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G-000-1005.51

**FEMP COMMUNITY MEETING JULY 21, 1992 OPERABLE UNIT 4  
SUMMARY OF CHARACTERIZATION RESULTS**

**07/21/1992**

**DOE-FN  
19  
HANDOUT**

**PUBLIC**

3647

**FEMP COMMUNITY MEETING**

**JULY 21, 1992**

**OPERABLE UNIT 4**

**SUMMARY OF CHARACTERIZATION RESULTS**

## SUMMARY OF OU 4 HORIZONTAL (SLANT)

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### BORING SAMPLING PROGRAM

Five unconventional low-angle borings were drilled and sampled to investigate possible leakage of the K-65 waste to the subsoils as depicted on the figure titled "Low Angle Boring Locations." The samples collected were analyzed for chemical and radiological parameters. Perched water was encountered in all five borings (1615, 1616, 1617, 1618, and 1619). Water samples were collected and analyzed for chemical and radiological constituents. Analyses of the water encountered in the borings provided valuable insight as to the extent of the migration of any possible leakage from the silos into the soils. Boring 1616 was cased to enable continued sampling of the soils below the perched water zone (figure titled "OU4 Slant Boring No. 1616").

A hollow stem auger technique coupled with a horizontal boring machine was used for the five low-angle borings. The horizontal boring machine was chosen over conventional drilling equipment due to the torque requirements of the project. Due to the unconventional nature of the low-angle boring and sensitivities concerning tracking of the boreholes, a practice boring was completed in an area away from the K-65 area prior to drilling under the silos. This allowed the sampling crews to become more familiar with drilling and the borehole tracking and sampling phases of the project.

## SUMMARY OF OU4 VERTICAL (BERM)

### BORING SAMPLING PROGRAM

Four vertical borings (1620, 1621, 1622, and 1623) were drilled and sampled approximately five feet from the silos and depicted on the figure titled "Vertical Boring Locations" to determine and verify the extent of contamination in the soils surrounding the K-65 silos. Samples collected at the specified intervals were analyzed for radiological and chemical constituents. The four vertical borings were sampled using a Vibra-corer sampling device. After the drilling and sampling was completed, the borings were plugged with grout.

**CONCLUSIONS****I. Soil/Perched Groundwater Contamination in Area. However:**

- Soil contamination is localized (S.E. of silo 1; N.W. of silo 2)
  - Found on surface (under berm)
  - Thought to be as a result of spills during filling of silos (documented spill at S.E. silo 1 location)
- No significant contamination under silos.
- Radiological constituents found in area groundwater monitoring wells are consistent with those found in OU 1.
- Walkover survey of Weston Road (west of silos) in Spring, 1992, showed no contamination.
- Level of water in decant sump tank has increased 39 inches since removal action in April 1991. The level in the tank is monitored on a monthly basis. Therefore, there is no evidence that the tank is leaking.

