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ORISE  
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

December 9, 1994

Mr. Randolph Ragland  
United States Nuclear Regulatory Commission  
Region I  
475 Allendale Road  
King of Prussia, PA 19400

**SUBJECT: PROPOSED CHARACTERIZATION RADIOLOGICAL SURVEY PLAN  
FOR THE ASH LAGOON AND ADJACENT PROPERTY, KISKI VALLEY  
WATER POLLUTION CONTROL AUTHORITY, VANDERGRIFT,  
PENNSYLVANIA (RFTA # 94-05)**

Dear Mr. Ragland:

Enclosed is the proposed radiological characterization survey plan for the ash lagoon at the Kiski Valley Water Pollution Control Authority (KVVWPCA) facility in Vandergrift, Pennsylvania. The survey will be performed on December 13-16, 1994 and will be followed by a draft letter report for the U. S. Nuclear Regulatory Commission's (NRC) review and comments.

The survey sample analysis cost estimate is likely to be the upper bound of the cost estimate; the actual cost of sample analysis should be less because the number of samples may be less than that which is accounted for in the cost estimate. The survey is tentatively scheduled for December 13-16; for this schedule to be met, approval will be needed by December 12, 1994.

Please do not hesitate to contact me at (615) 576-0065 or Jack Beck at (615) 576-5031 should you have any questions.

Sincerely,



Wade C. Adams  
Health Physicist/Project Leader  
Environmental Survey and  
Site Assessment Program

WCA:rde

Enclosures

cc. R. Uleck, NRC/NMSS/TWFN 7F27  
D. Tiktinsky, NRC/NMSS/TWFN 8A23  
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**PROPOSED  
CHARACTERIZATION RADIOLOGICAL SURVEY PLAN  
FOR THE ASH LAGOON AND ADJACENT PROPERTY  
KISKI VALLEY WATER POLLUTION CONTROL AUTHORITY  
VANDERGRIFT, PENNSYLVANIA**

**INTRODUCTION AND SITE HISTORY**

The Kiski Valley Water Pollution Control Authority (KVVWPCA) operates a wastewater treatment plant in Vandergrift, Pennsylvania, which is approximately 40 km (25 mi) northeast of Pittsburgh. The facility separates solids from raw sewage, which are then concentrated prior to dewatering by vacuum filtration. The dewatered sludge is then incinerated and sterilized and converted to ash. From 1976 to early 1993, this ash was mixed with water, and converted to a slurry and transferred to a lagoon for storage. This practice and use of the lagoon was discontinued in early 1993. Ash is now accumulated and disposed of in a municipal landfill on a batch type basis as it is created.

In August 1993, the Pennsylvania Department of Environmental Resources (PADER) notified the NRC that they had measured elevated uranium activity in a sludge ash sample obtained from this ash lagoon. In September 1994, PADER provided the U.S. Nuclear Regulatory Commission (NRC) a "split" sample for independent analysis. This sample was analyzed by the Oak Ridge Institute for Science and Education (ORISE), and results confirmed PADER's analysis. In September 1994, the NRC conducted surface and subsurface sampling in the ash lagoon. Analysis of the samples from the ash lagoon indicated that some of the samples contained concentrations of enriched uranium exceeding remediation guidelines typically used by the NRC for uranium in soil.

**SITE DESCRIPTION**

The ash lagoon, which is located on KVVWPCA property, is surrounded by a 3 meter high berm. An access road borders the berm to the south and east. The property boundary fence is located

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Prepared by the Environmental Survey and Site Assessment Program of Oak Ridge Institute for Science and Education, Oak Ridge, TN, under interagency agreement (NRC Fin. No. A-9093) between the U.S. Nuclear Regulatory Commission and the U.S. Department of Energy.

beyond the access road to the south and east and runs along the bottom of the berm to the west. The Kiskiminetas River is located just east of the area.

The area of concern covers approximately 8,000 m<sup>2</sup>, with the lagoon area covering approximately 4,000 m<sup>2</sup>. The lagoon is 3 meters deep at the center and currently contains approximately 10,000 cubic meters of ash, which was deposited from 1976 to 1993. The influent pipe is located in the northwest corner of the lagoon. The lagoon is un-lined and the soil beneath the ash is mostly clay.

