U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 999-90003/94011(DRSS)

License No. Non-Licensee

Organization: Northeast Ohio Regional Sewer District (NEORSD)
Cleveland, Ohio

Inspection At: NEORSD Southerly Wastewater Treatment Plant
6000 Canal Road
Cuyahoga Heights, OH 44125-1075

Inspection Conducted: October 15, 1993

Inspectors: Raymant L. Glinski, Jr. 3/9/94
Raymant L. Glinski Date
Radiation Specialist

Donald Sreniawski 3/9/94
Donald Sreniawski Date
Senior Radiation Specialist

George M. McCann 3/11/94
George M McCann Date
Chief, Fuel Facilities and
Decommissioning Section

Accompanying Personnel: Todd Brady, Radiation Protection Programs
Cuyahoga County Board of Health

Approved By: George M. McCann for 03/14/94
Gary. L. Shear, Chief Date
Fuel Cycle and Decommissioning
Branch

Inspection Summary

Inspection on October 15, 1993 (Report No. 999-90003/94011(DRSS))
Areas Inspected: This was a special inspection which was limited to a radiological surveys of Lagoon A, the roads surrounding the lagoons, the area between the lagoons and the South Fill Area, and the Aeration Tank area. Samples of soil/ash were collected from the areas surveyed.
Results: The NRC inspectors identified four locations between the lagoons and the South Fill Area with radiation levels above ambient background. One of

the samples collected from Lagoon A and one of the samples from the area between Lagoon A and the South Fill Area contained a level of cobalt-60 (Co-60) contamination in excess of the NRC unrestricted use criteria for soil. However, the sampling effectively remediated the areas. The survey data will be used by the NRC regarding its decision to approve a conditional release of the lagoons.

DETAILS

1. Persons Contacted

Richard Connelly, Manager, Water Quality and Industrial Surveillance, Northeast Ohio Regional Sewer District (NEORSD)
James Dean, Radiation Safety Project Manager, Radiation Service Organization, Inc.; NEORSD Health Physics Contractor

2. Background

The NEORSD is responsible for operating three wastewater treatment plants in and near Cleveland, Ohio. The Southerly Wastewater Treatment Plant (SWTP) of NEORSD began operations in 1927. The current process at SWTP involves degritting the sludge, thickening the sludge in a centrifuge, and thermally conditioning the sludge prior to vacuum filtration and incineration. The incinerated sewerage ash is liquified and then pumped into the three evaporation lagoons, designated as Lagoons A, B, and C.

An April 1991 aerial radiation survey of the Cleveland area identified areas at SWTP with elevated levels of Co-60. The identified areas were the north edge of the plant, the sanitary ponds now in use, and the south fill area. Figure 1 presents a schematic map of the SWTP and provides a cursory history of the Co-60 contamination found onsite.

The NRC and an NRC contractor (Oak Ridge Institute for Science and Education - ORISE), began a limited radiological site characterization in the summer of 1991. Upon completion of the ORISE limited site characterization, NEORSD secured the services of a health physics vendor which conducted the remediation of the sanitary ponds and performed close-out surveys. The remediation of Lagoon A involved the removal of the entire bottom to a depth of 1.5 - 2 feet (60 cm) below grade, and a removal to 3 feet (1 m) below grade of 6 separate grids. The dimensions of the grids were 10 x 10 meters.

At the time of this inspection, the ORISE confirmatory survey had not been completed. To support a conditional release of Lagoon A for unrestricted use, before installing the new clay bottom, the NRC Region III office decided to conduct further surveys and sampling in that area.

2. Survey Procedures

The field instruments employed for this survey were as follows: a Ludlum Model 14C ratemeter with a Model 44-9 pancake probe, NRC #013158, calibrated August 10, 1993; a Bicron Microrem Meter, NRC #028330, calibrated November 5, 1992; and an Eberline PRM-7 MicroR meter, NRC #18765, calibrated May 8, 1993. Detector response was checked with a cesium-137 check source prior to the survey. All meters responded properly.

Background readings for each meter were as follows: 8-12 microRoentgens per hour (μR/h) [2-3 nanocoulombs per kilogram per hour - nC/kg/h] for

the Eberline PRM-7, 5-7 microrem per hour (μrem/h) (50-70 nanosieverts per hours) for the Bicron μrem meter, and 40-50 counts per minute (cpm) for the Ludlum pancake probe.

