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ORISE

OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

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June 30, 1994

W. Alexander Williams, Ph. D
Designation and Certification Manager
EM-421
Quince Orchard
U. S. Department of Energy
Washington, DC 20585-0002

SUBJECT: PROPOSED RADIOLOGICAL/CHARACTERIZATION SURVEY PLAN OF PORTIONS OF THE FORMER BLISS AND LAUGHLIN STEEL COMPANY FACILITY, BUFFALO, NEW YORK

Dear Dr. Williams:

Enclosed is the proposed Bliss and Laughlin site survey plan. This plan addresses the additional data needs previously discussed in the May 27, 1994 ESSAP correspondence. After your review, ESSAP will incorporate any comments you may have into the final plan.

Please do not hesitate to contact either Jim Berger at (615) 57[illegible] at (615) 576-5073 should you have any questions.

Sincerely,

Timothy J. Vitkus
Environmental/Project Leader
Environmental Survey and
Site Assessment Program

TJV:dac

Enclosure

cc. R. Kirk, DOE/OR-FSRD
J. Berger, ORISE/ESSAP
File/363

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PROPOSED RADIOLOGICAL/CHARACTERIZATION SURVEY PLAN OF PORTIONS OF THE FORMER BLISS AND LAUGHLIN STEEL COMPANY FACILITY BUFFALO, NEW YORK

INTRODUCTION AND SITE HISTORY

In the fall of 1952, the Bliss and Laughlin Steel Company, Buffalo, New York, performed machining and straightening operations on uranium rods. The finished rods were shipped directly to the Fernald site in Ohio; turnings were returned by the Atomic Energy Commission (AEC) to the Lake Ontario Ordnance Works (LOOW) for packaging and ultimate disposal or recycle. Available records indicate uranium machining occurred at the site during September and October of 1952, and that 53 drums of turnings were generated by the Bliss and Laughlin activities.[1] It is unknown whether these records described the full extent of the Bliss and Laughlin work; no records, indicating the total quantity of [illegible] handled at this site, have been located. There is also mention of possible earlier Atomic [illegible]ommission work at the site (the nature of which is unknown[1]) in an October 1951 [illegible] which indicated that several drums of dry uranium oxide had been accumulated. [illegible] facility was sold to Ramco Steel, Inc.; the current owner is Niagara Cold Drawn Corporation.

Based on the operations performed at this site, the potential radiological contaminant would be processed natural uranium, i.e. uranium chemically separated from its long-lived daughter products and in its naturally occurring isotopic abundances. Surveys of the facility, conducted by National Lead of Ohio at the time of the rod turning operations, identified contamination on the turning machines. The machinery used for this work has been replaced; disposition of the old equipment is not known. No records, indicating the radiological conditions of the site following the uranium machining, have been located. The U.S. Department of Energy's Office

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[1] Prepared by the Environmental Survey and Site Assessment Program, Energy/Environment Systems Division, Oak Ridge Institute for Science and Education, under contract number DE-AC05-76OR00033 with the U.S. Department of Energy.

of Environmental Restoration and Waste Management (DOE/EM) recommended that the current radiological conditions be determined and requested the Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) perform a radiological survey of the facility. The survey was performed in March 1992 and the results provided in a June 1992 report.[2] Localized contamination was identified in that portion of the facility known as the "special finishing" area; therefore, DOE subsequently designated the facility into the Formerly Utilized Sites Remedial Action Program (FUSRAP). However, there was a significant accumulation of snow on the ground; which limited the effectiveness of the exterior surface scans, at the time of this survey. In addition, several of the contaminated locations identified on the floor of the "special finishing" area were adjacent to equipment or stored material, beneath which floors were inaccessible for survey. As a result, DOE has requested that ESSAP perform additional radiological/characterization surveys of the exterior grounds, and once equipment and materials are relocated, the previously inaccessible portions of the floors in the "special finishing" area and other selected facility areas.

OBJECTIVES

The objectives of the survey are to complete the radiological survey activities for previously inaccessible portions of both the exterior and interior of the facility. The additional data generated will permit a complete assessment of the facilities radiological status relative to the DOE guidelines. In addition, identified areas of residual contamination will be characterized to determine which areas will require remediation.

RESPONSIBILITY

Work described in this survey plan will be performed under the direction of James Berger, Program Director and Tim Vitkus Project Leader, with the Environmental Survey and Site Assessment Program of the Energy/Environment Systems Division of ORISE. The cognizant site supervisor has been delegated the authority to make appropriate changes to the survey plan and procedures, as deemed necessary, as the survey progresses. Any such changes will be

documented in the site survey records and major changes in scope must have the concurrence of the DOE/EM Project Manager for ESSAP designation/verification activities.

PROCEDURES

The ESSAP survey will be conducted in phases. Phase 1 will consist of a radiological survey of the exterior grounds of the building. Phase 2 will focus on further delineation of previously identified contaminated locations in the "special finishing" area as well as surveys of the contiguous areas which were inaccessible at the time of the initial radiological survey. Phase 3 will be the characterization of those areas identified by previous surveys and by Phases 1 and 2 of this survey. Survey activities will be conducted in accordance with the ORISE ESSAP Survey Procedures Manual. Specific procedures applicable to this survey are listed on pages 6 and 7 of this survey plan.

PHASE 1: EXTERIOR RADIOLOGICAL SURVEY

The following procedures are applicable to surveys of the ex[illegible]nds of the building.