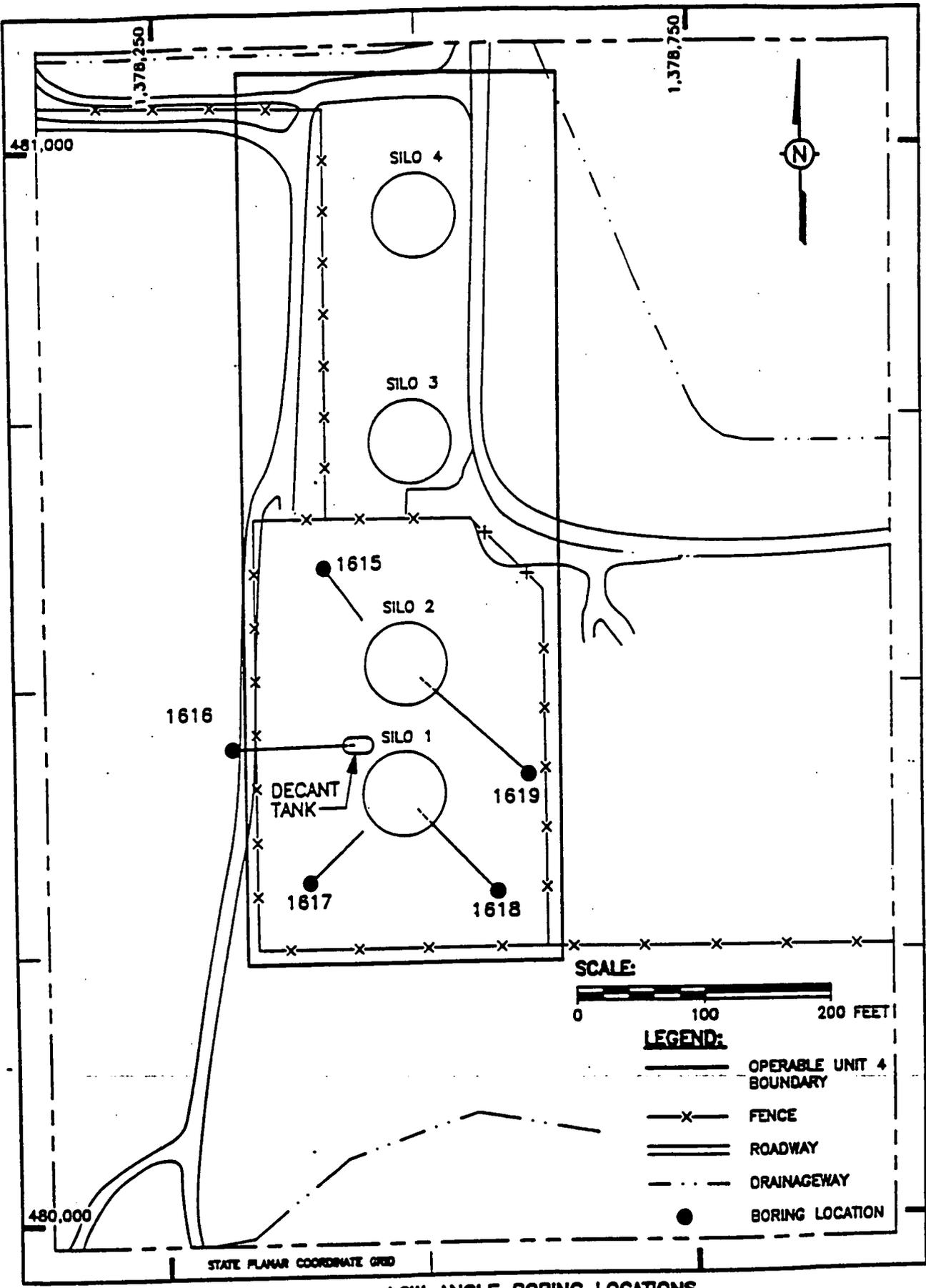
**II. Recommended Actions**

- No removal actions are recommended at this time. However, evaluation of the data is continuing as part of the RI/FS process and will be documented in OU 4 RI Report.
  - Elevated analytes found in soils are below berm surface (i.e. no dispersion due to wind erosion) and are insoluble (i.e. will migrate through soil at an immeasurable rate).
  - Perched groundwater contamination at Groundwater Monitoring Well No. 1032 and Slant Boring No. 1616 is consistent with that seen in area (OU 1 and OU 4). Elevated R<sub>a</sub> 226 would indicate silo leakage.

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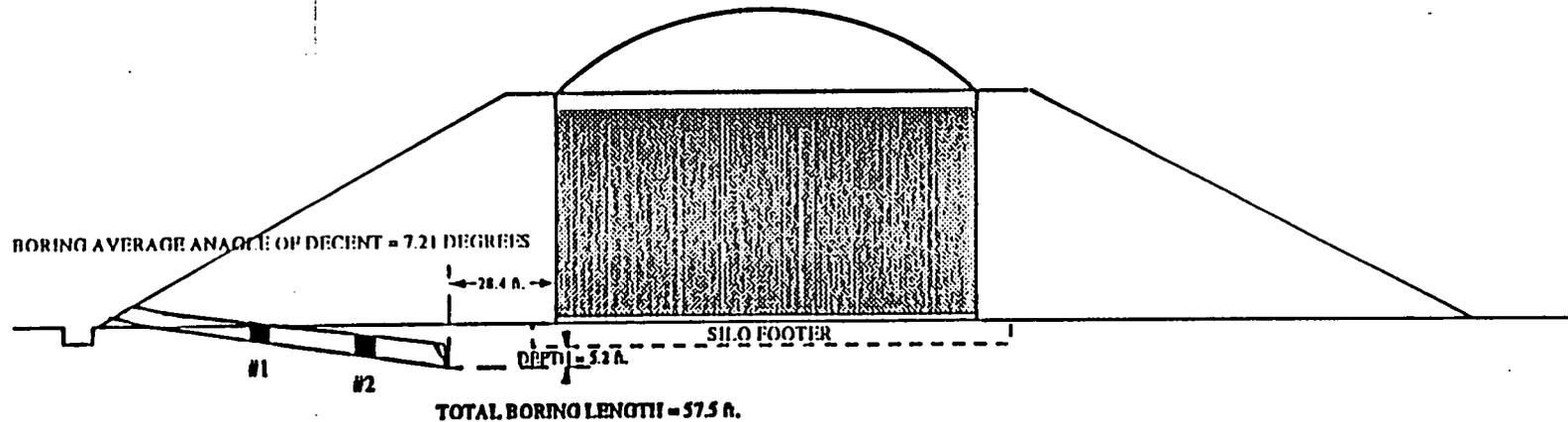
**SLANT BORINGS**