The U. S. Nuclear Regulatory Commission, Region I Office, has requested that the Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) to perform a radiological characterization survey of the ash lagoon and adjacent area at the Kiski Valley Pollution Control Authority in Leechburg, Pennsylvania.

### **OBJECTIVE**

The objective of the survey is to obtain sufficient data to evaluate the radiological condition of the site and the significance of the uranium contamination in the ash lagoon and adjacent property relative to the NRC guidelines. Information will also be gathered to evaluate options for remediation.

### **RESPONSIBILITY**

Work described in this survey plan will be performed under the direction of Jack Beck, Program Director, and Wade Adams, Project Leader of the Environmental Survey and Site Assessment Program of the Energy/Environment Systems Division of ORISE. The cognizant ESSAP site supervisor has the authority to make appropriate changes to the survey procedures as deemed necessary. After consultation with the NRC site representative, the scope of the survey may be altered. Deviations to the survey plan or procedures will be documented in the site log book.

## PROCEDURES

A survey team from ESSAP will visit the KVVWPCA property and perform visual inspections and independent measurements and sampling. Survey activities will be conducted in accordance with the ORISE/ESSAP Survey Procedures and Quality Assurance Manuals. The procedures applicable to this survey are listed on page 6 of this survey plan. This survey may be conducted in two phases.

### **SURVEY PROCEDURES: PHASE I**

#### **Reference Grid**

A 10 m × 10 m reference grid system will be established by ESSAP along the top of the lagoon berm, encompassing the entire lagoon. Adjacent property will not be gridded; measurement and sampling locations in ungridded areas will be referenced to the lagoon grid or prominent site features.

#### **Surface Scans**

Gamma surface scans will be conducted at 1-2 m intervals using gamma scintillation detectors and ratemeters with audible indicators. Locations of elevated radiation, suggesting the presence of surface or near surface contamination, will be marked for further investigation.

#### **Exposure Rate Measurements**

Gamma exposure rates will be performed at 1 m above the surface at each soil sampling location and at locations at elevated radiation identified by the gamma surface scans, using a pressurized ionization chamber (PIC). Site exposure rates will be compared to background exposure rates collected during previous ESSAP survey activities in the Pittsburgh, Pennsylvania area.

## **Soil Sampling**

Surface soil samples will be collected at grid line intersections in the lagoon, and from approximately 25 locations in the adjacent property. Additional samples will be collected from locations of elevated radiation identified by surface scans.

Subsurface soil samples (at approximately 1 m, 2 m, and 3 m depth) will be collected from a minimum of 20 grid block centers. Subsurface samples will also be collected from locations of elevated surface radiation and from other suspect locations as deemed appropriate by previous ESSAP reports.<sup>1-3</sup> Radionuclide concentrations in on-site soil samples will be compared to background soil samples collected from previous ESSAP survey activities in the Pittsburgh, Pennsylvania area.

## **Additional Sampling**

Water samples may be collected, if water is present, at locations of standing surface water at the site. Additional water samples may be collected if water is present at subsurface sampling locations.

## **SURVEY PROCEDURES: PHASE 2**

The Phase 2 survey plan will be developed based on Phase 1 findings and will be submitted separately. Data from Phase 1 will be evaluated and will serve as a basis for formulating the Phase 2 survey plan, if necessary.

## **SAMPLE ANALYSIS AND DATA INTERPRETATION**

Samples and data will be returned to ORISE's ESSAP laboratory in Oak Ridge, TN for analysis and interpretation. Exposure rates will be reported in units of  $\mu\text{R}/\text{h}$ . Soil/sludge/ash samples will be analyzed by solid state gamma spectrometry. Water samples will be analyzed for gross alpha and gross beta activity using a low background gas proportional counter. Gamma spectrometry analyses may be performed on selected liquid samples based on the results of the

gross alpha and gross beta analyses of the samples. Based on the gamma spectrometry results of the soil/sludge/ash samples, some samples may be reanalyzed by alpha spectrometry. Soil concentrations will be reported in picocuries per gram (pCi/g) and water concentrations in picocuries per liter (pCi/L). The radionuclide of interest is uranium; however, spectra will be reviewed for other identifiable photopeaks.

Results will be presented in a draft report and provided to the NRC for review and comment. Data and samples collected as a part of this survey will be archived by ESSAP.

