SEPARATIONS PROCESS RESEARCH UNIT (SPRU)
DISPOSITION PROJECT (DP)

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QUALITY ASSURANCE PROJECT PLAN FOR MEASUREMENTS OF RADIONUCLIDE AIR CONCENTRATIONS FOR RAD-NESHAP COMPLIANCE AT THE SPRU DP

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LIST OF ACRONYMS

ANSI	American National Standards Institute
CAM	Continuous Air Monitor
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
DCG	Derived Concentration Guide
DL	Detection Limit
DOE	(United States) Department of Energy
DOE-SPRU DP	DOE, Separation Process Research Unit – Disposition Project Office
DQOs	Data Quality Objectives
EDE	Effective Dose Equivalent (permitting and reporting dose)
EL	Environmental Lead (Environment Subcontractor Manager)
EMPP	Environmental Monitoring Program Plan
EMS	Environmental Management System
ENV	Environmental Compliance Procedure
EPA	(United States) Environmental Protection Agency
ESH&QA	Environmental Safety, Health and Quality Assurance
EST	Eastern Standard Time
GFF	Glass Fiber Filter
HEPA	High-efficiency Particulate Air (filter)
HLW	High-level (radioactive) Waste
HPS	Health Physics Society
HVAC	Heating, Ventilation, and Air Conditioning
ID	Identification (Number or Code)
ISMS	Integrated Safety Management System
LLD	Lower Limit of Detection
LLW	Low-Level (Radioactive) Waste
LPM	Liters per minute
MAPEP	DOE Radiological Environmental Sciences Laboratory Mixed Analyte Performance Evaluation Program
M&TE	Measuring & Test Equipment
μCi	Microcurie
MDC	Minimum Detectable Concentration
MDL	Method Detection Limit
MEOSI	Maximally Exposed Off-Site Individual
mL	Milliliter
mR	Milliroentgen
mrem	Millirem
mSv	Millisievert
NESHAP	National Emission Standards for Hazardous Air Pollutants
NIST	National Institute of Standards and Technology
NRC	(U.S.) Nuclear Regulatory Commission
NYCRR	Official Compilation of Codes, Rules, and Regulations of the State of New York
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health

OVEs/PVUs	Outdoor Ventilated Enclosures/Portable Ventilation Units
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PEDE	Potential Effective Dose Equivalent (monitoring dose)
PNNL	Pacific Northwest National Laboratory (formerly Pacific Northwest Laboratory)
ppb	Parts per billion
ppt	Parts per trillion
PQL	Practical Quantitation Limit
PSR	Process Safety Requirement
PVUs	Portable Ventilation Units
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RP	Radiation Protection
SOPs	Standard Operating Procedures
SPRU DP	Separations Process Research Unit–Disposition Project
SRM	Standard Reference Material
SWMUs	Solid Waste Management Units
U.S.	United States

1.0 INTRODUCTION

The Separation Process Research Unit–Disposition Project (SPRU DP) is required to demonstrate compliance with Title 40 Code of Federal Regulations Part 61 (40 CFR 61), Subpart H, *National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities,* which sets an annual dose standard of 10 millirem (mrem) effective dose equivalent to any member of the public (see Attachment A). SPRU DP demonstrates compliance with the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulation primarily by measuring radionuclides in emissions from point sources (exhaust vents) and using approved computer models to calculate the dispersion of these radionuclides (the traditional "measure and model" approach). SPRU DP releases have historically resulted in annual doses to the maximally exposed off-site individual (MEOSI) that are a very small percentage of the dose standard (i.e., about 0.014% in 2009).

The regulation also provides for an alternate means to demonstrate compliance by using environmental measurements of radionuclides in air at critical receptor locations (40 CFR 61.93[b][5]). Use of the alternate method requires prior approval of the United States (U.S.) Environmental Protection Agency (EPA). Although SPRU DP has a perimeter ambient air monitoring system, it is not used to demonstrate compliance with the NESHAP standard at this time. However, with ongoing facility decontamination and decommissioning (D&D), the total quantity of radioactivity on-site is being stabilized and diminished by removing facilities and shipping waste off site. Therefore, no alternate method use is anticipated at this time.

The purpose of this Quality Assurance Project Plan (QAPP) is to describe the system, policies, and procedures used to ensure that the measurements of radionuclides in air will be of the type and quality needed for use in demonstrating NESHAP compliance no matter which method is used (i.e. the "measure and model" method or via "environmental measurements".) Both point and diffuse (non-point) source emissions are within the scope of this plan document. This QAPP was prepared in accordance with EPA QA/R-5, *EPA Requirements for Quality Assurance Project Plans* (EPA/240/B-01/003, 2001 [reissued March 2006]) to meet requirements for rad-NESHAP regulatory compliance given in 40CFR61 Appendix B, Method 114 and ANSI/HPS N13.1-1999.

Note: ***Major quality aspects covered within a section listed in ANSI/HPS N13.1-1999 (Section 7.1), although not verbatim, are printed in bold italics.***

1.1 Requirements for Environmental Monitoring

Per DOE Order 450.1A, Section 4.c.5, one requirement of an Environmental Management System (EMS) is: "The conduct of environmental and effluent monitoring, as appropriate, to characterize pre-operational conditions and to detect, characterize and respond to releases from site operations and activities; assess impacts; estimate dispersal patterns in the environment; characterize the pathways of exposure to members of the public; characterize the exposures and doses to individuals and the population; and evaluate the potential impacts to the biota in the vicinity of the release. Where appropriate, use an integrated monitoring system and sampling approach to avoid duplicative data collection".

Stationary sources of atmospheric pollutants from the SPRU DP are authorized by either the EPA for sources of radiological emissions, or by NYSDEC for sources of nonradiological emissions. In accordance with the requirements of 40 Code of Federal Regulations (CFR) 61, *National Emission Standards for Hazardous Air Pollutants* (NESHAP) Subpart H, sources of atmospheric radioactive

discharges that may result in a dose at or above 0.1 millirem (mrem) (0.001 millisievert [mSv]) effective dose equivalent (EDE) in a year to the maximally exposed off-site individual (MEOSI) may require permits. Also, per 40 CFR 61, Subpart H, the continuous measurement of vent emissions is only required for point sources that emit radionuclides above a certain level. At the SPRU DP, continuous monitoring is presently required only at certain radioactive emission points. Periodic confirmatory measurements or process knowledge are used to estimate emissions at the rest.

1.2 ***Program Objectives and Rationale (ANSI/HPS N13.1-1999 7.1.p)***

DOE policy is to "conduct effluent monitoring and environmental surveillance programs that are sufficient to determine whether the public and the environment are adequately protected during DOE operations and whether operations are in compliance with DOE and other applicable federal, state, and local radiation standards and requirements. DOE Order 450.1A requirements are implemented by the site as identified in the SPRU DP contract. It is also DOE policy that departmental monitoring and surveillance programs be capable of detecting and quantifying unplanned releases and meet high standards of quality and credibility" (DOE/EH-0173T, Section 1.0). A detailed listing of objectives for implementing these policies, taken from DOE/EH-0173T, Section 5.3.1, specifies that environmental programs at DOE sites must:

- provide compliance with all applicable environmental quality standards and public exposure limits, the requirements of DOE Order 450.1A, and environmental commitments made in environmental impact statements, environmental assessments, or other official DOE documents;
- determine the background levels and contributions from the site of radioactive materials in the environment;
- determine the effectiveness of effluent treatment and controls in reducing effluents and emissions;
- demonstrate the validity and effectiveness of models in predicting the concentrations of pollutants in the environment;
- determine long-term buildup and predict environmental trends of site-released radioactive material; and
- provide for the detection and quantification of unplanned releases

To achieve the above objectives at the SPRU DP, environmental monitoring and surveillance is conducted to estimate the potential effects of DOE activities on the surrounding environs and the public. This QAPP was developed to document program requirements.

Identification of Sources (ANSI/HPS N13.1-1999 7.1.d)

Positive identification, such as name plates or serial numbers, will be affixed to the emission sources to identify that the correct source is being assessed.

1.3 Program Design

The focus of the rad-NESHAP monitoring program at the SPRU DP is the air pathway. Air effluents are monitored on-site by collecting samples at locations where radioactivity are released or might be released. Releases from ventilation ducts are monitored to determine point source emissions while ambient air surveillance measures both point and diffuse (non-point) emissions.

Additional sampling points or parameters may be added as the SPRU DP progresses or as new requirements are imposed externally or identified by the Project. If it is determined that the current level of sampling at a location is no longer required to meet program objectives, with DOE approval, reductions may also be made to the program.

1.4 Airborne Releases

1.4.1 Regulatory Basis

On-site airborne emissions can originate from "point" sources such as vents or from "diffuse" (non-point) sources such as contaminated areas, water tanks, or structures without ventilation or with ventilation that does not exhaust from a well-defined release point (DOE/EH-0173T). Dilution and dispersion of point and non-point releases reduce contaminant concentrations before they reach the site boundary.

1.4.1.1 Requirements

The NESHAP standard, for which compliance is to be demonstrated, is that no member of the public may receive an EDE greater than 10 mrem (0.1 mSv) per year resulting from radionuclide emissions to the atmosphere. Compliance with this standard has been demonstrated for the SPRU DP using the traditional "measure and model" approach, although, alternative methods of compliance do exist (see note below).

Sources of airborne emissions which may result in a dose (calculated in a conservative manner) to the MEOSI exceeding 0.1 mrem (0.001 mSv) EDE in a year are required by EPA to be permitted **(unless exempt under 40CFR61.96)** as specified under NESHAP regulations. At present, the SPRU DP will maintain three permitted points for radioactive air emissions. (See the permit list in Attachment B, Table B-3). Diffuse (non-point) sources of emissions are also assessed. **Prospective assessments** for "permitting" purposes are performed per SPRU-ENV-010.

Also, point sources that could exceed [when calculated in a specific manner, see **40CFR61.93(b)(4)(ii) and 40CFR61.93(f)]** the 0.1 mrem (0.001 mSv) dose threshold for potential to emit need to be continuously monitored and/or sampled. Design and inspection requirements for sampling and monitoring systems are specified by NESHAP regulations. **Prospective assessments** for "monitoring" requirements are performed per SPRU-ENV-010.

1.4.1.2 Objectives and Rationale

Specific objectives in regard to airborne releases are to (accurately) determine quantities and concentrations of radionuclides in airborne releases and to characterize the effluent streams, discharge modes, and radiological properties of the sources, and to estimate potential dose to humans. Additionally, continuous monitoring at major point sources can be used to detect releases of radioactive materials above levels of significance.

As an important pathway for the possible release of radioactive materials off-site, air emissions from Project activities are routinely monitored for radiological constituents. Primarily, radioactive airborne emissions of concern at the SPRU DP originated from earlier nuclear fuel reprocessing operations.

At present, airborne radiological releases are from a limited number of point sources and diffuse (non-point) emissions. Ongoing D&D activities will be carried out in fabric enclosures which are ventilated by point sources. Isotopes in significant quantities in airborne emissions include Sr-90, Cs-137, Pu-239 and Am-241.

1.4.1.3 ***Basis for the Selection of Sampling (ANSI/HPS N13.1-1999 7.1.e and f)***

Representative sampling is the goal. The 2002 update to 40 CFR 61 Subpart H (NESHAP) invoked ANSI/Health Physics Society (HPS) N13.1-1999 design criteria for new or modified facilities.

Per ANSI/HPS N13.1-1999 a "written technical basis shall be prepared for the programs and procedures to sample or monitor the releases of airborne radioactive substances from the ducts and stacks of nuclear facilities".