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LOW ANGLE BORING LOCATIONS

**K-65 SILO 2**  
**OU4 SLANT BORING No. 1615**  
**RADIOLOGICAL DATA**



<u>SAMPLE LOCATION #1</u>			
LENGTH	SAMPLE#	ANALYTE	RESULTS
15 ft.	66956	Total U	63.70 ug/g
		Ra 226	206.00 pCi/g
		Pb 210	101. pCi/g
17 ft.	66974	Total U	ND
		Ra 226	176.00 pCi/g
		Pb 210	97.90 pCi/g
19 ft.	66983	Total U	4.77 ug/g
		Ra 226	1.31 pCi/g
		Pb 210	0.55 pCi/g
21 ft.	66960	Pb 210	1.75 pCi/g
	66959	Total U	ND
		Ra 226	1.74 pCi/g

<u>SAMPLE LOCATION #2</u>			
LENGTH	SAMPLE#	ANALYTE	RESULTS
41 ft.	66968	Total U	3.27 ug/g
		Ra 226	0.98 pCi/g
		Pb 210	ND
57 ft.	64007	Total U	1.51 ug/g *
		Ra 226	ND
		Pb 210	ND

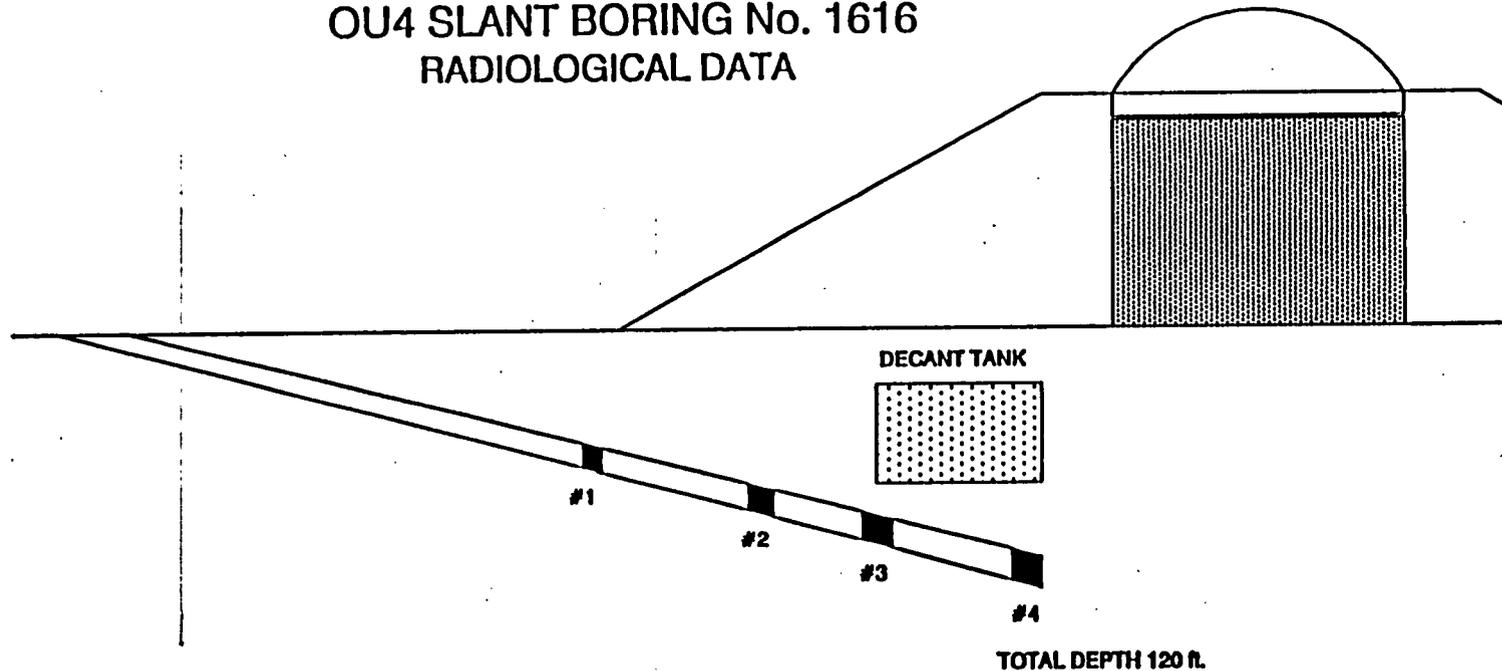
DRAWING NOT TO SCALE

\*PERCHED GROUNDWATER

# K-65 SILO DECANT TANK

## OU4 SLANT BORING No. 1616

### RADIOLOGICAL DATA



**SAMPLE LOCATION #1**

DEPTH	SAMPLE #	ANALYTE	RESULTS
