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OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

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Mr. Tom McLaughlin
U.S. Nuclear Regulatory Commission
Division of Waste Management
11545 Rockville Pike
Mail Stop T-7E18
Rockville, MD 20852

SUBJECT: FINAL STATUS SURVEY PLAN FOR THE NRC REGION I RADIOLOGICAL LABORATORY, KING OF PRUSSIA, PENNSYLVANIA (RFTA NO. 06-004)

Dear Mr. McLaughlin:

Enclosed is the final status plan (FSSP) for the U.S. Nuclear Regulatory Commission's (NRC) Region I Radiological Laboratory in King of Prussia, Pennsylvania. These survey activities are scheduled to begin on February 28, 2006. Attachment A contains the spending plan for these activities. Approval of the FSSP and spending plan is required prior to commencement of survey activities.

If you have any questions, please direct them to me at 865.576.0056 or J. Scott Kirk at 865.574.0685.

Sincerely,

Wade C. Adams
Project Leader
Survey Projects

WCA:ar

Enclosures

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FINAL STATUS SURVEY PLAN
NRC REGION I RADIOLOGICAL LABORATORY
KING OF PRUSSIA, PENNSYLVANIA

INTRODUCTION AND SITE HISTORY

The U.S. Nuclear Regulatory Commission (NRC) operated a radiological laboratory at their Region I Office located in King of Prussia, Pennsylvania. The laboratory was used primarily for the analyses of radiological samples collected from NRC-licensed sites. Previous radiological surveys by the NRC have determined that radioactive material contamination levels are below established release criteria.

NRC records indicate that the laboratory processed samples containing tritium (H-3), carbon-14 (C-14), fission/activation products [cesium-137 (Cs-137), cobalt-60 (Co-60), strontium-90 (Sr-90)], uranium and thorium. For most of the radionuclides that were present, the extent of the contamination was limited to the hood, benchtop surfaces and sink drains in the laboratory. Currently, analytical activities within the laboratory have ceased and NRC Region I has performed remedial actions and prepared the room for unrestricted release (NRC 2006).

The U.S. Nuclear Regulatory Commission (NRC) has requested that the Oak Ridge Institute for Science and Education (ORISE) perform final status surveys of the NRC Region I Laboratory in King of Prussia, Pennsylvania.

SITE DESCRIPTION

The laboratory is located in the NRC Region I Offices at 475 Allendale Road, King of Prussia, Pennsylvania. The Region I laboratory is approximately 500 ft^2 with two fume hoods (and associated ventilation systems), two sinks, a floor drain, and laboratory furniture (benches, drawers, cabinets, etc.). The floor and walls are constructed with sheet vinyl and dry wall, respectively. The ceiling is suspended with electrical, piping and vent systems above the false ceiling (NRC 2006).

OBJECTIVES

The objectives of the final status survey is to collect independent radiological data for use by the NRC in evaluating whether or not residual contamination has been sufficiently removed in the NRC

Prepared by the Oak Ridge Institute for Science and Education, under interagency agreement (NRC FIN No. J-5403) between the U.S. Nuclear Regulatory Commission and the U.S. Department of Energy.

Region I laboratory to levels that will allow for "unrestricted use" in accordance with NRC regulatory guidance (NRC 1993).

RESPONSIBILITY

Work described in this survey plan will be performed under the direction of Eric Abelquist, Program Director, Scott Kirk, Survey Projects Manager, and Wade C. Adams, Project Leader, with ORISE. The cognizant 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 based on findings as the survey progresses, and additional information provided by the NRC.

DOCUMENT REVIEWS

ORISE will review the available site history and radiological survey data for the laboratory for adequacy and appropriateness.

PROCEDURES

Survey activities will be conducted in accordance with the ORISE Survey Procedures and Quality Assurance Manuals (ORISE 2004 and 2005a, respectively). Deviations to the survey plan or procedures will be documented in the site logbook.

