.0 feet of very soft to stiff, mottled yellow brown and gray sandy clays and silty clays.
- Unit 3: 3.5 to 4.5 feet of stiff, gray sandy silt.
- Unit 4: 4.0 to 5.0 feet of very soft yellowish brown gravelly sands (western end) and dark gray silty clays and silty sands.

Figure 2.1 illustrates the geologic environment of the SFD-2 trench excavation areas.

2.1 TRENCH NO. 1

2.1.1 Waste Characterization

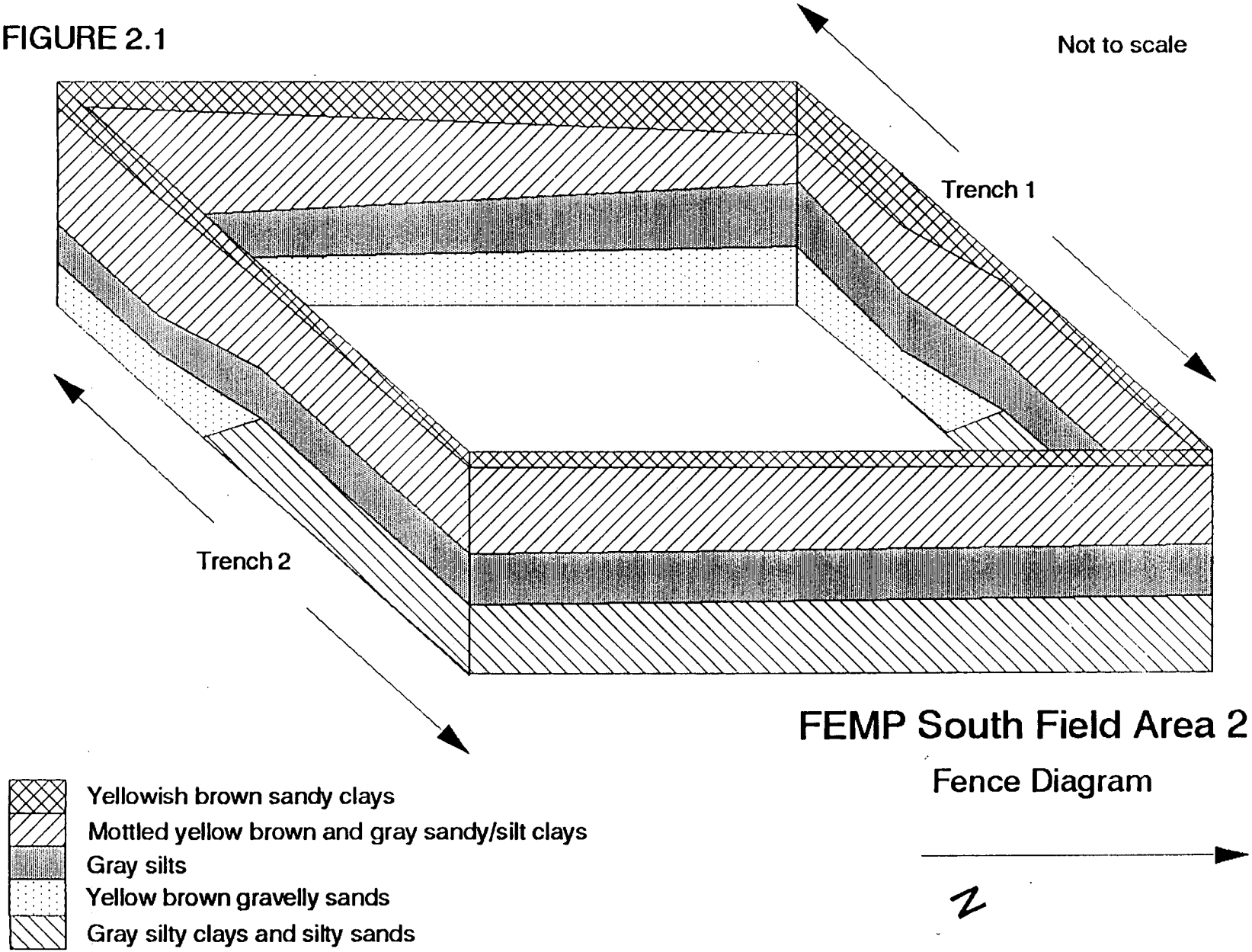
In general, Trench No. 1 was void of any waste materials. The only evidence of any waste materials was electrical wiring conduit within the upper 12 inches of soil at the center of the trench.

2.1.2 Soils

Soil Units 1 through 4 were observed during trench excavation activities as illustrated by Figure 2.2.