48 ft.	64021	Total U	439.00 ug/l *
		Ra 226	ND
		Pb 210	ND

**SAMPLE LOCATION #2**

DEPTH	SAMPLE #	ANALYTE	RESULTS
89 ft.	64032	Total U	ND
		Ra 226	0.79 pCi/g
	64033	Pb 210	0.58 pCi/g

**SAMPLE LOCATION #3**

DEPTH	SAMPLE #	ANALYTE	RESULTS
108 ft.	64041	Total U	ND
		Ra 226	0.66 pCi/g
	64042	Pb 210	0.46 pCi/g

**SAMPLE LOCATION #4**

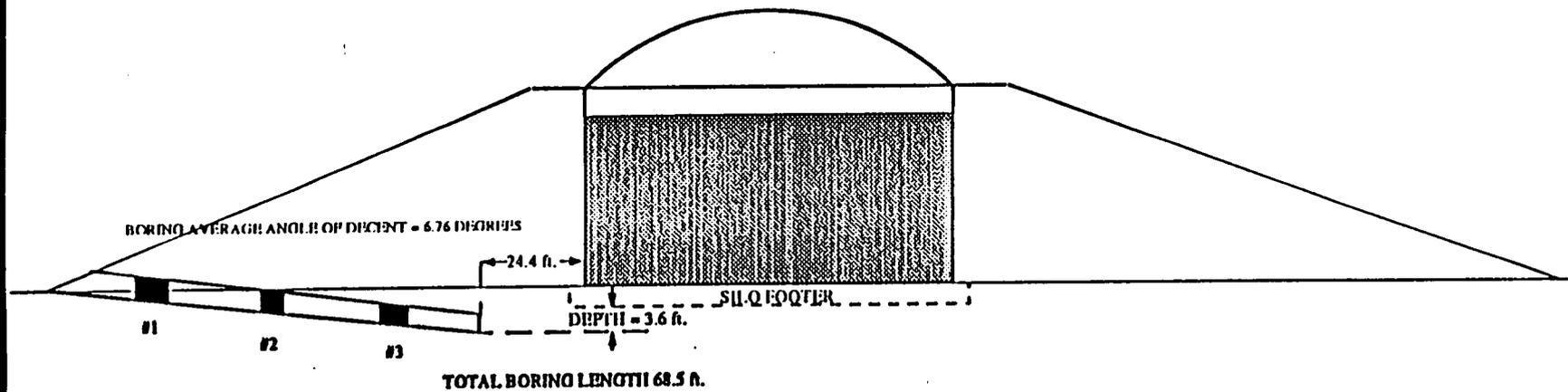
DEPTH	SAMPLE #	ANALYTE	RESULTS
120 ft.	64052	Total U	6.17 ug/l *
		Ra 226	ND
		Pb 210	ND

\*PERCHED GROUNDWATER

# K-65 SILO 1

## OU4 SLANT BORING No. 1617

### RADIOLOGICAL DATA



SAMPLE LOCATION #1			
LENGTH	SAMPLE#	ANALYTE	RESULTS
18 ft.	66984	Pb 210	0.55 pCi/g

SAMPLE LOCATION #2			
LENGTH	SAMPLE#	ANALYTE	RESULTS
38 ft.	66992	Total U	54.20 ug/g
		Ra 226	0.97 pCi/g
		Pb 210	1.03 pCi/g