The inspectors collected surface samples from the bottom of Lagoon A and the general lagoon area. Figure 2 indicates the sampling locations in the area surrounding the lagoons. Figure 3 indicates the sampling locations within Lagoon A. In addition, subsurface samples from the Aeration Tank Area were collected on November 17. 1993. Figure 4 presents the locations of the samples collected from the Aeration Tank area. The depth of the Aeration Tank samples was from 30-45 centimeters.

4. Survey Results

General radiation levels measured were in the ambient background range, approximately 10 μR/h. However, the inspectors identified four locations with elevated radiation levels ranging from 2,000-62,000 cpm and up to 60 μR/h (15.5 nC/kg/h). These areas of elevated radiation were located between the lagoons and the South Fill Area. In Figure 2, the results of the beta/gamma survey in the area surrounding the incinerated ash ponds are presented.

The soil/ash samples were sent to ORISE for gamma spectrometry analysis. One of the samples collected from Lagoon A and one of the samples from the area between Lagoon A and the South Fill Area contained Co-60 contamination in excess of the NRC soil guideline value for release for unrestricted use of 8 picocuries per gram (pCi/g) [296 millibecquerels per gram (mBq/g)]. This criteria can be found in "Order Establishing Criteria and Schedule for Decommissioning of Bloomsburg site," Federal Register, February 1992. The samples collected from the Aeration Tank Area ranged from 0.3 - 3.7 pCi/g (11.1 - 136.9 mBq/g). The two areas above the limits were essentially remediated by the sample collection, that is, no detectable contamination remained. The results for all the analyses are presented in Tables 1 and 2.

5. Exit Meeting

The NRC representatives met with Mr. Richard Connelly at the conclusion of the inspection. Mr. Connelly was advised that the survey and analysis data would be provided to NEORSD. He was also informed that Lagoon A may not have been remediated sufficiently, such that its release could be guaranteed for unrestricted use. Therefore, after all surveys and evaluations are completed, further remediation of Lagoon A might be necessary.

Attachments:
1. Figure 1 - Plot Plan of Southerly Wastewater Treatment Plant
2. Figure 2 - Survey Results and Sampling Points
3. Figure 3 - Sampling Locations in Lagoon A
4. Figure 4 - Aeration Tank Area
5. Table 1
6. Table 2