HEALTH AND SAFETY

A walkdown of the laboratory will be performed to evaluate the area for potential health and safety hazards. Additionally, the proposed survey and sampling procedures will be evaluated to ensure that any hazards inherent to the procedures themselves are addressed in current job hazard analyses (JHAs). The procedures entail minimal potential hazards that are addressed in current ORISE JHAs. Personnel will also adhere to the NRC health and safety requirements.

REFERENCE SYSTEM

Measurements and sampling locations will be referenced to the existing NRC grid system or on laboratory maps prepared by ORISE or NRC.

SURFACE SCANS

Alpha, beta and gamma radiation surface scan coverage will be up to 100% of available lower wall, floor and laboratory furniture and equipment surfaces, up to 50% of available upper wall surfaces below the false ceiling, and up to 10% of the upper wall and ceiling surfaces above the false ceiling. Additional area scans may be performed, depending on findings as the survey progresses and project time constraints. Particular attention will be given to cracks and joints where material may have accumulated.

At the request of the NRC Radiation Safety Officer (RSO), additional scans may be performed on the roof exhausts associated with the hood ventilation system. Scans will be performed using gas proportional, Geiger-Muller (GM), and sodium iodide (NaI) scintillation detectors coupled to ratemeters or ratemeter-scalers with audible indicators. Any locations of elevated direct radiation detected by surface scans will be marked for further investigation—to include additional surface scans, as deemed necessary to delineate contamination boundaries.

SURFACE ACTIVITY MEASUREMENTS

Construction material-specific background measurements for correcting gross activity measurements performed on structural surfaces within the laboratory will be collected as necessary from a non-impacted area of the NRC Region I Office building. Initially, direct measurements of surface activity will be performed at any locations of elevated direct radiation identified by surface scans. Additional direct measurements will be collected as deemed necessary to delineate contamination boundaries and for the determination of 1 m^2 average values. At the request of the NRC Radiation Safety Officer (RSO), additional surface activity measurements may be performed on the roof exhausts associated with the hood ventilation system.

The majority of the direct measurements will be performed using gas proportional detectors—GM detectors will be used in areas that are inaccessible to the gas proportional detectors. Additional direct measurements will be performed at up to 30 judgmental locations within the laboratory. Detectors will be coupled to ratemeter-scalers. A set of two smears will be collected from each direct measurement location in the laboratory area—a dry for smear for determining removable gross alpha and beta activity and a wet smear sample for the determination of removable H-3 and C-14 activity.

MISCELLANEOUS MATERIAL SAMPLING

At the discretion of the NRC site representative, samples of miscellaneous material, such as sink and floor drain residues, paint, and dust residues may be collected from random locations, areas that are not accessible for direct surveys, or from locations of elevated direct radiation detected by surface scans.

SAMPLE ANALYSIS AND DATA INTERPRETATION

Samples and data will be returned to the ORISE laboratory in Oak Ridge, Tennessee for analysis and interpretation. Samples will be analyzed in accordance with the ORISE Laboratory Procedures Manual (ORISE 2005b). Smears will be analyzed for gross alpha and gross beta activity using a low-background proportional counter and for H-3 and C-14 by liquid scintillation analysis. Smear results and direct measurement data will be converted to units of disintegrations per minute per 100 square centimeters (dpm/100 cm^2). Miscellaneous material samples will be analyzed by gamma spectroscopy and/or liquid scintillation analysis. Results will be reported in either units of picocuries per sample or converted to dpm/100 cm^2.

Total surface activity and smear data generated will be compared with the residual surface activity guidelines for release for unrestricted use. Miscellaneous samples data will be used for informational purposes. The survey 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 ORISE.