SAMPLE LOCATION #3			
LENGTH	SAMPLE#	ANALYTE	RESULTS
60 ft.	64001	Total U	15.8 ug/g
		Ra 226	0.61 pCi/g
		Pb 210	ND
69 ft.	64009	Total U	6.33 ug/l *
		Ra 226	ND
		Pb 210	ND

DRAWING NOT TO SCALE

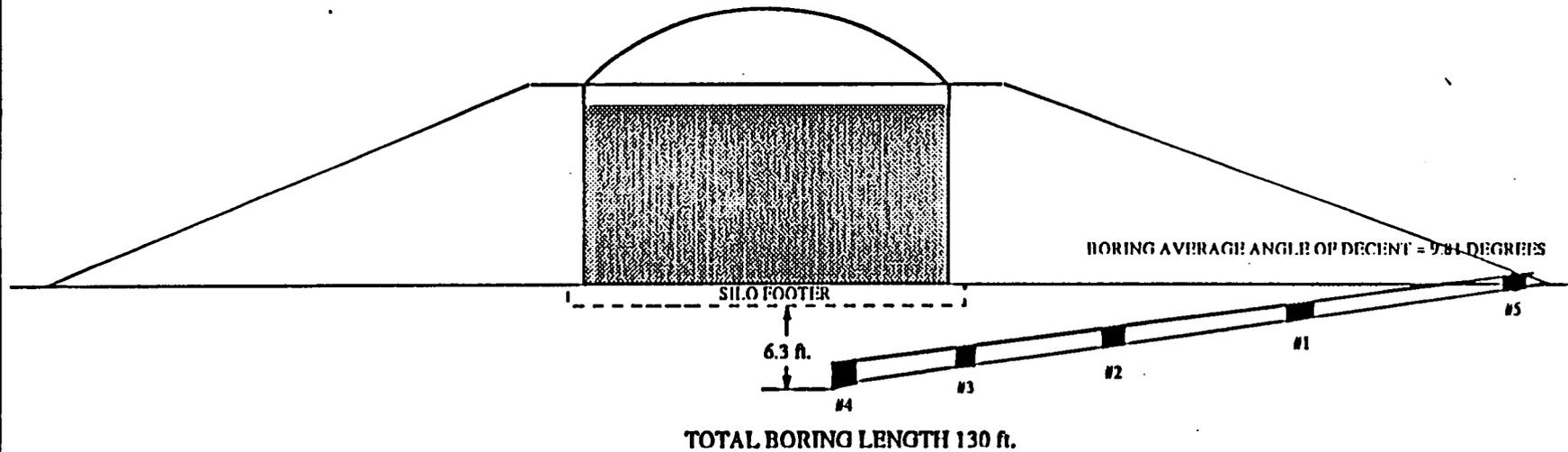
\*PERCHED GROUNDWATER

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# K-65 SILO 1

## OU4 SLANT BORING No. 1618

### RADIOLOGICAL DATA



**SAMPLE LOCATION #1**

LENGTH	SAMPLE#	ANALYTE	RESULTS
51 ft.	64105	Total U	4.76 ug/g
		Ra 226	1.29 pCi/g
	64106	Pb 210	1.06 pCi/g

**SAMPLE LOCATION #2**

LENGTH	SAMPLE#	ANALYTE	RESULTS
71 ft.	64115	Total U	10.30 ug/g
		Ra 226	0.75 pCi/g
	64116	Pb 210	0.73 pCi/g

**SAMPLE LOCATION #3**

LENGTH	SAMPLE#	ANALYTE	RESULTS
106 ft.	64136	Total U	110.00 ug/g
		Ra 226	0.90 pCi/g
	64137	Pb 210	0.63 pCi/g

**SAMPLE LOCATION #4**

LENGTH	SAMPLE#	ANALYTE	RESULTS
128 ft.	64148	Total U	10.70 ug/g
		Ra 226	0.96 pCi/g
	64149	Pb 210	0.52 pCi/g
130 ft.	64152	Ra 226	2.89 pCi/g *
		Pb 210	1.96 pCi/g *