The results of field screening analyses and visual characterizations for soil samples collected from Trench No. 1 are provided by Figure 4.3. In general, the soil samples exhibited beta/gamma activities of 40 to 60 cpm and volatile organic vapor concentrations of 6.8 to 22.0 ppm. The upper 12 feet of soil was found to have relative consistencies of very soft to stiff; while the soils from 12 to 15 feet in depth had relative consistencies of very soft.

FIGURE 2.1



FEMP South Field Area 2

Fence Diagram

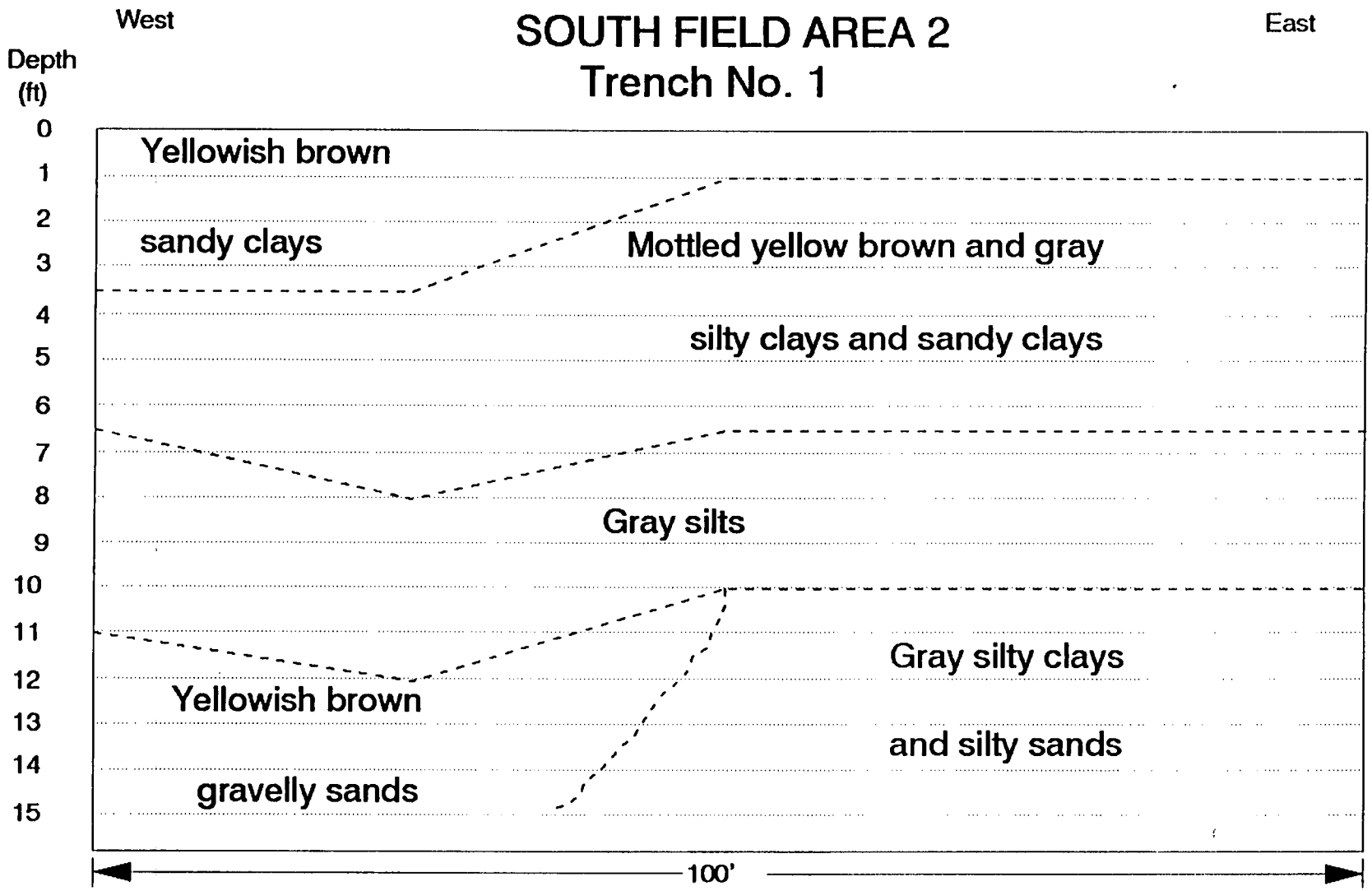

West
SOUTH FIELD AREA 2
Trench No. 1
East
Depth
(ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Yellowish brown
sandy clays
Mottled yellow brown and gray
silty clays and sandy clays
Gray silts
Gray silty clays
and silty sands
Yellowish brown
gravelly sands
100'