In general, continuous sampling systems for point source emissions are designed in accordance with the requirements of ANSI/HPS-N13.1-1999 at the SPRU DP and consist of several components, the first of which is a sampler that draws air through a very fine filter with a vacuum pump. The total volume of air drawn through the filter is typically measured and recorded by a totalizing meter. The filter traps particles that are then analyzed in the laboratory for radioactivity, and the estimated concentration in the effluent stream is calculated based on the air volume sampled and the activity on the filter.

Samplers for all major fixed air emission points must be operated continuously while the ventilation system is operating. Although not required by NESHAP regulations, the SPRU DP has elected to provide continuous sampling while the ventilation system is operating for certain other on-site sources having a predicted dose of less than 0.1 mrem.

In addition, accurate measurements of the flow in ducts must be periodically measured in accordance with ANSI/HPS-N13.1-1999. Three types of systems are commonly used for measuring flowrates in stacks and ducts: thermal anemometers, pitot tubes and acoustic meters.

1.4.1.4 SPRU DP Sources of Emission

A. The proposed H2 Building vent is the most significant emission point for on-site radioactive airborne emissions.

B. The proposed G2 Building vent is the second most significant emission point for on-site radioactive airborne emissions

C. Outdoor Ventilated Enclosures/Portable Ventilation Units (OVEs/PVUs) are proposed to be operated at various locations around the facility including ventilation of the E1-G1 Tunnel. PVUs provide ventilation to support temporary work activities in areas that are not routinely or adequately ventilated and where the potential for airborne contamination exists.

D. Possible releases from miscellaneous non-point ("diffuse" (non-point) or "fugitive") sources are also estimated for inclusion in the annual NESHAP reports. Such sources include outdoor radioactive waste storage areas, open air demolition and soil remediation.

NOTE: Indoor air is outside the scope of this QAPP. Indoor facility air is routinely monitored by the Radiation Protection Department for radioactive particulates.

1.5 Meteorological Monitoring Program

The climate is moderate, with an average annual temperature of 8.6°C (47.5°F). Precipitation is markedly influenced by the Atlantic Ocean to the east. Average annual precipitation is about 98 centimeters (38.6 inches). The prevailing winds are from the West to the Northwest with a secondary maximum from the South to the South-Southeast.

1.5.1. Rationale for Meteorological Monitoring

The capacity of the atmosphere to dilute and disperse emissions and/or effluents is a major factor in evaluating the environmental effects of SPRU DP operations on public health and safety under both normal and abnormal conditions. Because the dispersive capability of the atmosphere is a function of wind speed, wind direction, and atmospheric stability, these meteorological conditions must be determined to assess off-site exposures from routine radiological or non-radiological releases.

In addition, existing meteorological conditions during the period of an airborne release must be known to assess the off-site dose. Computer program CAP88-PC version 3.0, used for modeling airborne releases and for estimating dose for purposes of annual NESHAP compliance reporting, requires meteorological data to be input.

The meteorological system must be operated continuously to provide a database upon which decisions can be made concerning airborne releases and appropriate control activities. Meteorological data are routinely used by various on-site groups to aid facility design and operations and evaluate data trends.

1.5.2. Data Collection Equipment and Procedures

The Knolls Atomic Power Laboratory (KAPL) provides the meteorological data used as input to the CAP88-PC version 3.0 model. The meteorological system is operated and maintained by KAPL.

2.0 DOSE ASSESSMENT

Both NESHAP regulations and DOE Order 450.1A specify a standard of 10 mrem (0.1 mSv) EDE to any member of the public from airborne emissions in a year. DOE Derived Concentration Guide (DCG) and radiation protection standards that are of interest at the SPRU DP are noted in Attachment B.

2.1 Dose to the Public

Radionuclides entering the body through air, water, or food are distributed in different organs of the body. Uranium and plutonium isotopes, when inhaled, may remain in the lungs for an extended time. Radionuclides such as tritium, carbon-14, and cesium-137 will be distributed uniformly throughout the body.

The effective dose equivalent, expressed in mrem or mSv, provides a means of combining unequal organ and tissue doses into a single "effective" whole body dose. The EDE is calculated by multiplying the organ dose equivalent by the organ-weighting factors developed by the International Commission on Radiological Protection. The weighting factor is a ratio of the risk from a specific organ or tissue dose to the total risk resulting from an equal whole body dose. All organ-weighted dose equivalents are then summed to obtain the EDE. The CAP88-PC version 3.0 computer code uses organ-weighting factors from FGR-13. Earlier versions of this code used data from other Federal Guidance Reports.

The dose from internally deposited radionuclides calculated for a fifty-year period following intake is called the fifty-year committed effective dose equivalent (CEDE). The CEDE sums the dose to an individual over fifty years to account for the biological retention of radionuclides in the body. The total EDE for one year of exposure to radioactivity is calculated by adding the CEDE to the dose equivalent from external, penetrating radiation received during the year.

Strontium-90, cesium-137, and alpha isotopes (primarily plutonium-239 and americium-241) are responsible for the larger fractions of the estimated maximum individual doses for the air pathways at the SPRU DP. The SPRU DP measures at least all radionuclides that could contribute more than 10% to the calculated PEDE from effluents with the potential to produce a combined EDE of greater than 0.1 mrem (0.001 mSv).

2.2 Dose Assessment Methodology

The radiation dose to the general public from activities at the SPRU DP is evaluated in a manner consistent with the requirements of DOE Order 450.1A. Measurements of radionuclide concentrations in air released from the Project are used to determine annual EDE. Results of ambient air measurements provide an assurance that the doses estimated are credible.

Doses are calculated by a qualified health physicist using radionuclide effluent data collected by the on-site Laboratory or based on process knowledge. As soon as annual surveillance data are compiled after the end of each calendar year, the dose to the MEOSI for the subject year is

estimated. This hypothetical individual is assumed to reside continuously at a location near the site and to eat locally produced food at the maximum consumption rates for an adult.

Estimated dose from airborne emissions is reported in the annual NESHAP report. Historically, annual dose calculations have demonstrated that the hypothetical maximum annual dose to an off-site resident has remained well below permissible standards since the SPRU DP was initiated.

2.3 Models and Input Data

Computer models are used to calculate the environmental dispersion of radionuclides from air releases at the site. The CAP88-PC computer codes versions 1, 2, and 3 (Parks, March 1992; Parks, March 2000; and Trinity Engineering Associates, Inc., March 2006, respectively) are approved for use by the EPA to demonstrate compliance with the NESHAP standard. SPRU DP uses CAP88-PC version 3. Using site-specific meteorological data, CAP88-PC version 3 may be used to calculate the EDE from airborne releases of radionuclides into the environment.

Assumptions concerning transport and dose calculation are detailed in SPRU-ENV-010, *Radiological Dose Assessment Procedures*. Specific factors used in dose calculations from airborne emissions are summarized in SPRU-ENV-011, *Dose Assessment for and Preparation of the SPRU DP Annual NESHAP Report*.

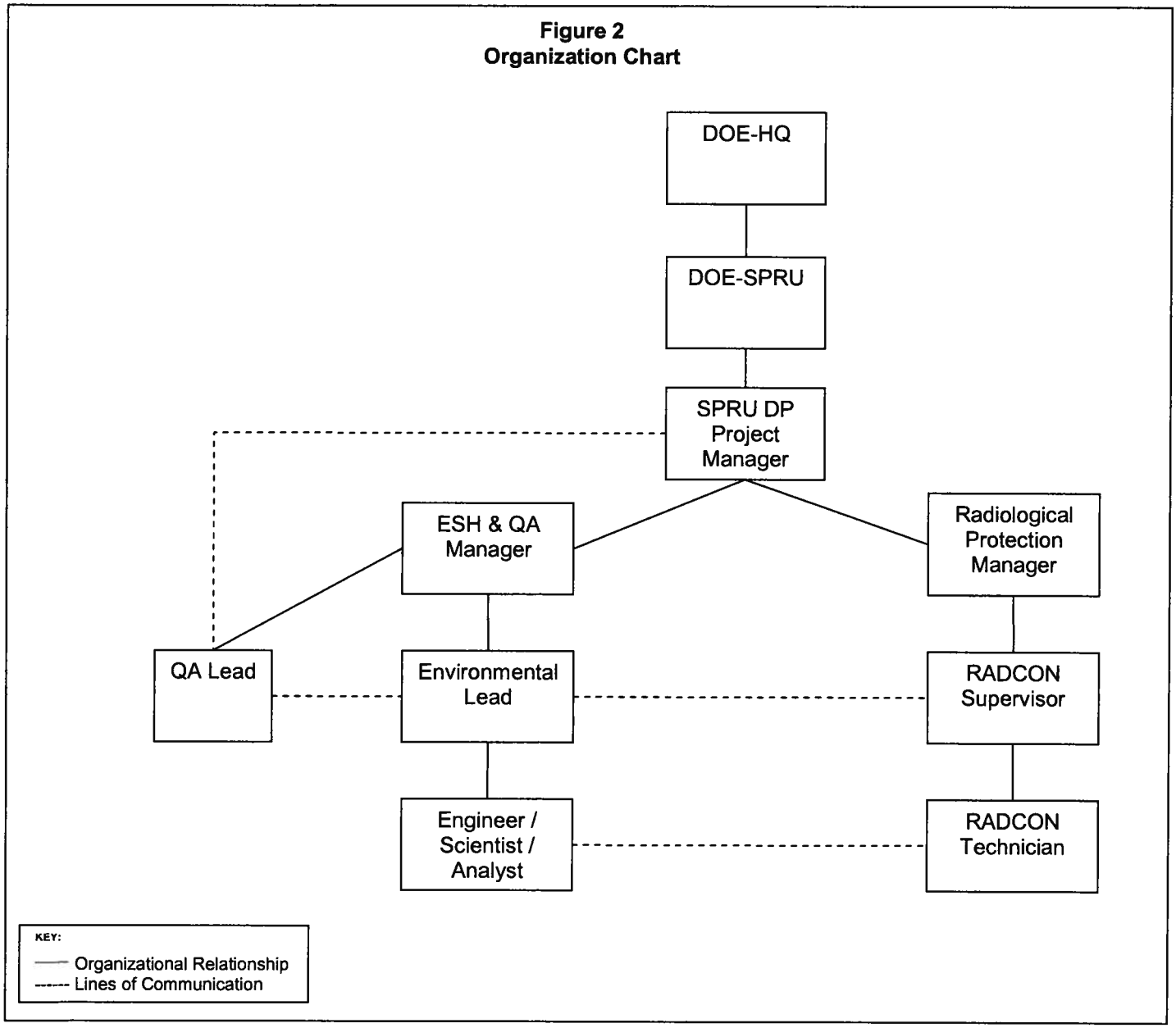
Some factors used in dose assessment, such as total curies released from a source, emission rates, and meteorology, are re-evaluated annually; others such as local land use and population near the site are re-evaluated periodically. See Attachment A-2-1, for a map of the nearest residences around the SPRU DP.

3.0 *ORGANIZATIONAL RESPONSIBILITIES (ANSI/HPS N13.1-1999 7.1.a)*

3.1 Project Organization

Organizational relationships and lines of communication for the measurement of radionuclides in air to demonstrate rad-NESHAP compliance are shown on Figure 2: Organization Chart and the Roles and Responsibilities are summarized below.

Figure 2
Organization Chart



3.1.1 SPRU DP Environmental Lead (EL): has the overall responsibility for the NESHAPs program and for confirming compliance with this plan.