**SAMPLE LOCATION #5**

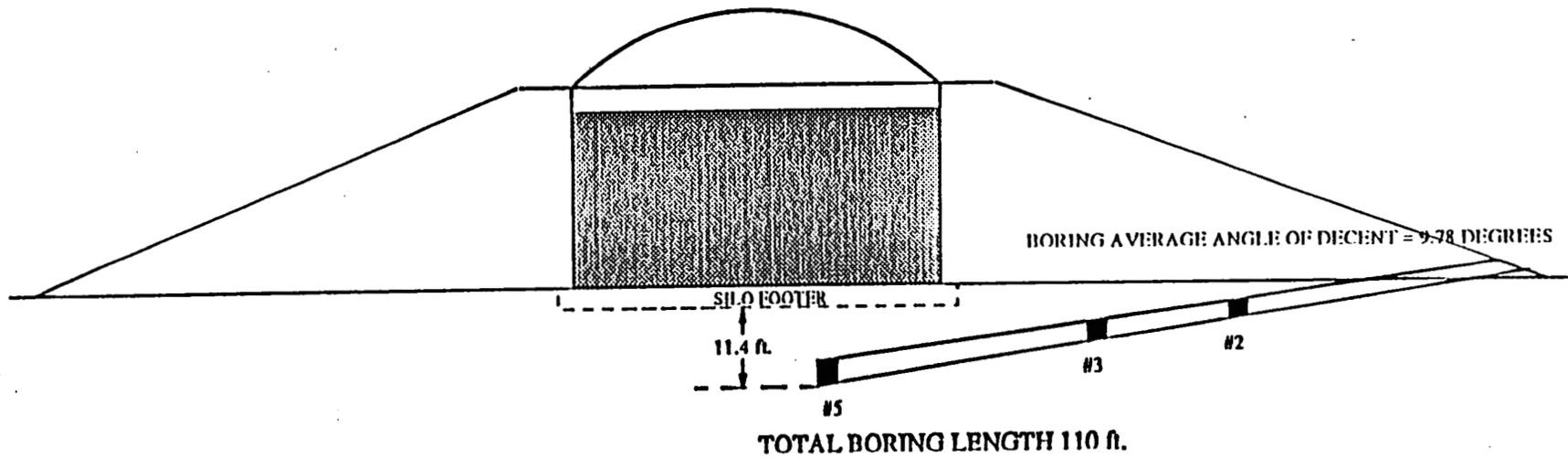
LENGTH	SAMPLE#	ANALYTE	RESULTS
4 ft.	64157	Total U	26.60 ug/g
		Ra 226	137.00 pCi/g
		Pb 210	34.00 pCi/g

DRAWING NOT TO SCALE

\*PERCHED GROUNDWATER

# K-65 SILO 2

## OU4 SLANT BORING No. 1619 RADIOLOGICAL DATA



SAMPLE LOCATION #2			
LENGTH	SAMPLE#	ANALYT	RESULTS
61 ft.	64071	Total U	ND
		Ra 226	0.88 pCi/g
	64072	Pb 210	0.71 pCi/g

SAMPLE LOCATION #3			
LENGTH	SAMPLE#	ANALYT	RESULTS
91 ft.	64125	Pb 210	ND
	64126	Total U	74.9 ug/g
		Ra 226	0.97 pCi/g

