Department of Energy
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MAY 20 2016

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Mr. John E. Kieling
Chief
Hazardous Waste Bureau
New Mexico Environment Department
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Santa Fe, New Mexico 87505

Subject: Submittal of Updated Reference Document Cited in the Resource Conservation and Recovery Act Facility Operating Permit for Sandia National Laboratories/New Mexico (SNL/NM), Environmental Protection Agency Identification Number NM5890110518

Dear Mr. Kieling:

The Department of Energy/National Nuclear Security Administration and Sandia Corporation are submitting the enclosed updated reference document to the New Mexico Environment Department. This submittal is required within 30 days of the effective date of the updated document, which is April 22, 2016.

This submittal is comprised of one document used by SNL/NM personnel to perform monitoring activities at the Corrective Action Management Unit; FOP 08-20, Soil Moisture Determination Utilizing Neutron Logging.

If you have questions, please contact David Rast of our staff at (505) 845-5349.

Sincerely,

James W. Todd
Assistant Manager for Engineering

Enclosure
cc: See Page 2

Submittal of Updated Reference Document Cited in the Resource Conservation and Recovery Facility Operating Permit

Sandia National Laboratories
Albuquerque, New Mexico
EPA ID No. NM5890110518

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

Michael W. Hazen, Vice President
Sandia Corporation
Albuquerque, New Mexico
Operator

2 May 2016
Date Signed

James W. Todd, Assistant Manager
U.S. Department of Energy
National Nuclear Security Administration
Sandia Field Office
Owner

20 May 2016
Date Signed

Enclosure A

Updated Reference Document Cited in the
Resource Conservation and Recovery Act Facility Operating Permit
for Sandia National Laboratories/New Mexico

FOP 08-20 Soil Moisture Determination Utilizing Neutron Logging

May 2016

Sandia National Laboratories
EPA ID No. NM5890110518

SANDIA NATIONAL LABORATORIES
ANALYTICAL SERVICES DEPARTMENT (4131)

SOIL MOISTURE DETERMINATION UTILIZING NEUTRON LOGGING

FIELD OPERATING PROCEDURE

FOP 08-20
Revision 3

Author: Robert Ziock, Project Lead — **Date:** 4/18/2016

Reviewer: Donald Schofield, Field Support Operations Team Lead — **Date:** 4/18/2016

Reviewer: John Walter, Radiological Protection — **Date:** 4/18/2016

Approved: Pamela Puissant, Manager — **Date:** 4/18/2016

Author: How frequently does this document need to be reviewed and/or revised?	Every 3 years, or when activities change.
Manager: Does this document need to be tracked?	**Yes**

EFFECTIVE DATE: 4/22/2016

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REVISION HISTORY

Revision	Effective Date	Summary of Changes
0	12/17/2008	New document.
1	2/28/2011	Training Course List Table 3.1 added. Attachment C, "Operating Manual" added. Updated Attachment I.
2	4/23/2013	Review cycle changed from 2 to 3 years. Updated to reflect the department's current formatting requirements for a FOP. Removed all "correlation drum" information. Removed the following attachments: On-the-Job Training, Authorized Users List, and CPN 503 DR Hydroprobe® Moisture gauge Operating Manual. Updates were made to the following appendices: Radiological Hazardous Materials Summary and the Neutron Probe (Source) Checklist for Shipping & Receiving.
3	4/22/2016	Updated department name. Added description of the CAMU. Removed field forms from the appendices. Created and hyperlinked forms located on the 4100 Controlled Documents website. To Section 3.0 and 12.0, added new permit reference. To Section 5.0, added reference to the safety case ALW 14-02 as well protocol for minor completing a change/deviation form. Added Section 7.5, Inspection of Monitoring Equipment and Locations. Removed Section 5.0, Data Quality Objectives and added Section 9.0, Quality Assurance. Added Section 11.0, Records. Updated Appendix D, Neutron Probe (Source) Checklist for Shipping & Receiving.

ACRONYMS AND ABBREVIATIONS

ALARA	as low as reasonably achievable
CAMU	Corrective Action Management Unit
cm	centimeter
CPN probe	CPN 503 DR Hydroprobe® Moisture Gauge
CSS	Chemical Waste Landfill sanitary sewer
EDMS	Environmental Data Management System
ES&H	Environment, Safety, and Health
FOP	field operating procedure
ft	foot (feet)
m	meter
mrem/hr	millirem per hour
OJT	on-the-job training
OSHA	Occupational Safety and Health Administration
Permit	Hazardous Waste Facility Operating Permit for Sandia National Laboratories
PHS	primary hazard screening
PSL	primary sub-liner
PVC	polyvinylchloride
RCT	Radiological Control Technician
RPPM	Radiological Protection Procedures Manual
SNL/NM	Sandia National Laboratories/New Mexico
TWD	technical work document
VCP	vitrified clay pipe

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1.0 PURPOSE, SCOPE, AND OWNERSHIP

The Corrective Action Management Unit (CAMU) consists of a containment cell and ancillary systems that occupies a 3.75-acre site located in the southeastern portion of Sandia National Laboratories/New Mexico Technical Area III. The containment cell was constructed with an engineered liner system that is used to permanently contain hazardous wastes remediated from the Chemical Waste Landfill. Monitoring requirements for the CAMU are specified in the Hazardous Waste Facility Operating Permit for Sandia National Laboratories (Permit) (NMED January 2015).