- The EL has the responsibility for ensuring SPRU DP compliance with the reporting requirements of 40 CFR 61, Subpart H, in particular those requirements mandating timely submission of the annual NESHAP report for the SPRU DP.
- The EL will ensure that the designated cognizant engineers, scientists, and analysts (as applicable) are qualified by virtue of education and/or experience to act in their designated capabilities in preparing the report.
- The EL will appoint a Records Coordinator with specific responsibilities for on-site NESHAP records and assume overall responsibility for maintaining records supporting 40 CFR 61 reporting and compliance, in accordance with SPRU-ENV-011.

3.1.2 SPRU DP Quality Assurance (QA) Lead, under the Environmental Safety, Health, and Quality (ESH&Q) Department: assists ESH&Q and EL management in determining and implementing the QA requirements applicable to activities under their cognizance. The QA Lead is responsible for maintaining the site-wide QA program and for assessing compliance with and effectiveness of programs and associated implementing procedures by conducting audits, assessments, surveys, and/or inspections in accordance with a site-wide integrated assessment program.

3.1.3 SPRU DP Radiological Protection Manager: responsible for ensuring that the activities pertaining to data acquisition, as described in this QAPP, are carried out in accordance with the requirements specified in this QAPP and in accordance with controlled procedures applicable to each activity.

3.1.4 SPRU DP cognizant engineer (or scientist/analyst): responsible for overall production of the NESHAP Applications for Approval to Construct or Modify and for the NESHAP annual report for the SPRU DP.

- The cognizant engineer shall ensure that Application and the annual report is technically accurate and in full compliance with the requirements of 40 CFR 61 and with this QAPP.
- The cognizant engineer is responsible for direct production of the final NESHAP annual report and for performing the NESHAP calculations in accordance with SPRU-ENV-011 and the requirements of this QAPP.
- The cognizant engineer is responsible for obtaining qualified peer review of the dose assessment analyses performed.

4.0 AMBIENT MEASUREMENTS

The SPRU DP will continue to demonstrate rad-NESHAP compliance using the "measure and model" approach. The current ambient air monitoring system provides assurance that there are minimal emissions from diffuse sources.

4.1 Project/Task Description

The current method of demonstrating rad-NESHAP compliance at the SPRU DP, based on measurements of point source emissions and diffuse (non-point) source estimation and computer

modeling of these emissions, will continue to be used. Total dose (from the "measure and model" method) to the MEOSI from point and diffuse (non-point) sources will be combined with that from unplanned (accidental) releases (that are not included elsewhere) and may be compared to that obtained using results from any environmental measurement program, as appropriate, for radionuclides in air to confirm that compliance has been achieved.

5.0 GENERAL QUALITY OBJECTIVES AND CRITERIA

5.1 Quality Assurance (QA) Program

QA policy for SPRU DP is set forth in SPRU-PQP-020, *Quality Assurance Guidelines for Decommissioning Nuclear Facilities*. The QA program is described in SPRU-QAP-001, Project Specific Quality Assurance Plan. Implementation of the QA program is documented in *Project Quality Procedures*. Requirements and standards on which the above documents are based include:

- 10 CFR 830.120, Subpart A, *Quality Assurance Requirements,*
- 10 CFR 830.122, *Quality Assurance Criteria,*
- DOE O 414.1C, *Quality Assurance,*
- DOE P 450.4, *Safety Management System Policy* and
- American Society of Mechanical Engineers NQA-1-1989, *Quality Assurance Program Requirements for Nuclear Facilities.*

Additional documents that include requirements or guidance applicable to QA and quality control (QC) for the environmental monitoring program at the SPRU DP are:

- DOE/EH-0173T, 10.0, *Quality Assurance,*
- 40 CFR 61, Appendix B, Method 114, Section 4, *Quality Assurance Methods* (NESHAP),
- DOE *Environmental Measurements Laboratory Procedures Manual*, HASL-300.

QA requirements specific to NESHAP compliance monitoring are summarized in Table 1.

5.2 40 CFR 61, Subpart H, Section 61.93(c)(2)(iv)

40 CFR 61, Subpart H, Section 61.93(c)(2)(iv) (for new point sources) states "A quality assurance program shall be conducted that meets the performance requirements described in ANSI/HPS N13.1-1999." Meeting these requirements overlaps with meeting those under 40 CFR 61, appendix B, method 114 and are given in Table 1.

5.3 40 CFR 61, Subpart H, Section 61.93(g)

40 CFR 61, Subpart H, Section 61.93 (g) with regard to the use of environmental measurements at critical receptor locations, states, "A quality assurance program shall be conducted that meets the performance requirements described in appendix B, Method 114." Table 1 summarizes the elements from ANSI/HPS N13.1-1999, which are consistent with elements from Section 4 of Method 114, and lists the policies, procedures, and manuals that are used at the SPRU DP to implement each element.

TABLE 1
Implementing Policies and Procedures at the SPRU DP for Elements from NESHAP Quality Assurance Methods for ANSI/HPS N13.1-1999 (clause 7, Subclause 7.1)

7.1 Quality Assurance Plan Quality Aspects	Implementing Policies/Procedures*
a. organizational responsibilities; and b. personnel qualifications;	SPRU-EM-001 SPRU-ENV-010, 011, 012 SPRU-ESH-005 SPRU-RC-001, 011, 113, 116, 119
c. administrative controls;	SPRU-ESH-005 SPRU-RC-001, 014
d. means for identification of sources;	Positive identification, such as name plates or serial numbers, will be affixed to the emission sources to identify that the correct source is being assessed.
e. basis for selection of sampling points. The methodology for verification of compliance with mixing requirements shall be documented;	SPRU-PQP-013 SPRU-RC-113, 129 Engineering and Testing Specifications
f. basis for selection of sampling and monitoring systems. The methodology for demonstrating compliance with performance requirements shall be documented;	SPRU-PQP-013 SPRU-RC-113, 129 Engineering and Testing Specifications
g. sample collection and tracking procedures; q. data analysis	SPRU-ENV-012 SPRU-RC-011, 113, 116, 117, 119, 120, 121, 122, 129, 131 Subcontractor procedures (e.g. Energy Solution) for Chain of Custody
h. calibration methods and calibration standards; i. system operating procedures; and j. maintenance and inspection procedures;	SPRU-ENV-012 SPRU-RC-113, 116, 119 Subcontractor procedures (e.g. Energy Solutions) for Calibration
k. procedure qualification;	SPRU-DCRM-001
l. data quality objectives and how they are accomplished;	SPRU-ENV-012 SPRU-RC-011, 123, 132
m. audit and surveillance procedures;	SPRU-ENV-012 SPRU-PQP-008
n. corrective action program; r. inspection status and disposition of deficient items and conditions;	SPRU-ENV-012 SPRU-PQP-005, 006, 029
o. reporting and notification system;	SPRU-ENV-010, 011, 012 SPRU-RC-113, 132
p. (QA) program documentation requirements;	SPRU-ENV-012 SPRU-QAP-001 SPRU-RC-011 Project Quality Procedures

* For procedure Titles, see Attachment C

5.4 *Audits and Surveillances / Corrective Actions (ANSI/HPS N13.1-1999 7.1.m and n)*

Inspections, assessments, and audits of programs at the SPRU DP are carried out by SPRU DP QA in accordance with SPRU-PQP-008. This procedure addresses the protocols for responding to conditions identified as part of the assessment process and for documenting responses and corrective actions.

5.5 *Personnel Qualifications (ANSI/HPS N13.1-1999 7.1.b)*

No special certifications are required to perform the activities within the scope of this QAPP. All personnel working at the SPRU DP are required to participate in General Employee Training, as well as special training specific to their job functions (e.g., Radiological Worker training).

Personnel (1) operating, calibrating, and maintaining air samplers, (2) collecting, analyzing, and shipping samples, (3) recording, entering, reviewing, and validating data, and (4) documenting activities associated with each of these tasks shall be trained in accordance with their assigned duties.

Personnel evaluating the data, conducting dose assessments, and preparing the NESHAP reports shall be qualified by virtue of education and/or experience to act in their designated capabilities, as determined by the EL.

5.6 Documents and Records

This QAPP, as well as policies, procedures, and manuals to be used when implementing the QAPP, are controlled in accordance with SPRU-DC-RM-001. Current copies of controlled documents are available on the SPRU DP Intranet.

Records applicable to sample collection, sample analysis, and data management are maintained in accordance with SPRU-DC-RM-001, *SPRU DP Records Management Program Plan*, and with SPRU-RC-014. In compliance with special recordkeeping requirements from 40 CFR 61 §61.95, records documenting the contents of annual NESHAP reports are stored on-site as specified in SPRU-ENV-011, *Dose Assessment for and Preparation of the SPRU DP Annual NESHAP Report*. On-site maintenance of NESHAP records is the responsibility of the Records Coordinator. Records no longer required to be stored on-site are the responsibility of the SPRU DP Records Department and will fall under SPRU DP Records and Disposition Schedules.

6.0 DATA GENERATION AND ACQUISITION

6.1 General Sampling Process Design

Approved and controlled procedures are defined for collecting each type of sample or field measurement.

Field personnel trained in accordance with SPRU-RC-006 collect the samples or take the field measurements. Where specific procedures are not applicable, good practice is used to protect the sample from contamination during collection, transport, and storage.

Field sampling locations are clearly marked to ensure that routine samples are collected in the same location each time. Locations of nonroutine sample collections are designated either on a survey map or by description or reference. Any nonroutine sample collection conditions that may affect the analysis or data reduction are noted and the details are documented on the field or analytical data records.

Collection equipment that remains in the field is routinely inspected, calibrated, and maintained. Automated sampling stations are kept locked to prevent tampering.

Chain-of-custody documentation is maintained to trace sample possession from time of collection through analysis. Samples from the field are transferred under signature to the sample custodian, where the samples are stored in a secure sample lockup. The lockup is accessible to authorized personnel only.

If a sample is sent to a subcontract laboratory for analysis, a chain-of-custody/request-for-analysis packing sheet form is generated before transferring custody of the sample. This form travels with the samples; appropriate signatures indicate release and acceptance of custody. Subcontractor (e.g., SEC) procedures cover this process, laboratories are required by contract to maintain internal chain-of-custody records and to store the samples under secure conditions.

All samples are shipped via the most rapid means feasible in order to minimize sample degradation and to meet specified holding times. A carrier that maintains signature control and active package-tracking methods is used to ensure control of sample custody and to prevent sample loss. All shipments are made in accordance with SPRU DP shipping procedure requirements SPRU-PEP-414, SPRU-PQP-021, SPRU-RC-117 and subcontractor (e.g. SEC) procedures. A record of the shipment date, receiving facility, and analyses requested is maintained on file for samples sent to each subcontract laboratory.

Portions of some samples sent to a subcontract laboratory for analysis are retained until the results are received and compared with previous or expected data. Unique samples, such as baseline background or pre-operational collections, that can be stored without degrading may be retained indefinitely and archived.

Descriptions of each type of field QC sample, its use in evaluating environmental data, and the frequency of use are detailed in SPRU-RC-011.