Reference System

ESSAP will use prominent site features to reference survey locations

Surface Scans

Surface scans for gamma activity will be performed out to 20 meters of the building's perimeter. Scans will be performed using NaI detectors coupled to ratemeters with audible indicators. Locations of elevated direct radiation will be marked for further investigation.

Soil Sampling

Surface soil samples (0 to 15 cm) will be collected from 10 to 20 randomly selected locations. Additional samples will also be collected from locations of elevated direct radiation detected by surface scans.

Exposure Rate Measurements

Exposure rate measurements will be performed at each soil sampling location. Measurements will be made at 1 m above the surface using a pressurized ionization chamber (PIC).

PHASE 2: INTERIOR RADIOLOGICAL SURVEY

The following procedures will be used for the completion of the radiological survey of the "special finishing" area and other facility locations selected for survey.

Reference System

Survey locations will be referenced to prominent building features.

Surface Scans

The areas which were inaccessible during the previous survey, floors beneath steel stock and machinery in the "special finishing" area and approximately 30 other previously inaccessible areas throughout the remainder of the facility, will be gamma and beta scanned. In addition, 5% of the horizontal overhead surfaces above the "special finishing" area, where material may have settled or accumulated, will also be scanned. Alpha scans will not be performed, because the previous site survey indicated that the condition of the floor resulted in significant alpha radiation attenuation, and therefore does not provide an accurate representation of surface activity levels. Scans will be performed using NaI, GM, and/or gas proportional detectors. Locations of elevated direct radiation detected by scans will be marked for further investigation.

Exposure Rate Measurements

Exposure rate measurements will be performed at the center of each of the areas selected for survey if gamma scans indicate the presence of direct radiation, differing from ambient background. Measurements will be made at 1 m above surfaces using a PIC.

Surface Activity Measurements

Direct measurements of total beta activity will be performed on floor and/or overhead surfaces where elevated direct radiation is detected by surface scans and will be addressed as indicated below under Phase 3. If surface scan results indicate that elevated direct radiation is not present in an area, then 10 direct measurements will be performed systematically in each area. Smear samples for determining removable alpha and beta activity will be collected from each direct measurement location.

PHASE 3: INTERIOR CHARACTERIZATION SURVEY

The following procedures will be used for characterizing locations of elevated direct radiation previously identified and any additional areas which may be identified during the radiological survey.

Reference Grid

ESSAP will reestablish the 2 m x 2 m grid system in the "special finishing" area. A 2 m x 2 m grid system will also be established in any additional areas identified as contaminated during the radiological surveys.

Surface Scans

The approximate area of each location of elevated direct radiation identified during the 1992 radiological survey and any locations identified during the Phase 2 radiological survey will be delineated by performing beta surface scans.

Surface Activity Measurements

Measurements on floors, walls, ceilings, or overhead structures will be performed in such a manner where each area of elevated direct radiation may be compared to, and characterized in accordance with, both the maximum "hot spot" and the 1 m^2 average guidelines. Typically, this will include measurement(s) of individual "hot spots" as well as additional measurements in the contiguous 1 m^2 to permit determination of the average activity. Boundaries of contaminated areas exceeding the DOE unrestricted release guidelines will then be marked using environmentally safe paint. Smear samples for determining removable alpha and beta activity will be collected from each measurement location.

SAMPLE ANALYSIS AND DATA INTERPRETATION

Samples and measurement data will be returned to ESSAP's laboratory in Oak Ridge, TN for analysis and interpretation. Soil samples will be analyzed by solid state gamma spectrometry. The spectrum will be reviewed for uranium and any other identifiable photopeaks. Results will be reported in units of nCi/g. Smears will be analyzed using a low background proportional counter. Smear data and direct measurement data will be reported in disintegrations per 100 cm^2. Exposure rates will be reported in μR/h.

Data will be compared with the established DOE guidelines. The site contaminant is processed natural uranium. The applicable guidelines are:

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Total Activity

5,000 α dpm/100 cm², average in a 1 m² area

15,000 α dpm/100 cm², maximum in a 100 cm² area

Removable Activity

1,000 α dpm/100 cm²

The exposure rate guideline is 20 μR/h above background. Soil concentration guidelines for residual uranium are developed on a site-specific basis and have not been developed for this site.

TENTATIVE SCHEDULE

PHASE 1

Measurement and Sampling	To be deter	BD)
Sample Analysis	(Tentativ	o conduct Phase I
Draft Report	in conju	NFSS Building 401
	survey.)	

PHASE 2

Measurement and Sampling	TBD
Sample Analysis	TBD
Draft Report	TBD

PHASE 3

Measurement and Sampling	TBD
Sample Analysis	TBD
Draft Report	TBD

LIST OF CURRENT PROCEDURES

Applicable procedures from the ORISE 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 and Cross Calibration
- 5.5. GM Detector Calibration and Check-Out
- 5.6 Proportional Detector Calibration and Check-Out
- 5.7 Pressurized Ionization Chamber Calibration and Check-Out
- 5.9 Floor Monitor 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
- 7.4 Beta Radiation Measurement
- 7.5 Gamma Radiation (Exposure Rate) M[illegible]

Section 8.0 Sampling Procedures
- 8.1 Surface Soil Sampling
- 8.7 Determination of Removable Activity
- 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

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REFERENCES

1. Attachment to letter from A. Williams (DOE/EM) to F. Archer (Niagara Cold Drawn Steel Co.), regarding history of MED/AEC activities at Bliss and Laughlin Steel Company, February 21, 1991.

2. Radiological Survey of the Former Bliss and Laughlin Steel Company Facility, Buffalo, New York," J. D. Berger, Oak Ridge Institute for Science and Education, June 1992.