GUIDELINES

The primary radionuclides of concern (ROCs) for the NRC Region I laboratory are those radionuclides which were identified by the NRC site representative. The ROCs identified are H-3, C-14, Co-60, Sr-90, Cs-137 and uranium and thorium isotopes. The applicable NRC guidelines for surface contamination are as follows (NRC 1993):

Radionuclide Contaminant	Surface Activity (dpm/100 cm^2) Average[a]	Maximum[b]	Removable[c]
Co-60, Cs-137, C-14, H-3	5,000 βγ	15,000 βγ	1,000 βγ
Sr-90 and Th	1,000	3,000	200
U	5,000 α	15,000 α	1,000 α

[a]Measurement of average activity should not be averaged over more than 1 m^2.
[b]The maximum contamination level applies to an area not more than 100 cm^2.
[c]The removable contamination level applies to an area not more than 100 cm^2.

ORISE will use the more restrictive guidelines for strontium contamination for comparing beta surface activity measurements.

TENTATIVE SCHEDULE

The following activities are planned to be conducted in accordance with the following schedule:

- Field Measurements — March 1, 2006
- Sample Analysis — March 2006
- Draft Letter Report — March 2006

The final letter report will be issued within 15 days of the receipt of the NRC comments on the draft report.

REFERENCES

Oak Ridge Institute for Science and Education (ORISE). Survey Procedures Manual for the Environmental Survey and Site Assessment Program. Oak Ridge, Tennessee; September 2, 2004.

Oak Ridge Institute for Science and Education. Quality Assurance Manual for the Environmental Survey and Site Assessment Program. Oak Ridge, Tennessee; July 28, 2005a.

Oak Ridge Institute for Science and Education. Laboratory Procedures Manual for the Environmental Survey and Site Assessment Program. Oak Ridge, Tennessee; June 20, 2005b.

U.S. Nuclear Regulatory Commission (NRC). Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source or Special Nuclear Material. Washington, DC; April 1993.

U.S. Nuclear Regulatory Commission. Verbal communication with J. Kottan. NRC Region I. King of Prussia, Pennsylvania; February 16, 2006.

Attachment A

FY 2006 SPENDING PLAN

	PERFORMANCE PERIOD	
	From	To
Name of Laboratory: Oak Ridge Institute for Science and Education	Feb-06	Sep-06
Title of Project: NRC Region I Laboratory **(RFTA 06-004)**	**ORISE Number**	**Est. Project Cost**
	901646	$16,700.00

COST ELEMENTS	Oct-05	Nov-05	Dec-05	Jan-06
Total Estimate Costs	$0.00	$0.00	$0.00	$0.00
Project Completion	0.00%	0.00%	0.00%	0.00%
COST ELEMENTS	**Feb-06**	**Mar-06**	**Apr-06**	**May-06**
Total Estimate Costs	$10,855.00	$5,845.00	$0.00	$0.00
Project Completion	65.00%	100.00%	100.00%	100.00%
COST ELEMENTS	**Jun-06**	**Jul-06**	**Aug-06**	**Sep-06**
Total Estimate Costs	$0.00	$0.00	$0.00	$0.00
Project Completion	100.00%	100.00%	100.00%	100.00%

ACTIVITY INFORMATION	Hours	Estimated Cost
Project Communication	4.50	$540.00
Document Review	3.00	$340.00
Presurvey	12.00	$930.00
Travel- Labor	36.00	$3,200.00
Travel- Other Expenses		$3,310.00
Survey Activities	20.00	$1,750.00
Report Preparation	17.00	$1,540.00
Sample Analysis	5.20	$660.00
Sample Disposal	0.00	$0.00
ISM	1.00	$110.00
Other (Includes Common Cost)*	0.00	$4,320.00
Total	98.70	$16,700.00

Comments:

*Common costs are estimates of expected distributed general NRC contract support costs for project management, administrative support, laboratory support, equipment maintenance and related costs that are not associated with a specific RFTA.

BUSINESS CONFIDENTIAL

This document contains commercial and financial information that ORAU considers protected from disclosure under the (b)(4) exemption of the Freedom of Information Act.

Submitted by: Environmental Survey and Site Assessment Program
Radiological Safety, Assessments, and Training Unit
Oak Ridge Associated Universities, Inc.
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