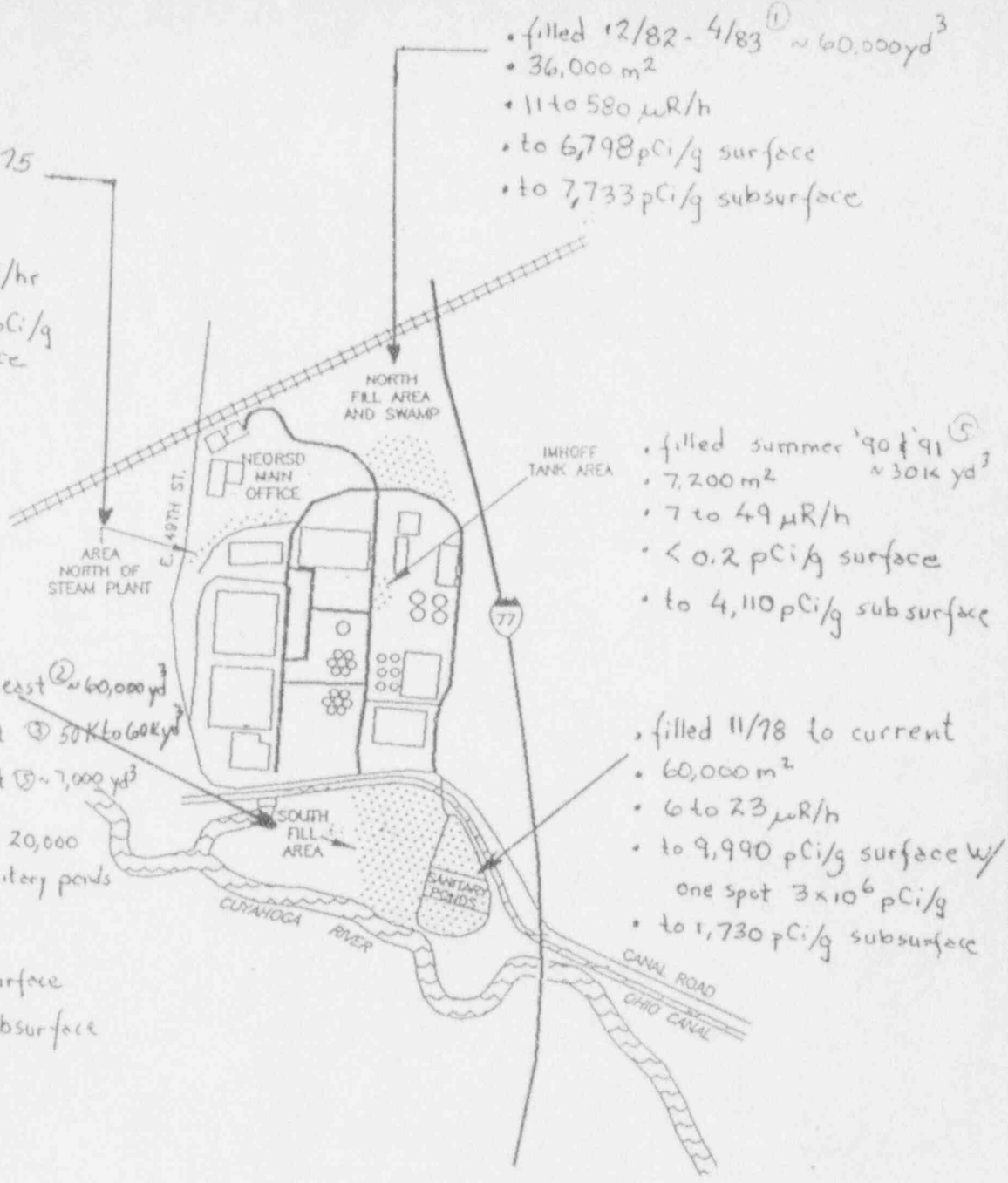


FIGURE 1: Plot Plan of