FIGURE 2.2

SOUTH FIELD AREA 2

Trench No. 1

Depth (ft)	West			East
0	PID = 18.0 ppm b/g = 60 cpm	Soft, dark brown sandy clay (10 YR 4/3)	PID = 18.0 ppm b/g = 50 cpm	Med. stiff, dark yellowish brown sandy clay (10 YR 4/4)	PID = 15.2 ppm b/g = 40 cpm
1					
2					
3					
4					
5	PID = 11.0 ppm b/g = 60 cpm	Very soft, brownish yellow sandy/silty clay (10 YR 6/8)	PID = 15.0 ppm b/g = 40 cpm	Stiff, brownish yellow sandy/silty clay (10 YR 6/8)	PID = 16.2 ppm b/g = 40 cpm
6					
7					
8					
9					
10	PID = 6.8 ppm b/g = 60 cpm	Stiff, gray sandy silt (10 YR 6/1)	PID = 11.0 ppm b/g = 40 cpm	Stiff, gray sandy silt (10 YR 6/1)	PID = 6.8 ppm b/g = 40 cpm
11					
12					
13					
14					
15	PID = 22.0 ppm b/g = 60 cpm	Very soft, yellowish brown gravelly sand (10 YR 5/8)	PID = 8.6 ppm b/g = 40 cpm		

100'

FIGURE 2.3 SOIL CHARACTERIZATION RESULTS

2.2 TRENCH NO. 2

2.2.1 Waste Characterization

In general, Trench No. 2 was void of any waste materials. The only evidence of waste materials was a concrete boulder within the upper 12 inches of soil at the center of the trench.

2.2.2 Soils

Soil Units 1 through 4 were observed during trench excavation activities as illustrated by Figure 2.4.

The results of field screening analyses and visual characterizations for soil samples collected from Trench No. 2 are provided by Figure 2.5. In general, the soil samples exhibited beta/gamma activities of 50 cpm and volatile organic vapor concentrations of 8.0 to 11.0 ppm. The upper 12 feet of soil was found to have relative consistencies of very soft to stiff.