6.2 *Instrument/Equipment Testing, Inspection and Maintenance (ANSI/HPS N13.1-1999 7.1.h & j)*

ANSI/HPS N13.1-1999 Section 7, Table 5 – *Summary of maintenance, calibration, and field check requirements,* is the basis for procedures and is used to ensure compliance with the Standard. Instruments and equipment are tested, inspected, and maintained in accordance with SPRU-PQP-017, 018 *Control of Calibrated Instrumentation and Measuring & Test Equipment (M&TE),* SPRU-RC-011, applicable field and analytical procedures (e.g. 116 and 119, 120, 122) and manufacturer's manuals (as applicable to equipment such as air samplers or to counting instruments). Subcontractor procedures (e.g. Energy Solutions) are used in some cases for calibration. No non-direct measurements will be used in this project.

6.3 *Inspection/Acceptance of Supplies and Consumables (ANSI/HPS N13.1-1999 7.1.r)*

Equipment, supplies, and services supporting field and analytical activities within the scope of this QAPP are purchased in accordance with SPRU-PQP-011 and PEP-402-GMOS. Quality levels applicable to specific purchased items or services are defined in SPRU-RC-011. These quality levels are designated on purchase requisitions. Receipt inspections are performed, as applicable, by SPRU DP QA.

In accordance with SPRU-RC-011, documentation supporting the quality of sampling or analytical data (e.g., field sampling logs, chain-of-custody forms, analytical logs, data sheets) shall be reviewed and approved by the cognizant manager or designee. If corrections are necessary, they shall be documented in accordance with SPRU-RC-011. After the internal technical review is completed and any correction made, the data can be released to data validation personnel.

6.4 Laboratory QA/QC

Environmental monitoring samples are analyzed at on-site and off-site laboratories. Analyses for radiological indicator parameters (gross alpha, beta) and gamma spectroscopy are conducted by the on-site laboratory.

Analyses performed at vendor laboratories off-site include isotopic radiological parameters. Samples are prepared from quantities sufficient to meet the detection limit for the required analysis. Detection limits expected for various analyses and matrices are listed in Tables 2 (radiochemical analyses at subcontract laboratories) and Table 3 (radiological analyses at the on-site laboratory). If sample quantity is insufficient, this fact will be noted in the appropriate analytical record. Good laboratory sample handling, transfer, and storage practices are used to minimize the possibility of sample contamination.

Table 2. Radiological Detection Limits (DLs) by Sample Matrix: Subcontract Laboratories

Nuclide	Air μCi/sample
Gross alpha	3E-07
Gross beta	5E-07
Am-241	3E-07
Be-7	**
Co-60	5E-06
Cs-137	3E-06
Eu-154	**
K-40	**
Pu-238	3E-07[1]
Pu-239/240	3E-07
Sr-90	3E-06
U-233/234	3E-07
U-235/236	3E-07
U-238	3E-07

** Minimum detectable activities for these nuclides are based upon meeting detection limits for Co-60 and Cs-137.
[1] Based on use of the entire filter.

Table 3. Radiological Minimum Detectable Concentrations (MDCs) by Sample Matrix: SPRU DP On-site Laboratory

Constituent	Air[1] μCi/ml
Gross alpha	2.0E-15
Gross Beta	4.0E-15
Gamma isotopic (Cs-137)	3.0E-14

[1] MDC for air is based upon a sample volume of 4E+08 mL (40 Lpm for one week); MDCs would be lower for biweekly samples.

Laboratory QA/QC practices specific to each analytical method are described in approved references or procedures. QA/QC practices include proper training of analysts, maintaining and calibrating measuring and test equipment and instrumentation, and routinely processing laboratory QC samples such as standards and spikes (to assess method accuracy), duplicates and replicates to assess precision), and blanks (to assess the possibility of contamination). QC results are either compared directly to specified acceptance limits or plotted on control charts with acceptance limits, in accordance with SPRU-PQP-005, SPRU-PQP-006. Standard reference materials (SRMs, materials with known quantities or concentrations of chemical or radiological constituents of interest) traceable to the National Institute of Standards and Technology (NIST) are used (if available) to calibrate counting and test instruments and to monitor their performance. Radiological reference standards are kept locked in a secure location and are inventoried periodically. Access to the standards is controlled.

Systems for measuring air flow are calibrated upon receipt from off-site subcontractors. Calibration methods for the alpha and beta counting system are described in SPRU-RC-120 and SPRU-RC-122.

All time references are to local time, except for the meteorological system which remains on Eastern Standard Time throughout the year. Key laboratory instruments and chronometers are synchronized quarterly to within 60 seconds of a NIST time signal, Naval Observatory, or equivalent national reference. A record of time synchronization and the timepieces affected is noted in the maintenance files. Changes to and from eastern daylight savings time are made on the laboratory chronometers, monitoring and counting instruments, and chart recorders.

The SPRU DP participates in formal crosscheck programs for both radiological and nonradiological analyses. Crosscheck samples (performance evaluation samples) contain a quantity or concentration of a constituent of interest known to the agency conducting the crosscheck, but unknown to the participating laboratory. Crosscheck programs provide an additional means of testing accuracy of environmental measurements. Subcontract laboratories are required to perform satisfactorily on crosschecks, defined as having at least 80% of reported results within control limits. If crosscheck results fall outside of control limits, formal corrective actions are initiated to determine conditions that could adversely affect sample data and to ensure that actual sample results are reliable.

Organizations performing radiological analyses as part of effluent or environmental monitoring are encouraged by the DOE to participate in formal crosscheck programs to test the quality of

environmental measurements being reported to the DOE by its contractors. The SPRU DP subcontract laboratories currently participate in the DOE Radiological Environmental Sciences Laboratory Mixed Analyte Performance Evaluation Program (MAPEP).

7.0 GENERAL DATA MANAGEMENT

Data management procedures are addressed in SPRU-RC-011, SPRU-RC-132, SPRU-RC-014, SPRU-ENV-010 and SPRU-ENV-011. Verification of computer programs and software is described in SPRU-PQP-028. Specific calculations are outlined in applicable procedures. Calculations are verified in accordance with defined data validation and peer review processes.

7.1 *Data Quality Objectives (ANSI/HPS N13.1-1999 7.1.l)*

Data quality objectives (DQOs) are qualitative and quantitative statements that specify the quality of data required to support decisions concerning environmental monitoring program objectives. Data are assessed against DQOs during data collection operations. Procedure SPRU-ENV-009 detail the requirements and protocol for developing DQOs and plans for data collection activities, including environmental programs (if activities are not already addressed in other controlled documents). Proper planning, sample collection and handling, sample analysis, data analysis, and statistical treatment are essential to produce valid and reliable data that can be used to support management decisions and actions concerning the objectives of the QAPP. DQOs for the routine environmental monitoring program are defined in this QAPP.

The following characteristics are used to assess the quality of environmental monitoring data: precision, accuracy, representativeness, completeness, and comparability (PARCC).

1. Precision is the degree of reproducibility of a measurement under a given set of conditions. Precision is assessed by evaluating results from duplicate field and analytical samples. As applicable, acceptance criteria for estimates of precision (e.g., relative percent difference, relative error ratio) are set in analytical and data validation procedures.

2. Accuracy is the degree of agreement between a measurement (or average of measurements) with an accepted reference or "true" value. Accuracy is assessed by evaluating results from standards or spikes. As applicable, acceptance criteria for estimates of accuracy (e.g., standard errors, standard deviations, percent recovery) are set in analytical procedures and data validation procedures.

3. Representativeness is the degree to which data accurately and precisely define a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

   For the SPRU DP environmental monitoring program, the target confidence interval for environmental measurements (e.g., the range of measurement values above and below the test result within which the "true" result is expected to lie) is set at 95%.

   Regulatory requirements and DOE guidance specify factors to be considered in designing air samplers that best represent the environmental samples of interest. Some examples include:

   A. siting ambient air samplers away from roads, vegetation, or buildings that could affect the composition of air being drawn through the samplers,

B. siting air effluent sampling as close as possible to the point of discharge

4. Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected. Completeness is usually expressed as a percentage. Percent completeness of QAPP data is calculated by dividing the number of valid results by the total number of analytes requested.

Although it would be desirable to achieve 100% complete (valid) data for all scheduled environmental monitoring program samples, this is not always possible. Some mechanisms to ensure that data are as complete as possible include the following:

A. Sample collection schedules are planned in advance to allow for contingencies produced by unusual conditions such as adverse weather.

B. To prevent equipment problems from occurring, preventive maintenance is scheduled for automated sampling equipment and analytical instruments.

C. Spare parts are kept in reserve for ambient air and effluent samplers so that automated collection systems can be repaired quickly.

Target completeness criteria for QAPP data have been defined based on the level of importance of the data. Data deemed "critical" to the monitoring program (such as emission or effluent data from the primary release points) are assigned higher targets for completeness than data from points with lesser priority.

A. Critical data. A target of 90% or greater completeness is set for legally required sampling, such as data collected in support of permitted NESHAP discharge points. NESHAP permitted air emission points may include the discharges from the H2 and G2 buildings and portable ventilation units.

High priority data. Data from samples critical to assessing site effects on public health are considered high-priority. A target of 85% completeness has been set for high priority data. Some examples include: (1) meteorological monitoring data which, in accordance with the *Standard for Determining Meteorological Information at Nuclear Power Sites* (American National Standards Institute 1984), must be at least 90% complete from locations downwind of release points which are used to ascertain the effect of site releases on the environment (e.g., air samplers located off site downwind and in nearby communities).

Where possible, a supplemental sample is retained as backup. Ultimately, if high priority data are not available due to problems with sampling or analysis, estimates based upon previous measurements may be calculated and documented.

B. The remainder of sample data is targeted for 85% completeness. If data from these points are not retrievable, the points may be reported as "NR" in the appropriate environmental reports (including the annual NESHAP report).

Comparability is the degree to which one data set can be compared with another. Precautions taken to ensure data comparability include the following.

A. Sampling locations are clearly labeled to ensure that samples are collected from the same locations each time. Personnel are trained in performing field and analytical

procedures to ensure that the procedures are completed correctly and consistently. Sampling procedures are clearly defined to minimize sources of variability introduced by changes in equipment, environmental conditions, or in method of collection. Chain-of-custody procedures are used to ensure that the sample taken is the one analyzed and reported.

B. Subcontract laboratories are contractually required to report analytical results in units compatible with those used on-site. A listing of required reporting units is included with each contract. The number of composited air filters used in air particulate analysis also must be reported. Sample volume must be reported for each analysis.

C. Providing analytical services so that data can be transferred directly into the electronic format desired. In addition to minimizing transcription errors, transfer from electronic data files reduces time and cost of data entry. In accordance with SPRU-PQP-028, all software used to generate, process, or manipulate data before reporting is subject to control, verification and/or validation before use to ensure that all computerized calculations are done in a controlled manner.

D. When data are transferred from one form of record to another (e.g., when raw data are copied from a printout to a bench log or keypunched from a bench log to the electronic format) the transfer must be verified as error free.

7.2 General Data Collection, Reduction and Handling

All rad-NESHAP compliance samples are logged in. Samples are assigned unique identification numbers (IDs). Filter holders are labeled or otherwise marked before or at the time of collection; the collector's initials and the date and time of collection are hand-entered on the label at the time of collection.

The sample is released by field personnel to the sample custodian.

Data reporting requirements are contractually defined with each subcontract laboratory. Levels of rigor for data reporting are described in detail in SPRU-RC-132. Specific listings of the information that is required to be reported to the SPRU DP by vendor laboratories may be found in vendor contracts.