Southerly Wastewater Treatment Plant

ATTACHMENT 1

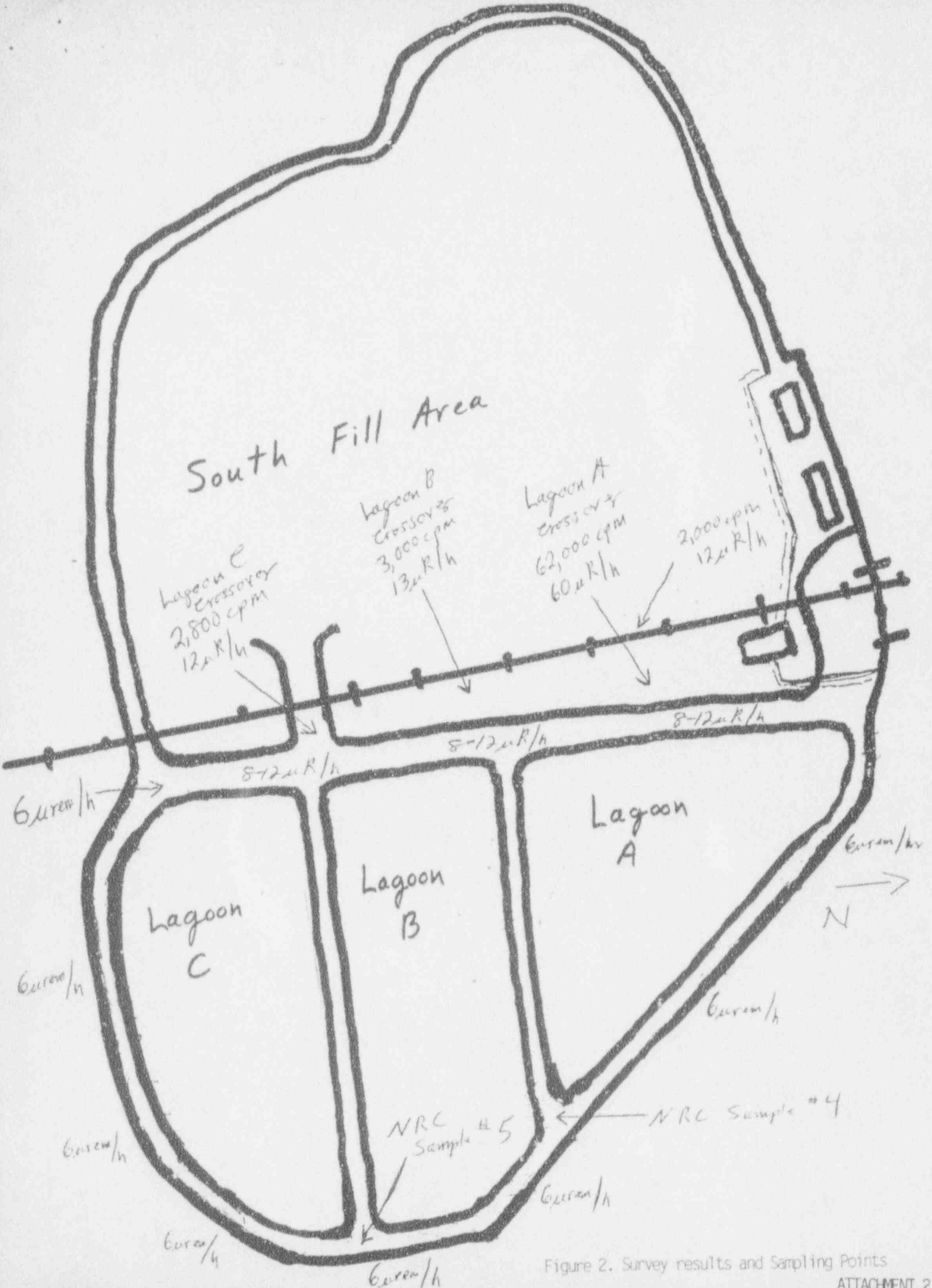
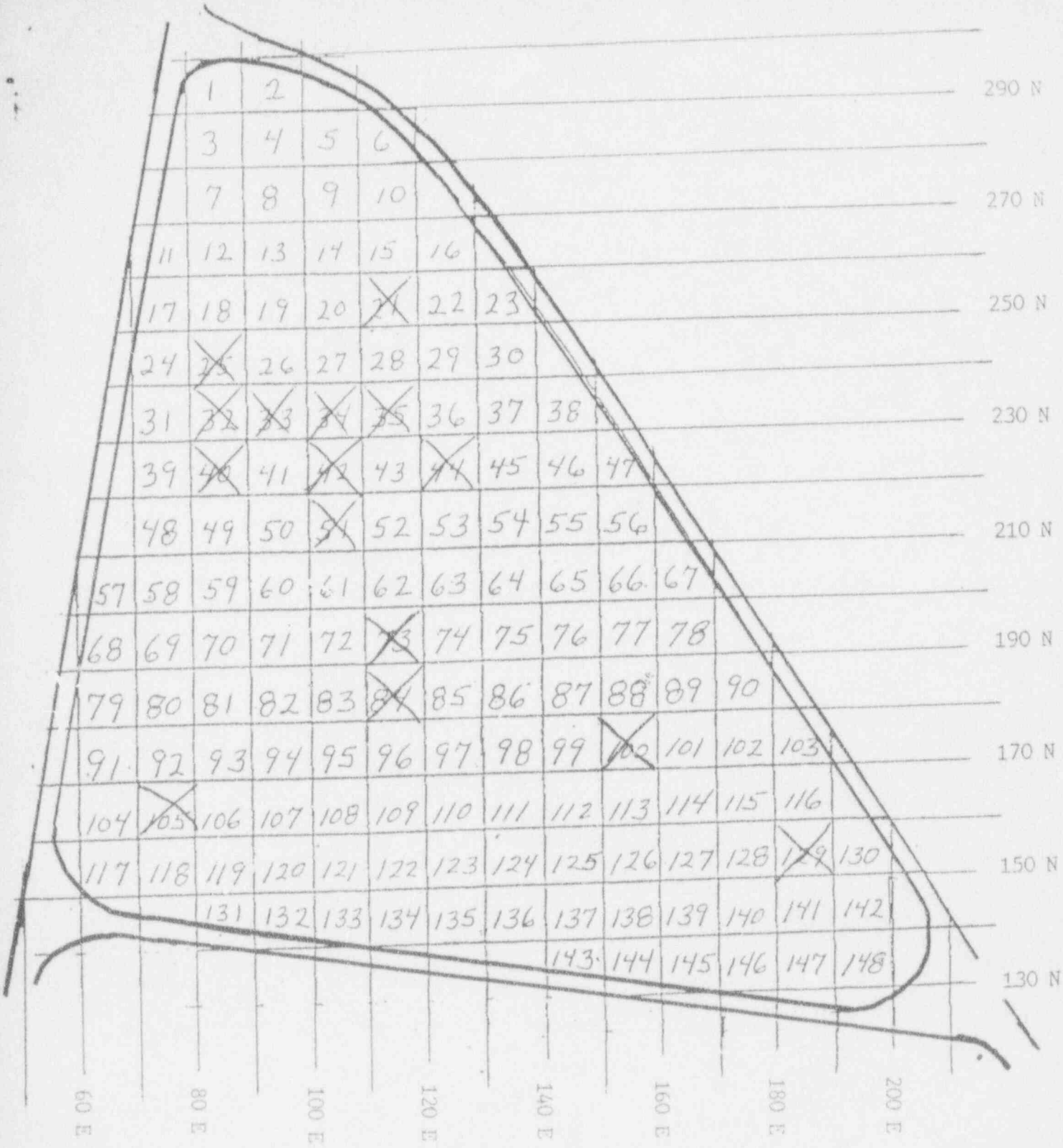