### **GUIDELINES**

The process of separating and incinerating solids from raw sewage tends to concentrate some forms of naturally occurring radioactivity. Consequently, background concentrations of total uranium in sludge ash and concentrations guidelines for remediation have not been established for this site.

The exposure rate guideline is 5  $\mu$ R/h above background.<sup>4</sup>

### **TENTATIVE SCHEDULE**

Measurement and Sampling	December 13-16, 1994
Sample Analysis	January 1995
Draft Survey Report	February 1995

## LIST OF CURRENT PROCEDURES

Applicable procedures from ORISE's ESSAP Survey Procedures Manual (Revision 8; December 31, 1993) include:

- Section 5.0 Instrument Calibration and Operational Check-Out
  - 5.1 General Information
  - 5.2 Electronic Calibration of Ratemeters
  - 5.3 Gamma Scintillation Detector Check-Out
  - 5.7 Pressurized Ionization Chamber Calibration and Check-Out
  - 5.12 Field Measuring Tape Calibration
  
- Section 6.0 Site Preparation
  - 6.1 Clearing to Provide Access
  - 6.2 Reference Grid System
  
- Section 7.0 Scanning and Measurement Techniques
  - 7.1 Surface Scanning
  - 7.5 Gamma Radiation (Exposure Rate) Measurement
  
- Section 8.0 Sampling Procedure
  - 8.1 Surface Soil Sampling
  - 8.2 Subsurface Soil Sampling
  - 8.4 Water Sampling
  - 8.9 Sample Identification and Labeling
  
- Section 9.0 Integrated Survey Procedures
  - 9.2 General Survey Approaches and Strategies
  
- Section 10.0 Health and Safety and Control of Cross Contamination
  
- Section 11.0 Quality Assurance and Quality Control

## REFERENCES

1. Letter from W. Adams (ESSAP) to R. Ragland (US NRC, Region I), RE: "Alpha and Gamma Spectrometry Results for the Sludge Ash Sample from the Kiski Valley Water Pollution Control Authority's Leechburg, Pennsylvania Site," September 26, 1994.
2. Letter from W. Adams (ESSAP) to R. Ragland (US NRC, Region I), RE: "Gamma Spectrometry Results for the Sludge Ash Samples from the Kiski Valley Water Pollution Control Authority's Leechburg, Pennsylvania Site," October 24, 1994.
3. Letter from W. Adams (ESSAP) to R. Ragland (US NRC, Region I), RE: "Alpha Spectrometry Results for the two Sludge Ash Samples from the Kiski Valley Water Pollution Control Authority's Leechburg, Pennsylvania Site (RFTA #94-040)," December 8, 1994.
4. U.S. Nuclear Regulatory Commission, "Policy and Guideline Directive FC 91-2, Standard Review Plan: Evaluating Decommissioning Plans for Licenses Under 10 CFR Parts 30, 40, and 70," August 1991.

**APPENDIX A  
KISKI VALLEY WATER POLLUTION CONTROL AUTHORITY  
RADIOLOGICAL SURVEY ACTIVITIES  
COST ESTIMATE\*  
LEECHBURG, PENNSYLVANIA**

Survey Preparation - \$9,100

Plan preparation includes the following activities: document and data reviews, final survey plan, trip planning, trip preparation (equipment calibration and packing), and the cost and time estimates.

On-Site Activities - \$40,900

On-site activities will include 16 man-days at the site performing the following: gamma surface scans; soil/sludge/ash sampling; and exposure rate measurements.

The on-site expenses also include travel to and from the site (airlines and rental vehicles), hotel expenses, and per diem.

Sample Analysis - \$14,800

Based on the information obtained from ESSAP cost estimate sheets, sediment and miscellaneous samples analysis will cost ~ \$14,800.

Report Preparation - \$ 14,800

The report preparation will include the following activities: unpacking equipment, logging in samples, tabulation of data, illustration, drafting and preparing the draft and final reports, word processing and reproduction.

Total Cost Estimate - \$91,100

*\*Estimates are for survey activities at all areas listed in the NRC Request for Technical Assistance (RFTA) received by ESSAP. Reduction or increase in the number of areas being surveyed would result in changes to the original estimate in the "on-site activities" and "sample analyses" categories. Due to the nature of the survey, this estimate is a best guess. Site and weather conditions and survey findings may change the scope of the survey and increase or decrease the cost estimate. The NRC site representative will be notified if major changes to the scope of the survey need to be made.*