Gross radiological results (i.e., gross alpha, gross beta) may be used as an alternative to more complex (and expensive) isotopic analyses under the following circumstances:

- when ratios of specific radionuclides are sufficiently well known and constant that concentrations can be calculated from gross activity measurements;
- when only conservative applications of the gross radiological data are required;
- when radioactivity is so low that specific nuclide measurements are precluded;
- when the quantity of sample is inadequate for radionuclide determination;
- as screening indicators; and
- as trend indicators

Most radiological results for environmental samples are close to or below the minimum detectable concentration, which is dependent upon the sample matrix, the counting instrument, instrument background levels, and counting times. Calculations involve subtracting analytical or instrument background counts from sample counts to obtain net values. If little or no radioactivity is present in the environmental sample, the calculated result may be zero or a negative number. A radiological result with an associated confidence interval larger than the result itself may be assumed to indicate no detectable radioactivity.

Although a negative result does not represent a physical reality, inferences can be made from data sets only if the very small and negative values are included in calculations such as long-term averages. Hence, laboratories are contractually required to report actual calculated values, including zeros and negative numbers. The laboratory is also required to report the uncertainty associated with the result.

Analytical results are entered as they are completed in-house or received from off-site vendor laboratories.

SPRU-ENV-010 specifies significant figures to be used in recording measurements, rounding protocols and standard calculations such as those used for propagation or pooling of error terms. Calculations specific to field or analytical activities, such as lower limit of detection calculations for radiological methods, are included in approved procedures. Nonroutine calculation methods or nonstandard conversion factors must be documented. Software packages used to generate data are verified and validated before use in accordance with SPRU-PQP-028.

7.3 ***General Data Validation and Data Assessment and Analysis (ANSI/HPS N13.1-1999 7.1.q)***

All analytical data produced at the bench level are reviewed and signed off by a qualified person other than the one who performed the analysis. A similar in-house review is contractually required from subcontractor laboratories. Once reported out of the analytical laboratory, environmental monitoring program data are then validated in accordance with approved procedure SPRU-RC-132.

Data validation is a systematic process for reviewing data and documenting data quality with respect to DQOs and PARCC parameters. Data validation includes comparing data to criteria designated by regulatory protocols, approved methodology, and contractual requirements. The data validation process includes identifying invalid data and qualifying the usability of the remaining data. Environmental monitoring program data are not formally approved in electronic format until data validation is complete, at which point they are released for use in data assessment and reporting.

As part of data assessment, validated analytical data, field information, and historical project data are integrated and evaluated to determine whether the constituents of interest are actually present and, if so, at what concentrations. Data problems identified at this level are investigated and appropriately resolved. Protocols for evaluating data at this level are addressed in SPRU-ENV-010, 011 and SPRU-RC-113.

Data from the environmental monitoring program are then evaluated to assess the effect, if any, of the site operations and activities on the environment and the public. Data from each sampling location are compared with historical results from the same location, with comparable background measurements, and (if applicable) with regulatory limits or guidance standards. Standard statistical methods are used to evaluate the data. Data are tabulated and checked to identify trends of

increasing levels of radiological constituents so that causes may be determined and mitigated before limits are exceeded. Data problems are investigated and addressed in accordance with approved procedures.

7.4 General Records

7.4.1 Records

Environmental monitoring program records must be kept to verify what was done and by whom. Records, in both paper and electronic form, must be clearly traceable to the item or activity to which they pertain. Examples of records maintained as part of the monitoring program include: field data sheets; chain-of-custody forms; sample shipping documents; sample logs; data packages; training records; method-dedicated laboratory notebooks; laboratory data sheets; quality control information; SRM certifications; equipment procurement and maintenance information; calibration logs; raw analytical data; corrective action records; and weather measurements.

Measured values, calibration factors, background corrections, and conversion factors used in calculations must be kept as part of the data record. Records of data review, data validation, data reduction, and dose calculations must also be maintained. Information must be documented to provide an auditable trail and to provide requisite information for use if the results need be recalculated in the future.

Documents are kept secure by restricting access to laboratory and office areas. Nonreplaceable records such as bench logs or raw data sheets are stored in fireproof cabinets when not in use. Records of a sensitive nature are retained in a secure manner and are accessible only to authorized personnel.

Approved and indexed permanent records are required to be archived with the SPRU DP Master Records Center as outlined in SPRU-DC-RM-001. SPRU-RC-014 specifies types of documentation maintained as part of the environmental monitoring program, requirements for maintenance, and frequency of archiving. Records pertaining to retrospective NESHAP dose assessment and required annual reporting are dispositioned in accordance with SPRU-ENV-011.

7.5 ***Administrative Controls (ANSI/HPS N13.1-1999 7.1.c)***

Reports to Management (Reporting and Notification) (ANSI/HPS N13.1-1999 7.1.o)

Significant out of specification values shall be brought to the immediate attention of management by all levels of the organization (from bench top to final reporting).

Environmental monitoring data are evaluated and reported on a monthly, quarterly, semiannual, or annual basis. To standardize the reporting of monitoring data, as a general rule the last Friday of each calendar month is considered to be the end of the sampling month. If the calendar month represents the conclusion of a calendar quarter or a semiannual or annual period, then the last Friday also constitutes the end of the respective period(s).

The SPRU DP Annual NESHAP Report summarizes radionuclide releases via air pathways over the subject year, including dose estimates to individual receptors and the population, fulfilling the

requirements of 40 CFR 61 Subpart H. (SPRU-ENV-011). Procedures SPRU-ENV-010, 011 and SPRU-RC-113 describe the protocols for evaluating and reporting data from the environmental monitoring program in the above reports. All reports described in these procedures are prepared under the cognizance of the SPRU DP EL. Data reports are peer reviewed and subjected to an additional general review before release. Significant out of specification values shall be brought to the immediate attention of management.

8.0 REFERENCES

NOTE: A listing of environmental laws, regulations, orders, and standards applicable to this QAPP may be found in Appendix B. A complete listing of SPRU DP implementing documents and procedures may be found in Appendix C.

8.1 American National Standards Institute, Inc. (ANSI) February 19, 1969. *American National Standard Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities*. ANSI-N13.1-1969. New York: American National Standards Institute, Inc.

8.2 ANSI 1984. *Standard for Determining Meteorological Information at Nuclear Power Sites*. ANSI/ANS-2.5-1984. New York: American Nuclear Society.

8.3 ANSI, January 12,1999. *American National Standard - Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities*. ANSI/HPS N13.1-1999. McLean, Virginia: Health Physics Society.

8.4 ANSI, 2005. *Determining Meteorological Information at Nuclear Facilities*. ANSI/ANS-3.11-2005.

8.5 American Society of Mechanical Engineers. September 1989. *Quality Assurance Program Requirements for Nuclear Facilities*. ASME NQA-1. New York: The American Society of Mechanical Engineers.

8.6 Pacific Northwest Laboratory (PNL). November 1988. *GENII - The Hanford Environmental Radiation Dosimetry Software System*. Version 1.485. Napier, B.A., D.L. Stronge, D.L. Peloquin, R.A. Ramsdell.

8.7 Parks, B.L. March 1992. *Users Guide for CAP88-PC, Version 1.0*. Las Vegas, NSV: U.S. Environmental Protection Agency Office of Radiation Programs. 402-B-92-001.

8.8 Parks, B.L, March 2000. *Updated User's Guide for CAP88-PC Version 2.0*. EPA Office of Radiation and Indoor Air. 402-R-00-004. Germantown, Maryland.

8.8 Trinity Engineering Associates, Inc. March 2006. *CAP88-PC Version 3.0 User Guide*.

8.9 U.S. Congress. 1990. *Clean Air Act*, 42 USC 1857 et seq., as amended.

8.10 U.S. Department of Energy (DOE). July 1983. DOE/EP-0096: *A Guide for Effluent Radiological Measurements at Department of Energy Installations*. Washington, D.C.

8.11 DOE, January 1991. DOE/EH-0173T: *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance*. Washington, D.C.

8.12 DOE, May 1994. *Quality Assurance*. 10 CFR 830.120.

8.13 DOE, *Quality Assurance Criteria*. 10 CFR 830.122.

8.14 DOE, June 4, 2008. *Environmental Protection Program*. DOE O 450.1A. Washington, D.C.

8.15 DOE, April 2005. *Nuclear Wallet Cards*. National Nuclear Data Center. Brookhaven National Laboratory. Upton, New York.

8.16 U.S. Environmental Protection Agency (EPA). December 15, 1989. 40 CFR 61, Appendix E, Table 2. *Concentration Levels for Environmental Compliance.*

8.17 EPA, December 15, 1989 (as amended September 9, 2002). 40 CFR 61, Subpart H, *National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities.*

8.18 EPA, July 1991. *Guidance on Implementing the Radionuclide NESHAPs Office of Radiation Programs.*

8.19 EPA, March 2001 (reissued May 2006). *EPA Requirements for Quality Assurance Project Plans*. EPA QA/R-5. EPA/240/B-01/003.

8.20 EPA, December 15, 1989. *National Emissions Standards for Hazardous Air Pollutants (NESHAP).* 40 CFR 61, Subpart H. Washington, D.C.: U.S. Government Printing Office.

8.21 EPA, March 17, 1994. Communication from P.A. Giardina, Chief Radiation Branch, U.S. EPA Region II, to T.J. Rowland, Director, U.S. DOE. NESHAP Compliance Approval for (1) Periodic Confirmatory Measurements and (2) HVAC Stack Effluent Monitoring Changes.

8.22 EPA, September 9, 2002. *National Emissions Standards for Hazardous Air Pollutants; National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities; National Emission Standards for Radionuclide Emissions from Federal Facilities Other Than Nuclear Regulatory Commission Licenses and Not Covered by Subpart H*; Final Amendment 67 FR 57159.

8.23 U.S. Nuclear Regulatory Commission. 1977. Regulatory Guide 1.109, *Calculations of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50*, Appendix I.

9.0 ATTACHMENTS

Attachment A, 2010/2011 Environmental Monitoring Program for rad-NESHAP Compliance Schedule and Maps

Attachment B, Tables of Derived Concentration Guides and Environmental Laws, Regulations, Orders, Standards and Permits

Attachment C, Implementing Documents for the SPRU DP

10.0 RECORDS

No records are generated as a result of implementing this procedure.

ATTACHMENT A

2010/2011 Environmental Monitoring Program for rad-NESHAP Compliance Schedule and Maps

Attachment A-1

Program for rad-NESHAP Compliance Schedule

Sample Location Code	*Sampling Type/ Medium*	*Collection Frequency/ Total Annual Samples*	*Measurements/Analyses*
Point Source Air Emissions			
H2 Fabric Enclosure[a] G2 Fabric Enclosure[a]	Continuous off-line air particulate filters	Weekly; 52 each location	Gross alpha/beta, gamma isotopic[b] upon collection, sample flow and stack flow
	Composite of biweekly particulate filters	Quarterly; 4 each location	Sr-90, U-233/234, U-235/236, U-238, Pu-238, Pu-239/240, Am-241, gamma isotopic, sample flow and stack flow
OVEs/PVUs[a] Outdoor ventilated enclosures/portable ventilation units (including HEPA vacs)	Continuous off-line air particulate filter	Collected as required by project	Gross alpha/beta, gamma isotopic[b] upon collection, sample flow and stack flow
	Composite of filters	Quarterly; 4 each location	Sr-90, U-233/234, U-235/236, U-238, Pu-238, Pu-239/240, Am-241, gamma isotopic, sample flow and stack flow

[a] Required by 40 CFR 61, Subpart H. Results reported in the Annual NESHAP Report.
[b] Gamma isotopic analysis done only if gross alpha/beta activity rises significantly.