Figure 2. Survey results and Sampling Points

ATTACHMENT 2



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LAGOON " A " SURVEY GRID

1 GRID = 10m x 10m

Figure 3. Sampling Locations in Lagoon A.

ATTACHMENT 3

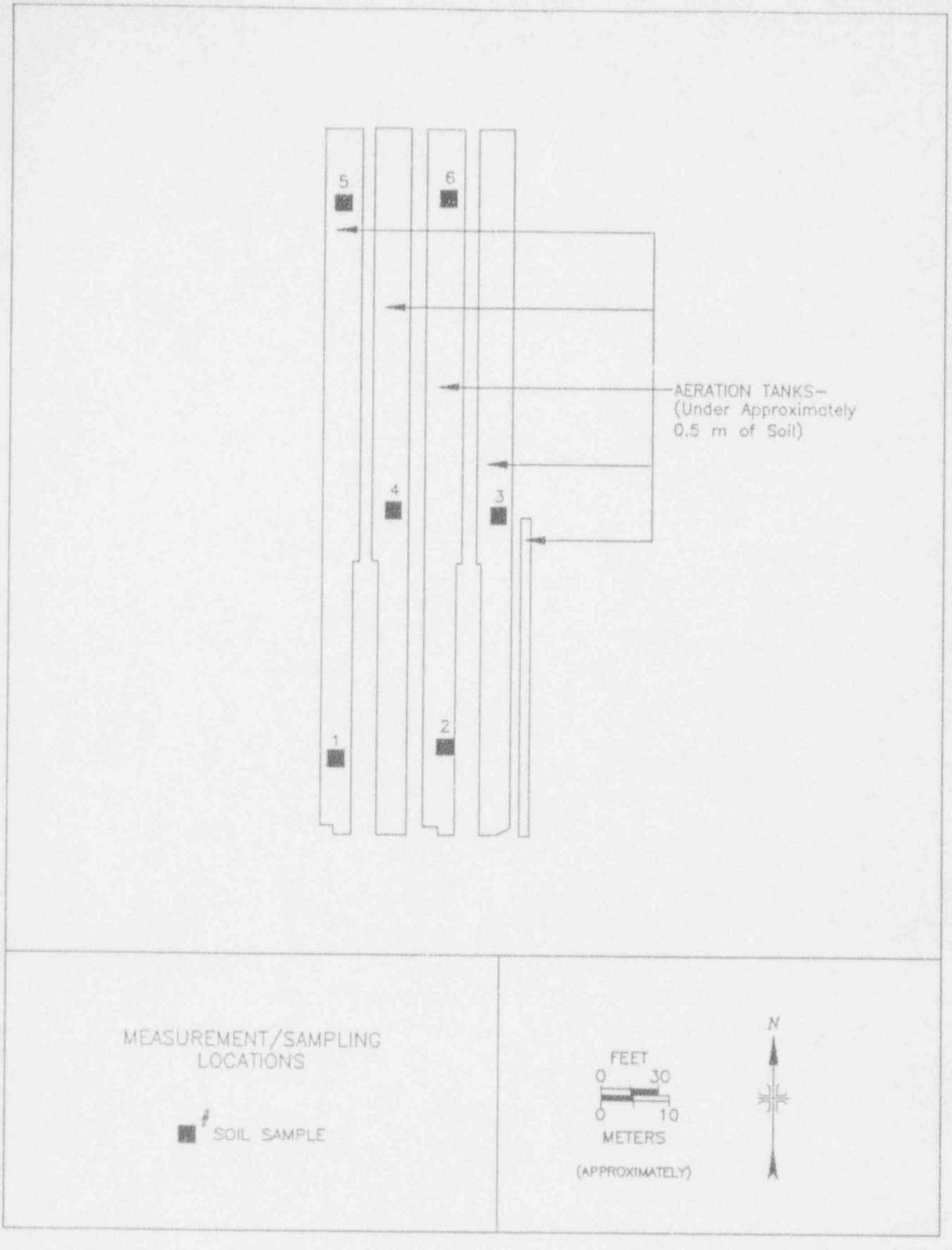

FIGURE 4: Aeration Tank Area – Soil Sampling Locations

TABLE 1

COBALT-60 CONCENTRATIONS
IN SOIL SAMPLES COLLECTED BY THE
U.S. NUCLEAR REGULATORY COMMISSION AND ANALYZED BY ESSAP
NORTHEAST OHIO REGIONAL SEWER DISTRICT
SOUTHERLY WASTEWATER TREATMENT PLANT
CLEVELAND, OHIO

Location[a]	Co-60 Concentration (pCi/g)
Surface Samples	
Lagoon A, 75E, 165N	0.1 ± 0.1
Lagoon A, 80E, 220N	2.9 ± 0.3
Lagoon A, 80E, 230N	3.1 ± 0.3
Lagoon A, 80E, 240N	4.8 ± 0.3
Lagoon A, 95E, 230N	0.4 ± 0.1
Lagoon A, 100E, 150N	<0.2
Lagoon A, 100E, 210N	2.3 ± 0.3
Lagoon A, 100E, 220N	1.8 ± 0.3
Lagoon A, 100E, 230N	0.8 ± 0.2
Lagoon A, 110E, 180N	0.2 ± 0.1
Lagoon A, 110E, 230N	1.1 ± 0.2
Lagoon A, 110E, 250N	1300.0 ± 7.0
Lagoon A, 120E, 90N	0.7 ± 0.1
Lagoon A, 120E, 225N	0.8 ± 0.2
Lagoon A, 150E, 170N	<0.1
Lagoon A Crossover, 63E, 240N	1500.0 ± 9.0
Lagoon B Crossover, 45E, 135N	0.2 ± 0.1
Lagoon C Crossover, 35E, 55N	0.4 ± 0.1
U.S. NRC - Sample #4	<0.1
U.S NRC - Sample #5	0.1 ± 0.1

[a]Uncertainties for ESSAP analysis represents the 95% confidence level, based only on counting statistics.

TABLE 2

COBALT-60 CONCENTRATIONS
IN SOIL SAMPLES COLLECTED FROM AERATION TANK AREA
NORTHEAST OHIO REGIONAL SEWER DISTRICT
SOUTHERLY WASTEWATER TREATMENT PLANT
CLEVELAND, OHIO

Location[a]	Co-60 Concentration (pCi/g)
1	3.7 ± 0.3[b]
2	1.2 ± 0.2
3	0.5 ± 0.2
4	0.3 ± 0.1
5	1.3 ± 0.2
6	0.3 ± 0.1

[a]Refer to Figure 2.
[b]Uncertainties represent the 95% confidence level, based only on counting statistics.