SAMPLE LOCATION #5			
LENGTH	SAMPLE#	ANALYT	RESULTS
110 ft.	64090	Ra 226	ND
		Pb 210	2.81 pCi/A *

DRAWING NOT TO SCALE

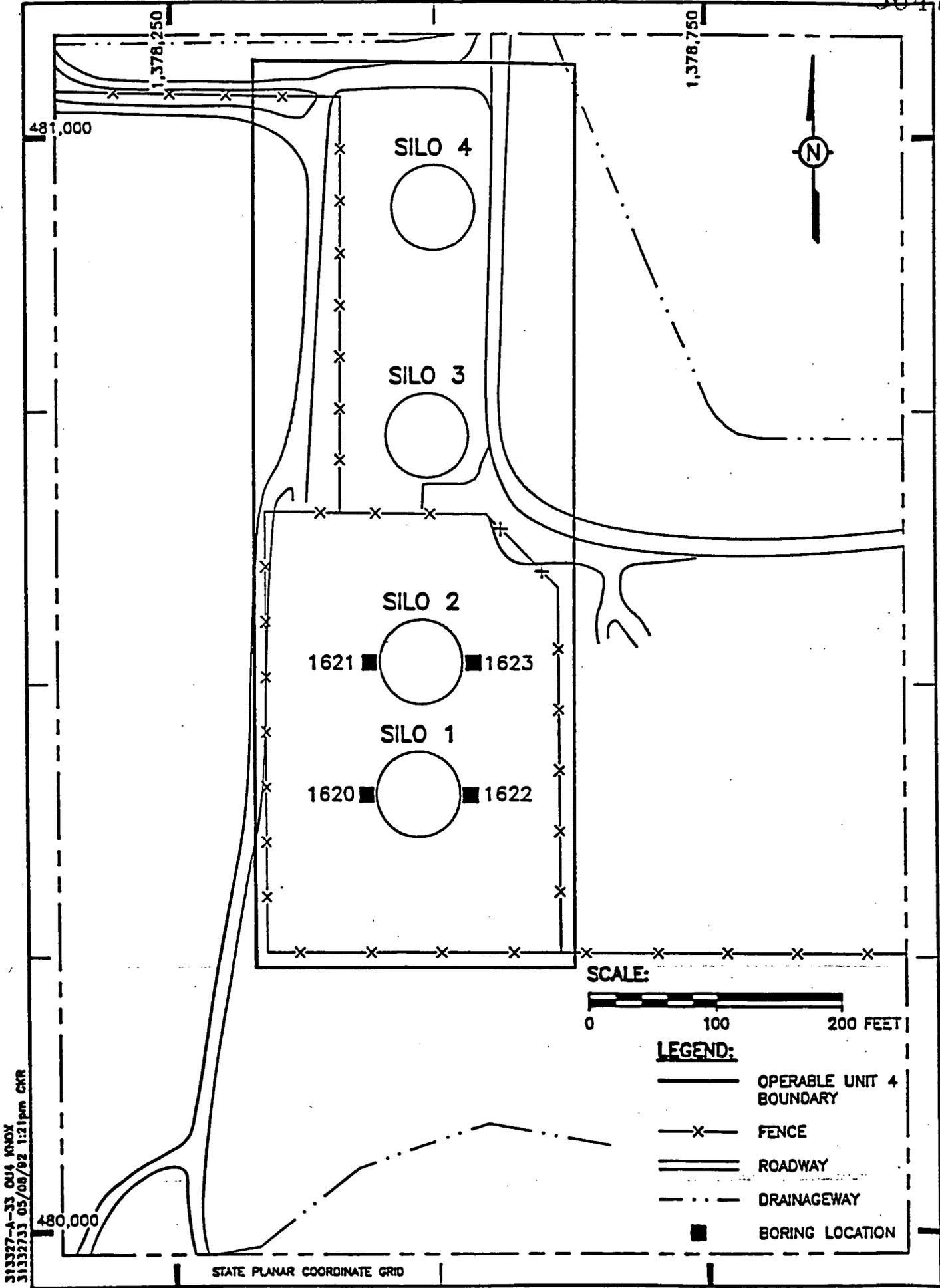
\*PERCHED GROUNDWATER

## OU 4 SLANT BORINGS

## Areas of Concern

<u>Boring No.</u>	<u>Media</u>	<u>Location</u>	<u>Analyte</u>	<u>Result</u>
1615	Soil	At Surface (under berm)	R <sub>A</sub> 226 P <sub>b</sub> 210 U <sub>TOT</sub>	206 pCi/g 101 Pci/g 63.7μg/g
1616	Perched groundwater	Decant Tank	U <sub>TOT</sub>	439μg/l
1618	Soil	18" from surface	R <sub>A</sub> 226	137 pCi/g

**BERM SAMPLING**



313377-A-33 OU4 MONX  
31332733 05/09/02 1:21pm CNR

STATE PLANAR COORDINATE GRID

FIGURE 2-3. VERTICAL BORING LOCATIONS

## VERTICAL BERM SAMPLING RADIOLOGICAL DATA

SAMPLE#	0 ft	ANALYTE RESULTS
99462	5 ft	Total U = 11.10 ug/g Ra 226 = 3.67 pCi/g Pb 210 = 1.96 pCi/g
	10 ft	
99482	15 ft	Total U = 12.40 ug/g Ra 226 = 1.28 pCi/g Pb 210 = 0.98 pCi/g
	20 ft	
99487	20 ft	Total U = 10.80 ug/g Ra 226 = 1.52 pCi/g Pb 210 = 1.37 pCi/g
	25 ft	
99500	25 ft	Total U = 11.90 ug/g Ra 226 = 1.52 pCi/g Pb 210 = 1.37 pCi/g