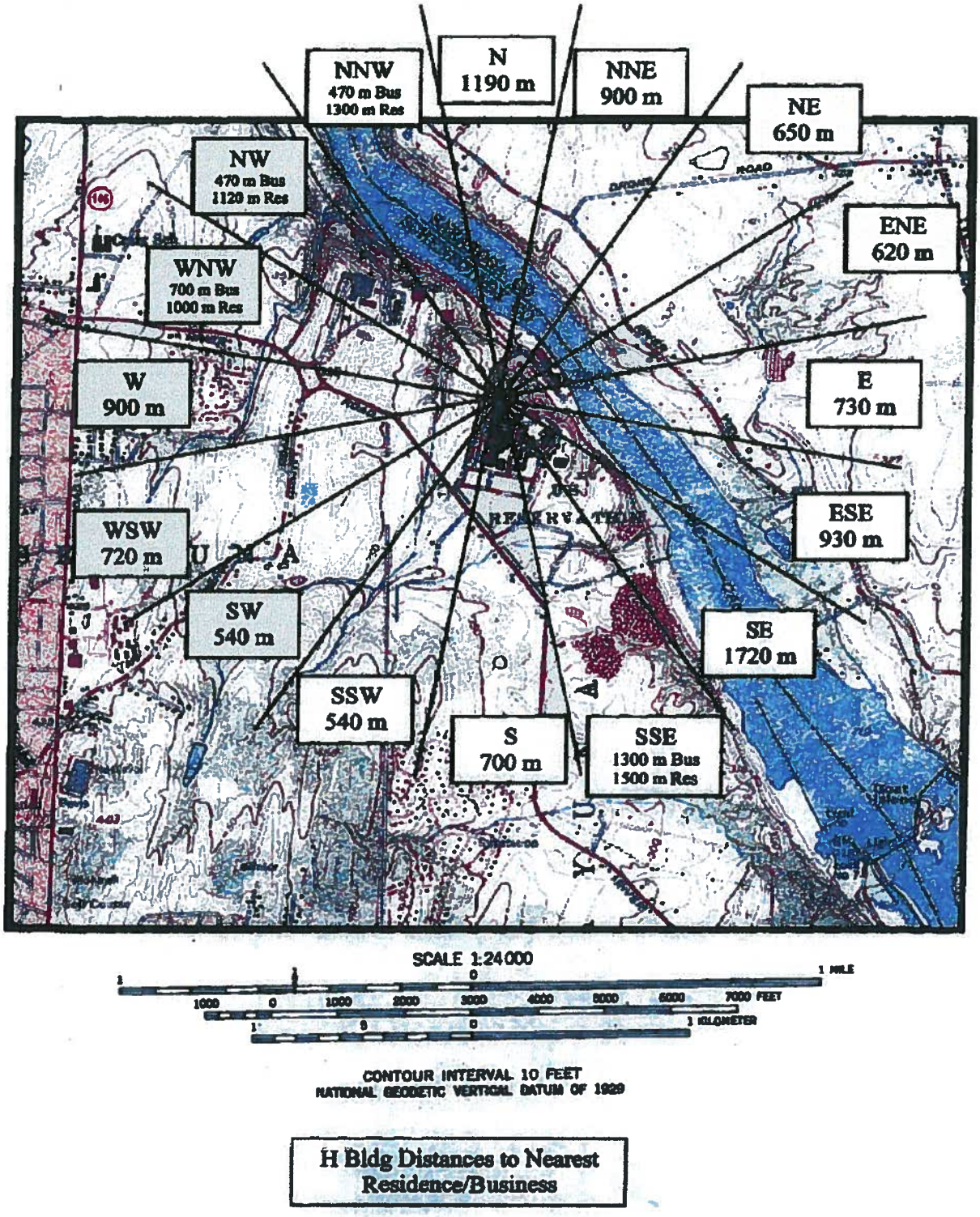
Summary of Monitoring Program Changes Since the Last QAPP

Location Code	Description of Changes
None	None

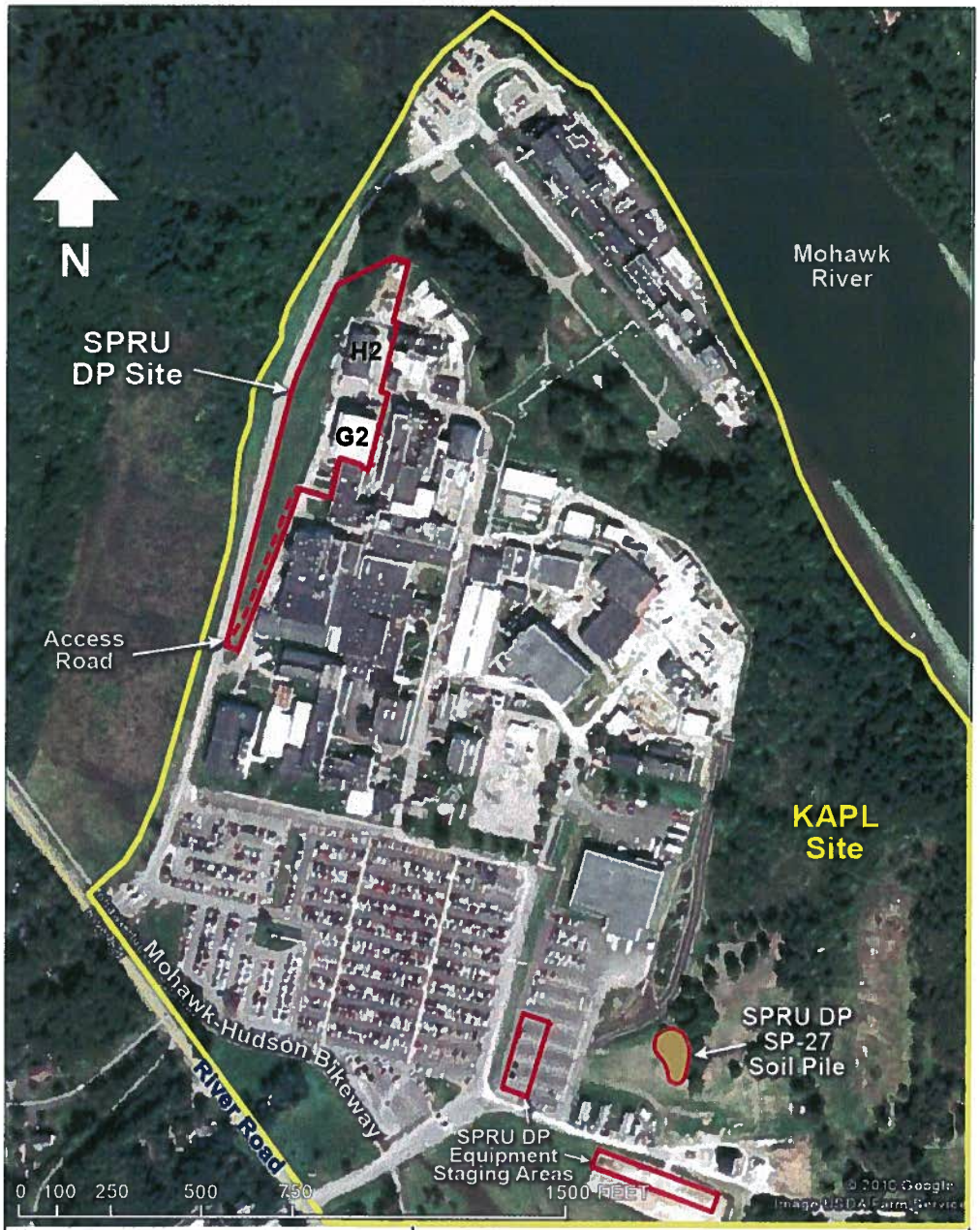
ATTACHMENT A-2

Maps

ATTACHMENT A-2-1
Maps



ATTACHMENT A-2-2



URS
Washington Division

Washington Group International, Inc. dba
Washington Division of URS Corporation

900 TRAIL RIDGE RD
AIKEN, SC 29803
(803) 502-9318

KAPL SITE
AND
SPRU DP SITE

SIZE	PROJECT NUMBER:	DRAWING NUMBER:	REV
A	SWPPP-09001	FIGURE 2	0

SCALE:	DATE:	SHEET:
1" = 370'	11/15/2010	1 OF 1

ATTACHMENT B

Tables of Derived Concentration Guides and Environmental Laws, Regulations, Orders, Standards and Permits

ATTACHMENT B

Table 1
Department of Energy Derived Concentration Guides (DCGs)[1] for Inhaled Air (μCi/mL)

Radionuclide	Half-life (years)[2]	DCG in Air
Gross Alpha (as Am-241)[3]	NA	2E-14
Gross Beta (as Sr-90)[3]	NA	9E-12
Tritium (H-3)	1.23E+01	1E-07
Carbon-14 (C-14)	5.70E+03	6E-09
Potassium-40 (K-40)	1.25E+09	9E-10
Cobalt-60 (Co-60)	5.27E+00	8E-11
Strontium-90 (Sr-90)	2.89E+01	9E-12
Technetium-99 (Tc-99)	2.11E+05	2E-09
Iodine-129 (I-129)	1.57E+07	7E-11
Cesium-137 (Cs-137)	3.00E+01	4E-10
Europium-154 (Eu-154)	8.59E+00	5E-11
Uranium-232 (U-232)	6.89E+01	2E-14
Uranium-233 (U-233)	1.59E+05	9E-14
Uranium-234 (U-234)	2.46E+05	9E-14
Uranium-235 (U-235)	7.04E+08	1E-13
Uranium-236 (U-236)	2.34E+07	1E-13
Uranium-238 (U-238)	4.47E+09	1E-13
Plutonium-238 (Pu-238)	8.77E+01	3E-14
Plutonium-239 (Pu-239)	2.41E+04	2E-14
Plutonium-240 (Pu-240)	6.56E+03	2E-14
Americium-241 (Am-241)	4.32E+02	2E-14

N/A - Not applicable

[1] DCGs are established in DOE Order 5400.5 and are defined as the concentration of a radionuclide that, under conditions of continuous exposure for one year by one exposure mode, would result in an effective dose equivalent of 100 mrem (1 mSv).

[2] Nuclear Wallet Cards. April 2005. National Nuclear Data Center. Brookhaven National Laboratory. Upton, New York.

[3] Because there are no DCGs for gross alpha and gross beta concentrations, the DCGs for the most restrictive alpha and beta emitters at the SPRU DP (americium-241 and strontium-90, respectively) are used as a conservative basis for comparison at locations for which there are no radionuclide-specific data, in which case a more appropriate DCG may be applied.

ATTACHMENT B

TABLE 2
Environmental Laws, Regulations, Orders and Standards

The following environmental laws, regulations, orders, and standards are applicable, in whole or in part, to rad-NESHAP compliance at the Separations Process Research Unit - Disposition Project.

Atomic Energy Act of 1954, 42 United States Code (USC) §2011 *et seq.*, as amended, and federal implementing regulations.

Clean Air Act (CAA). Pub. L. No. 84-159. 42 USC §7401 *et seq.*, as amended, and federal and state implementing regulations.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Pub. L. No. 96-510. 42 USC §9601 *et seq*. (including Superfund Amendments and Reauthorization Act [SARA] of 1986), and federal implementing regulations.

DOE Order 231.1A. August 19, 2003. *Environment, Safety, and Health Reporting* (replaced DOE Orders 231.1 and 232.1A), including Change 1 (June 3, 2004).

DOE Order 414.1C. June 17, 2005. *Quality Assurance.*

DOE Order 435.1. July 9, 1999. *Radioactive Waste Management*, including Change 1 (August 28, 2001).