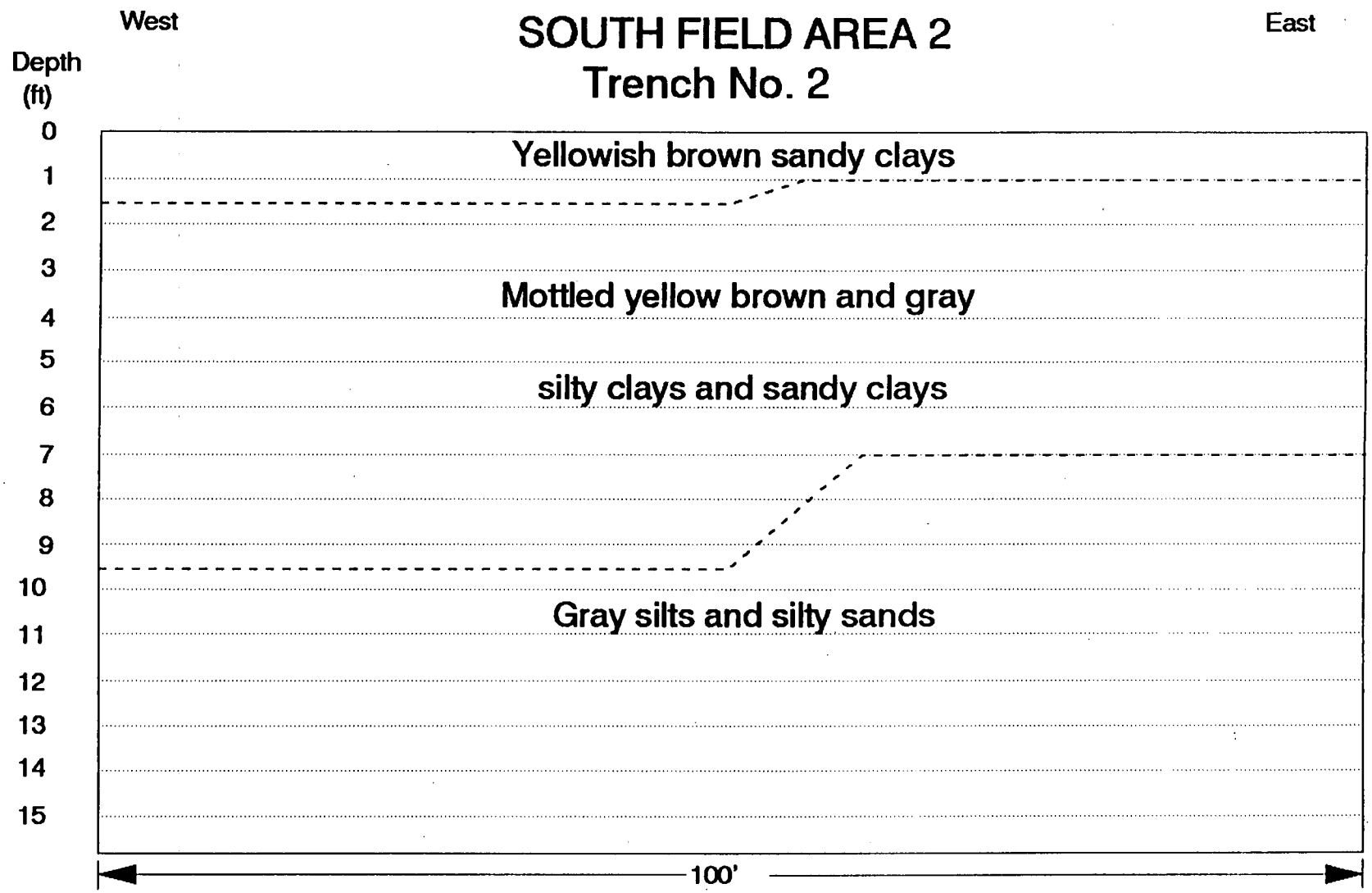

West
SOUTH FIELD AREA 2
Trench No. 2
East
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Yellowish brown sandy clays
Mottled yellow brown and gray
silty clays and sandy clays
Gray silts and silty sands
100'

FIGURE 2.4

SOUTH FIELD AREA 2
Trench No. 2

Depth (ft)	West			East
0	PID = 9.8 ppm b/g = 50 cpm	Soft, dark brown sandy clay (10 YR 4/3)	PID = 10.0 ppm b/g = 50 cpm	Med. stiff, dark yellowish brown sandy clay (10 YR 4/4)
1				
2				
3				
4				
5	PID = 8.0 ppm b/g = 50 cpm	Very soft, brownish yellow sandy/silty clay (10 YR 6/8)	PID = 9.8 ppm b/g = 50 cpm	Stiff, brownish yellow sandy/silty clay (10 YR 6/8)
6				
7				
8				
9				
10	PID = 11.0 ppm b/g = 50 cpm	Stiff, gray sandy silt (10 YR 6/1)	PID = 8.0 ppm b/g = 50 cpm	Stiff, gray sandy silt (10 YR 6/1)
11				
12				
13				
14				
15				

100'

FIGURE 2.5

3.0 DISCUSSION AND CONCLUSIONS

The trench excavation activities were conducted to provide data for: 1) the type and horizontal/vertical delineation of wastes deposited within the SFD-2, 2) SFD-2 geologic and hydrogeologic characterizations, 3) horizontal and vertical delineation of qualitative and quantitative concentrations of radiological and volatile organic constituents in the soils. The following subsections provide the conclusions, based on results of trench excavation activities, associated with these data objectives.

3.1 TYPE AND HORIZONTAL/VERTICAL EXTENT OF SFD-2 WASTES

The soils associated with the SFD-2 trenches were void of waste materials. The only evidence of waste materials was electrical wiring conduits within the upper 12 inches of soil at the center of Trench No. 1 and a concrete boulder within the upper 12 inches of soil at Trench No. 2.

3.2 SFD-2 GEOLOGY AND HYDROGEOLOGY

A total of four distinct lithologic units were encountered during trench excavation activities. The units, in order of increasing depth are as follows:

- Unit 1: 1.0 to 3.5 feet of soft to medium stiff, yellowish brown sandy clay, which thins towards the east and southeast.
- Unit 2: 3.5 to 7.0 feet of very soft to stiff, mottled yellow brown and gray sandy clays and silty clays.
- Unit 3: 3.5 to 4.5 feet of stiff, gray sandy silt.
- Unit 4: 4.0 to 5.0 feet of very soft yellowish brown gravelly sands (western end) and dark gray silty clays and silty sands.

The following perched water zones were encountered during trench excavation activities:

- The western end and center of Trench No. 1 at a depth of approximately 11.0 feet below surface grade.
- The western end and center of Trench No. 2 at a depth of approximately 10.0 feet below surface grade.

Groundwater samples could not be obtained due to the relatively rapid slumping of the trench excavation walls, which resulted in the formation of a sand-water slurry or complete burial of the trench base.

3.3 HORIZONTAL/VERTICAL EXTENT OF SOIL CONTAMINANTS

In general, beta/gamma activities in soils were at or near background contaminant levels.

Volatile organic vapor readings of approximately 5 to 20 parts per million above background, and 6 to 9 parts per million above background were detected in soils associated with Trench No. 1 and Trench No. 2, respectively.

The remainder of this section will be completed as an addendum when the analytical results are received.