Boring  
#1620

SAMPLE#	0 ft	ANALYTE RESULTS
99532	5 ft	Total U = 12.40 ug/g Ra 226 = 6.68 pCi/g Pb 210 = 4.45 pCi/g
	10 ft	
99537	10 ft	Total U = 3.69 ug/g Ra 226 = 1.63 pCi/g Pb 210 = 1.26 pCi/g
	15 ft	
99549	15 ft	Total U = 5.35 ug/g Ra 226 = 0.96 pCi/g Pb 210 = 0.77 pCi/g
	20 ft	
99554	20 ft	Total U = 3.92 ug/g Ra 226 = 0.96 pCi/g Pb 210 = 0.95 pCi/g
	25 ft	
99577	25 ft	Total U = 9.03 ug/g Ra 226 = 14.70 pCi/g Pb 210 = 8.69 pCi/g
	30 ft	
99576	30 ft	Total U = 9.03 ug/g Ra 226 = 14.70 pCi/g Pb 210 = 8.69 pCi/g

Boring  
#1621

## VERTICAL BERM SAMPLING RADIOLOGICAL DATA

SAMPLE#	0 ft	ANALYTE RESULTS
99592	5 ft	Total U = 6.46 ug/g Ra 226 = 1.62 pCi/g Pb 210 = 1.39 pCi/g
	10 ft	
99601	15 ft	Total U = 1.99 ug/g Ra 226 = 0.65 pCi/g Pb 210 = 0.62 pCi/g
	20 ft	
99606	20 ft	Total U = 9.56 ug/g Ra 226 = 0.62 pCi/g Pb 210 = 0.69 pCi/g
	25 ft	
99618	25 ft	Total U = 14.30 ug/g Ra 226 = 1.12 pCi/g Pb 210 = 1.54 pCi/g
	30 ft	
99623	30 ft	Total U = 186.00 ug/g Ra 226 = 876.00 pCi/g Pb 210 = 417.00 pCi/g

Boring  
#1622

SAMPLE#	0 ft	ANALYTE RESULTS
99633	5 ft	Total U = 10.50 ug/g Ra 226 = 1.04 pCi/g Pb 210 = 0.98 pCi/g
	10 ft	
99653	15 ft	Total U = 13.30 ug/g Ra 226 = 0.81 pCi/g Pb 210 = 0.84 pCi/g
	20 ft	
99658	20 ft	Total U = 10.80 ug/g Ra 226 = 1.27 pCi/g Pb 210 = 1.16 pCi/g
	25 ft	
99670	25 ft	Total U = 8.42 ug/g Ra 226 = 0.91 pCi/g Pb 210 = 0.89 pCi/g
	30 ft	
99675	30 ft	Total U = 9.95 ug/g Ra 226 = 1.11 pCi/g Pb 210 = 1.31 pCi/g

Boring  
#1623

## OU 4 VERTICAL BORINGS

## Area of Concern

<u>Boring No.</u>	<u>Analyte</u>	<u>Result</u>
1622	U <sub>TOT</sub>	186 µg/g
	R <sub>A</sub> 226	876 pCi/g
	P <sub>b</sub> 210	417 pCi/g

**AREA  
GROUNDWATER  
MONITORING  
WELL  
DATA**

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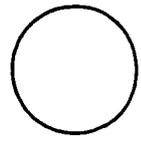
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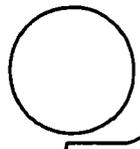
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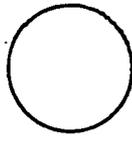
SILO 4



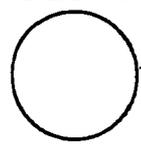
SILO 3



SILO 2



SILO 1

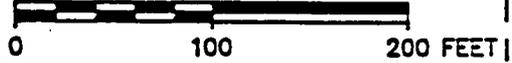


+ 032

+ 033

+ 034

SCALE:



LEGEND:

-  OPERABLE UNIT 4 BOUNDARY
-  FENCE
-  ROADWAY
-  DRAINAGEWAY
-  BORING LOCATION

313327-A-33 QU4 KNOX  
31332733 05/08/92 1:21pm CHR

480,000

STATE PLANAR COORDINATE GRID

+ GROUNDWATER MONITORING WELL CLUSTER

## GROUNDWATER MONITORING WELLS

## Area of Concern

<u>Well No.</u>	<u>Location</u>	<u>Analyte</u>	<u>Result</u>
1032	West of Silos	U <sub>TOT</sub>	261 µg/l