DOE Order 450.1A. June 4, 2008. *Environmental Protection Program.*

DOE Policy 450.4. October 15, 1996. *Safety Management System Policy.*

DOE Order 458.1, February 11, 2011. Radiation Protection of the Public and the Environment.

DOE Regulatory Guide DOE/EH-0173T. January 1991. *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance*

Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986. Pub. L. No. 99-499. 42 USC §11001 *et seq*., and implementing regulations.

Environmental Conservation Law of New York State Consolidated Laws and state implementing regulations (NYCRR).

Airborne emissions are regulated by the EPA under the National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR §61 Subpart H (December 15, 1989, including amendments).

ATTACHMENT B

TABLE 3
SPRU DP Environmental Air Permits

Permit Name and Number	Agency/Permit Type	Description	Status
H2 Exhaust	EPA/National Emission Standards for Hazardous Air Pollutants (NESHAP)	Emissions from building demolition fabric enclosure	TBD
G2 Exhaust	EPA/NESHAP	Emissions from building demolition enclosure	TBD
Outdoor Ventilated Enclosures / Portable Ventilation Units	EPA/NESHAP	Ten portable ventilation units (PVUs) for removal of radionuclides	TBD

ATTACHMENT C

(8 pages)

Implementing Documents for the SPRU DP

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SPRU-ADMIN - Administrative Procedures

SPRU-ADMIN-001	Disciplinary Action
SPRU-ADMIN-002	Interface Plan
SPRU-ADMIN-003	Out-Processing Procedure

SPRU-BMP - Business Management

SPRU-BMP-001	Monthly Cost Accrual

SPRU-COO - Conduct of Operations

SPRU-COO-001	Conduct of Operations Program
SPRU-COO-001-A	Conduct of Operations Manual
SPRU-COO-003	Lockout/Tagout Program
SPRU-COO-004	Use of Caution Tags
SPRU-COO-005	Not In Use
SPRU-COO-007	Communications
SPRU-COO-008	Independent Verification
SPRU-COO-009	Operator Aid Postings
SPRU-C00-010	Equipment And Piping Labeling
SPRU-C00-011	Control Of Equipment And System Status
SPRU-COO-012	Control Of On Shift Training
SPRU-COO-013	Operations Turnover
SPRU-COO-014	Logkeeping
SPRU-COO-015	Required Reading
SPRU-COO-016	Timely Orders
SPRU-COO-017	Shift Routines And Operating Practices

SPRU-DC-RM - Document Control-Records Management

SPRU-DC-RM-001	Document Control, Correspondence Control, and Records Management Program Administration
SPRU-DC-RM-002	Procedure Development

SPRU-DD - Decontamination and Decommissioning

SPRU-DD-001	Surveillance and Maintenance Plan
SPRU-DD-002	SPRU DP Maintenance Program
SPRU-DD-003	Transition Plan
SPRU-DD-004	SPRU DP Decommissioning Plan
SPRU-DD-006	G2 Turnover Plan
SPRU-DD-007	SPRU Disposition Project Characterization Plan
SPRU-DD-008	SPRU Tank Farm - Tank Venting Plan
SPRU-DD-009	Radiological Contamination Guidelines For Demolition of SPRU Facilities
SPRU-DD-010	SPRU Disposition Project Characterization Report
SPRU-DD-011	Electrical and Mechanical Isolation of Facilities to Support D&D Work
SPRU-DD-102	Ground Fault Circuit Interrupter (GFCI) Inspection and Assured Equipment Grounding Conductor Inspection (AEGCI) and Testing

SPRU-EM - Emergency Management

SPRU-EM-001	Emergency Preparedness Plan
SPRU-EM-002	Hazards Survey
SPRU-EM-003	Emergency Preparedness Plan for St. James Office Facility

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SPRU-ENV - Environmental Protection

SPRU-ENV-001	Environmental Protection Plan
SPRU-ENV-002	Stormwater Pollution Prevention Plan (SWPPP) for the Separations Process Research Unit Disposition Project (SPRU DP) G2/H2 Remediation
SPRU-ENV-004	SPRU DP Spill Prevention Control and Countermeasure (SPCC) Plan
SPRU-ENV-006	RCRA Interim Corrective Measures Work Plan Upper Level SWMUs
SPRU-ENV-007	RCRA Quality Assurance Project Plan for the RCRA Interim Corrective Measures Work Plan Upper Level SWMUs
SPRU-ENV-008	Erosion Control Implementation
SPRU-ENV-009	Best Management Practices (BMP) Plan
SPRU-ENV-010	SPRU DP Radiological Dose Assessment
SPRU-ENV-011	Dose Assessment for and Preparation of the SPRU Annual NESHAP Report Corrective Measures Work Plan Upper Level SWMUs
SPRU-ENV-012	Quality Assurance Project Plan for Measurements of Radionuclide Air concentrations for RAD-NESHAP Compliance at the SPRU DP

SPRU-ESH - Environmental Safety and Health

SPRU-ESH-001	Industrial Safety and Health Plan Table of Contents
SPRU-ESH-001-Introduction	SPRU Project Safety Commitment
SPRU-ESH-001-Section 1	Confined Space Procedure
SPRU-ESH-001-Section 2	Electrical Safety
SPRU-ESH-001-Section 3	Elevated Work
SPRU-ESH-001-Section 4	Compressed Gas Cylinders
SPRU-ESH-001-Section 5	Excavation and Trenching
SPRU-ESH-001-Section 6	Exits and Walkways
SPRU-ESH-001-Section 7	Hoisting and Rigging
SPRU-ESH-001-Section 8	Job Hazard Analysis (JHA) Program
SPRU-ESH-001-Section 9	Machine Guarding
SPRU-ESH-001-Section 10	Motor Vehicle Safety
SPRU-ESH-001-Section 11	Personal Protective Equipment
SPRU-ESH-001-Section 12	Powered Industrial Trucks
SPRU-ESH-001-Section 13	Safety Showers and Emergency Eye Washes
SPRU-ESH-001-Section 14	Safety Signs and Barricades
SPRU-ESH-001-Section 15	IH Procedure Monitoring
SPRU-ESH-001-Section 16	Industrial Hygiene Baseline Survey
SPRU-ESH-001-Section 17	Occupational Medicine
SPRU-ESH-001-Section 18	Respiratory Protection
SPRU-ESH-001-Section 19	Thermal Stress
SPRU-ESH-001-Section 20	Illumination
SPRU-ESH-001-Section 21	Hearing Conservation
SPRU-ESH-001-Section 22	Hazard Communications
SPRU-ESH-001-Section 23	Ergonomics
SPRU-ESH-001-Section 24	Hazardous Chemical Storage
SPRU-ESH-001-Section 25	Carcinogen Control
SPRU-ESH-001-Section 26	Bloodborne Pathogens Exposure Control Plan
SPRU-ESH-001-Section 27	Biological Hazards
SPRU-ESH-001-Section 28	Chemical Safety - Prohibited/Restricted Materials
SPRU-ESH-001-Section 29	Non-ionizing Radiation
SPRU-ESH-001-Section 30	Severe Weather Safety
SPRU-ESH-001-Section 31	Heavy Equipment Operations
SPRU-ESH-001-Section 32	Cranes and Derricks

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SPRU-ESH-002	Worker Safety and Health Program Administration
SPRU-ESH-003	Environment, Safety, and Health Reporting
SPRU-ESH-004	Spill/Release Evaluation, Management, and Reporting Program
SPRU-ESH-005	Event Investigation and Reporting Manual
SPRU-ESH-006	Chronic Beryllium Disease Prevention Program
SPRU-ESH-007	Non-operational Emergency Spill/Release Response
SPRU-ESH-008	Toxic and Hazardous Substances Compliance Program
SPRU-ESH-009	SPRU Decommissioning Plan Hazard Analysis
SPRU-ESH-010	Identification, Reporting and Resolution of Price-Anderson and Worker Safety and Health Noncompliances
SPRU-ESH-011	Initial Fact Finding to Support Event Investigation
SPRU-ESH-012	Event Investigation and Occurrence Reporting

Worker Safety and Health

SPRU-ESH-101	Safety Shoe Program
SPRU-ESH-102	Prescription Safety Eyeglass Program
SPRU-ESH-103	Selection, Control, Issue, and Use of Respiratory Protection

200 Series Procedures

SPRU-ESH-201	Beryllium Characterization Survey Plan

Beryllium Laboratory Procedures

SEC-HS-129069 (a)	Beryllium in Air Sample Preparation
SEC-HS-129069 (b)	Beryllium in Surface Wipes Sample Preparation
SEC-HS-129069 (c)	Fluorescence Analysis for Beryllium
SEC-HS-129069 (d)	Fractional Detection Solution Synthesis
SEC-HS-129069 (e)	Beryllium in Water Sample Preparation
SEC-HS-129069 (f)	Dissolution Solution 1% Synthesis

SPRU-FP - Fire Protection

SPRU-FP-001	Fire Protection Program Description
SPRU-FP-002	Control of Combustibles, Flammables, and Ignition Sources
SPRU-FP-003	Hot Work Procedure
SPRU-FP-004	Fire Extinguisher and Maintenance Procedure
SPRU-FP-005	Fire Protection for Demolition Activities
SPRU-TFHA-001	SPRU DP Transitional Fire Hazard Analysis (TFHA)

SPRU-ISM - Integrated Safety Management

SPRU-2008-ISM-001	Integrated Safety Management System Description
SPRU-ISM-003	Hazard Review Board
SPRU-ISM-005	Employee Concerns Program
SPRU-ISM-006	SPRU DP Work Planning and Control

SPRU-MGT - Management Expectations

SPRU-MGT-001	Safety, Changing Conditions and Hazards, and Stopping Work
SPRU-MGT-002	Smoking Policy

SPRU-NS - Nuclear Safety

SPRU-NS-004	Unreviewed Change Determination Process
SPRU-FHC-001	Final Hazard Categorization

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SPRU-OPS - Operating Procedures

SPRU-OPS-004	Process Media Vessel (PMV) Change Out
SPRU-OPS-006	Instructions for Vendor-supplied "Tell-tale" Pipe Penetration Equipment
SPRU-OPS-007	Frost Fighter Indirect Oil Fired Space Heater Operating Procedure
SPRU-OPS-008	Concrete Drilling and Core Removal for Sampling Purposes
SPRU-OPS-009	SPRU Temporary Hillside Drain System (THDS)

Surveillance Procedures

SPRU-OPS-101	SPRU Inspection Rounds
SPRU-OPS-103	SPRU Surveillance and Maintenance Tickler System
SPRU-OPS-104	SPRU Hillside Sump Test and Inspect

PEP - Project Execution Plans - Project Specific

SPRU-PEP-001	Project Execution Plan
SPRU-PEP-005	SPRU DP Commitment Tracking Process
SPRU-PEP-006	SPRU DP EVMS Surveillance and Maintenance Plan

PEP - Project Execution Plans - URS Corporate Adopted

PEP-203	Engineering Execution Plan
PEP-205	Project Procurement Planning
PEP-207	Licenses, Permitting, Codes and Hazard Requirements
PEP-209	Software & System Application Listing
PEP-210	Team Building
PEP-211	Project Definition Rating Index (PDR)
PEP-212	Preparation of Risk Management Plans
PEP-225	Information Technology Project Support Overview
PEP-228	Information Technology Project Support
PEP-229	Information Technology Project Demobilization
PEP-320	Business Administration
PEP-321	Accounting
PEP-353	Design Document Numbering System
PEP-355	Preparation of Specifications
PEP-356	Preparation of Engineering Calculation
PEP-358	Preparation, Checking and Approval Engineering Drawings
PEP-359	Independent Engineering Design Reviews
PEP-360	Technical Software Selection, Validation and Control for Engineering Applications
PEP-361	Compliance with Laws Regarding the Practice of Engineering
PEP-364	Regulatory Compliance Plan and Compliance Review
PEP-368	Design For Safety
PEP-406	Preparation of Subcontract Scope of Work
PEP-408	Backcharges
PEP-409	Field Orders
PEP-410	Receiving and Issuing Equipment or Material
PEP-413	Scrap and Surplus Material
PEP-414	Out-Shipments
PEP-415	Purchasing Services
PEP-416	Logistics and Transportation
PEP-450	Site Layout
PEP-451	Mobilization and Demobilization
PEP-453	Daily Construction Reports
PEP-461	Field Change Request

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PEP-600	Project Close-out
PEP-601	Preparation of Project Completion Report
PEP-700	Project Financial Measurements
PEP-704	Legal
PEP-706	Insurance

PEP - Project Execution Procedures - Earned Value Management (EVMS)

(E&E) EVMS System Description	Earned Value Management System Description (Energy & Environmental Business Group)
PEP (E&E) - 100	Work Authorization
PEP (E&E) - 200	Project Work Breakdown Structure, Organizational Breakdown Structure, Responsibility Assignment Matrix
PEP (E&E) - 300	Control Accounts, Work Packages and Summary Level Planning Packages
PEP (E&E) - 400	Change Control
PEP (E&E) - 450	Management Reserve
PEP (E&E) - 500	Cost Estimating
PEP (E&E) - 600	Project Planning and Scheduling
PEP (E&E) - 700	Project Earned Value Management System Reporting
PEP (E&E) - 800	Training, Surveillance and Maintenance
PEP (E&E) - 900	Subcontractor Planning and Control
PEP (E&E) - 950	Material Planning and Control

PEP - Project Execution Procedures - Energy & Environment Business Group

PEP-402-GMOS	Purchasing
PEP-407-GMOS	Subcontracting

SPRU-PM - Project Management

SPRU-PM-001	SPRU Risk Management Plan

SPRU-PROP - Property Management

SPRU-PROP-001	Property Management Procedure

SPRU-QAP - Quality Assurance Program

SPRU-QAP-001	Project Specific Quality Assurance Plan
SPRU-QAP-002	Suspect/Counterfeit Items
SPRU-QAP-003	Project Specific Quality Assurance Program Indoctrination

Project Quality Procedures

SPRU-PQP-001	Indoctrination and Training
SPRU-PQP-002	Qualification and Certification of Quality Assurance Audit Personnel
SPRU-PQP-003	Identification and Control of Items
SPRU-PQP-004	Control of Processes
SPRU-PQP-005	Control of Nonconformances
SPRU-PQP-006	Corrective Action Program
SPRU-PQP-007	Lessons Learned
SPRU-PQP-008	Quality Assurance Audits
SPRU-PQP-009	Instructions, Procedures, and Drawings
SPRU-PQP-010	Procurement Document Control

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SPRU-PQP-011	Control of Purchased Items and Services
SPRU-PQP-012	Procurement of Commercial Grade Items
SPRU-PQP-013	Procurement Guide
SPRU-PQP-014	Inspection
SPRU-PQP-015	Surveillances
SPRU-PQP-016	Test Control
SPRU-PQP-017	Control of Measuring and Test Equipment
SPRU-PQP-018	Inspection, Test, and Operating Status
SPRU-PQP-019	Management Assessments
SPRU-PQP-020	Quality Assurance Guidelines for Decommissioning Nuclear Facilities
SPRU-PQP-021	Handling, Storage, and Shipping
SPRU-PQP-022	Stop Work Orders
SPRU-PQP-023	Qualification and Certification of Inspection Personnel
SPRU-PQP-024	Design Control
SPRU-PQP-025	Change Control
SPRU-PQP-026	Design Verification
SPRU-PQP-027	Design Interface Control
SPRU-PQP-028	Software Quality Assurance
SPRU-PQP-029	Problem Reporting

SPRU-RC - Radiological Controls

SPRU-RC-001	SPRU DP Radiological Controls Manual
SPRU-RC-002	Documented Radiation Protection Program and Implementation Plan for Title 10, Code of Federal Regulations, part 835, as Amended June 2007

Technical Basis and Program Manuals

SPRU-RC-003	Internal Dosimetry Technical Basis Document
SPRU-RC-004	External Dosimetry Technical Basis Document
SPRU-RC-006	RCT and Support Personnel Training
SPRU-RC-007	ALARA Program Manual
SPRU-RC-008	Dosimetry Program Manual
SPRU-RC-009	SPRU DP Internal Dosimetry Program Quality Assurance Plan
SPRU-RC-010	SPRU DP External Dosimetry Program Quality Assurance Plan
SPRU-RC-011	Quality Assurance Project Plan for Radiological Confirmation Sampling
SPRU-RC-012	Radiological Confirmation Sampling and Analysis Plan/Final Status Survey (CSAP/FSS) for the Separations Process Unit Upper Level Land Area
SPRU-RC-013	General Decontamination Procedure
SPRU-RC-014	Air Monitoring Technical Basis Document
SPRU-RC-015	Skin Dose Calculations from Personnel Contamination

Implementing Procedures

SPRU-RC-101	Radioactive Source Receipt, Inventory, and Leak Testing
SPRU-RC-102	Radiological Work Permits
SPRU-RC-103	Radiological Control / ALARA Performance and Reporting
SPRU-RC-104	ALARA / Engineering Controls
SPRU-RC-106	Radiological Controls Response to Emergencies / Abnormal Radiological Conditions
SPRU-RC-107	Radiological Posting and Labeling
SPRU-RC-108	Performing Surface Radioactivity Measurements
SPRU-RC-109	Performing Radiation and Contamination Surveys
SPRU-RC-110	Operation of Dose Rate Survey Meters
SPRU-RC-111	Operation of Count Rate Meters (Friskers)
SPRU-RC-112	Scaler Operation
SPRU-RC-113	Airborne Radioactivity Monitoring Procedure

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SPRU-RC-114	Initial Set-Up and Daily Pre-Operational Checks of Portable Count Rate Survey Instruments
SPRU-RC-115	Set-Up of Scaler Counting Systems
SPRU-RC-116	Low-Volume Air Sampler Operation
SPRU-RC-117	Receipt and Shipment of Radioactive Material
SPRU-RC-118	Instructions for Handling and Transfer of Liquid Nitrogen (LN2)
SPRU-RC-119	Sample Collection
SPRU-RC-120	Tennelec sample changer operations
SPRU-RC-121	Operation and Calibration of Gamma Spectroscopy Systems Using Canberra Genie 2000
SPRU-RC-122	Calibration of the Tennelec Gas Proportional Alpha Beta Systems
SPRU-RC-123	Sample Plans
SPRU-RC-125	Donning and Doffing Anti-Cs and Setting-Up Control Points
SPRU-RC-126	Daily Operational Check Instructions for the Canberra iCAM
SPRU-RC-127	Daily Operational Checks of the PCM-1B Personnel Contamination Monitor
SPRU-RC-128	ALARA Committee
SPRU-RC-129	Use and Control of Portable HEPA Ventilation Units
SPRU-RC-130	Control of and Access to High Radiation and Very High Radiation
SPRU-RC-131	HEPA Vacuum Operation Procedure
SPRU-RC-132	Data Review
SPRU-RC-133	Determining Gross Radioactivity in Water Samples
SPRU-RC-134	Calibration Checks of the Canberra iCAM

200 Series Procedures - Dosimetry

SPRU-RC-201	Personnel Direct and Indirect Bioassay Monitoring
SPRU-RC-202	Establishing and Maintaining Permanent SPRU DP Dosimetry Files
SPRU-RC-203	General Dosimetry Badge Requirements
SPRU-RC-204	Special Dose Evaluations (SDEs)
SPRU-RC-205	Radiation Dose Reporting
SPRU-RC-207	Authorization to Exceed Administrative Control Levels or DOE Dose Limits

300 Series Documents

SPRU RC 302	SPRU DP Facility - Conditions for Demolition Technical Basis Document
SPRU-RC-303	SPRU DP Facility - Decontamination Technical Basis Document

SPRU-SP - Security Procedures

SPRU-SP-001	Project Security Plan
SPRU-SP-003	Visitor and Employee Site Access
SPRU-SP-004	SPRU-SP-002, Physical Security Plan for the Lower Level Rail Bed Area (LLRB)

SPRU-TP - Transportation

SPRU-TP-001	SPRU DP Transportation Plan
SPRU-TP-002	SPRU DP Hazardous Materials Transportation Security Plan

TP 900 Series Transportation Procedures

SPRU-TP-908	Classification of Hazardous Materials for Transport
SPRU-TP-909	Packaging Hazardous Materials for Transport
SPRU-TP-910	Shipment and Receipt of Hazardous Materials
SPRU-TP-911	Packaging & Transportation Manual
SPRU-TP-912	Maintenance, Repair, and Pre-Use Inspection of Reusable Hazardous Waste Packagings

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SPRU-TP-913	Hazardous Material Shipping
SPRU-TP-914	Acquisition, Control, and Use of Hazardous Material Packagings

SPRU-TRN - Training

SPRU-TRN-001	Training Manual

TRN 100 Series Radcon Training

SPRU-TRN-101	Radiological Training Standard For RCTS and Support Personnel
SPRU-TRN-102	Radiological Controls Technician

SPRU-WM - Waste Management

SPRU-WMP-001	Waste Management Plan
SPRU-WMP-002	Waste Services Quality / Waste Certification Program
SPRU-WMP-003	Software Management Plan for Waste Services Spreadsheets and Macros
SPRU-WMP-004	URS Separations Process Research Unit Disposition Project and Energy Solutions Interface Document

WM 300 Series Field and Operating Procedures

SPRU-WM-301	Waste Services Waste Management
SPRU-WM-302	Container Handling and Inspection
SPRU-WM-303	Dewatering
SPRU-WM-304	Lab Packing Waste for Offsite Disposal
SPRU-WM-305	Waste Services Waste Verification Program
SPRU-WM-306	Maintenance, Repair, and Pre-Use Inspection of Reusable

Various WM Documents

SPRU-WM-900	RCRA Small Quantity Generators
SPRU-WM-925	Control, Handling, and Disposal of Polychlorinated Biphenyls (PCBs)
SPRU-WM-926	Temporary Storage of PCB Waste
SPRU-WM-932	Resource Conservation and Recovery Act (RCRA) Hazardous Waste 180-Day and Satellite Accumulation Areas Management for the SPRU DP Site
SPRU-WM-2002	Waste Container Labeling and Marking
SPRU-WM-4605	Requirements for Recycling and Management of Universal Waste

SPRU-WSH - Worker Safety and Health

SPRU-WSH-001	Worker Safety and Health Program

SPRU DP RECORD OF REVISION

Rev. No.	Description of Changes	Revision On Page(s)	Dated
0	Original Issue	All	05/06/11
1	Re-Issue Original with DOE comments addressed	All	05/13/11
2	a. Updated minor typos; b. Replaced Section 5.2 Table 1 with ANSI N13.1-1999 list of requirements	15-16	05/18/11
	c. Section 6.2 added reference to ANSI N13.1-1999 Table 5	18	05/18/11