1.1 Purpose

Soil moisture monitoring requirements for the CAMU are defined in the Permit Attachment H, Section H.5 (NMED January 2015). The purpose of this field operating procedure (FOP) is to provide guidelines and procedures for use of the CPN503 DR Hydroprobe® Moisture Gauge (CPN probe) at the CAMU. The CPN probe counts neutrons that can be used to determine soil moisture content under and adjacent to the CAMU containment cell. Neutron counts are correlated to moisture values by use of a correlation formula.

1.2 Scope

This FOP is applicable to all Sandia National Laboratories employees and contractors who perform neutron logging activities at the Technical Area III CAMU containment cell using a CPN probe. The work does not require a Radiological Work Permit and it will not affect other organizations.

1.3 Ownership

The Analytical Services Department is responsible for development, approval, distribution, revision, and control of this procedure.

1.3.1 Program Description

Soil moisture monitoring is performed at the CAMU as part of Long Term Stewardship Program operations that are managed by the Analytical Services Department. The Long Term Stewardship Program's goal is the long-term protection of human health and the environment from hazards associated with former Environmental Restoration Project sites (e.g., CAMU), and minimization of Sandia's environmental liability by ensuring environmental compliance with the requirements provided in multiple New Mexico Environment Department permits.

2.0 RESPONSIBLE INDIVIDUALS AND ORGANIZATION

Responsible Organizations

The Analytical Services Department is responsible for the following:

- Completion and documentation of soil moisture monitoring as required by the Permit Attachment H, Section H.5 (NMED January 2015).
- Completion and documentation of inspections related to soil moisture monitoring equipment and locations as required by Permit Attachment E.10 (NMED January 2015).
- Performing the work in accordance with the Environment, Safety, and Health (ES&H) Radiological Protection Procedures Manual (RPPM) which implements the requirements of Corporate Procedure ESH100.2.RAD.1, Implement Radiation Protection Procedures.
- Storing and controlling access and tracking for the CPN probe.

Radiological Protection Department is responsible for providing the following:

- Providing guidance and support to Analytical Services Department personnel involving radiological materials.

The **Department Manager** is responsible for the following:

- Providing programmatic guidance leading to the development and revision of this FOP.
- Performing assessments of CAMU operations to ensure compliance to the Permit and the ES&H RPPM.
- Reviewing and recommending approval of the procedure.
- Approving an Activity Level Work Evaluation Form (EP 2009-ALW) for activities described in this FOP as required by program document PRG 15-01, *Work Planning and Control*.

The **Project Lead** (Job Coordinator equivalent in the ES&H RPPM) for vadose zone monitoring at the CAMU is responsible for the following:

- Providing overall coordination and management of the monitoring activities.
- Reviewing and reporting soil moisture data.
- Transmitting soil moisture data to the Department 4131 Database Administrator for inclusion in the Environmental Data Management System (EDMS).
- Reviewing and transmitting documentation forms to the Customer Funded Records Center and the CAMU Administrative Trailer (Building 6920E).
- Reviewing, revising, and maintaining relevant technical work documents (TWDs).
- Reviewing and recommending approval of this procedure.

The **Field Support Operations Team Lead** (Job Coordinator equivalent in the ES&H RPPM) is responsible for the following:

- Coordinating with the Project Lead and Field Technicians regarding monitoring activities.
- Supervising the Field Technicians.
- Reviewing training requirements for Field Technicians.
- Assigning qualified Field Technicians to conduct the activities described in this procedure.
- On-the-job training (OJT), as necessary, for new personnel performing field activities. Document training by completing on OJT Form (EP 2009-OJT).
- Providing Field Technicians with necessary equipment to conduct field work.
- Notifying the Project Lead of unusual field conditions, wells requiring maintenance, or breach of well security.
- Reviewing, revising, and maintaining technical work documents.

The **Field Technician** (Radiological Worker equivalent in the ES&H RPPM) is responsible for the following:

- Completing an Activity Level Work Evaluation Form (EP 2009-ALW) as required by PRG 15-01, *Work Planning and Control*.
- Performing and documenting inspections of monitoring equipment and locations.
- Operating the CPN probe to obtain soil moisture data.
- Completing and reviewing field documentation forms.
- Transmitting field documentation forms to the Project Lead.
- Informing the Field Support Operations Team Lead of monitoring locations requiring maintenance or if the monitoring location has been compromised (e.g., lock has been removed, damage to protective enclosure or casing).
- Annual calibration of the CPN probe.
- Maintaining the equipment.
- Keeping training current.
- Providing recommendations for revisions to this procedure (if necessary).

The **Radiological Control Technician** (RCT) is responsible for the following:

- Performing monthly radiation surveys of storage area for the CPN probe.
- Performing semi-annual leak surveys of the CPN probe.
- Performing shipping surveys when the CPN probe is sent to manufacturer for calibration and/or maintenance, and when it is returned to SNL/NM.
- Providing radiological protection support to the field activity in accordance with the ES&H RPPM.

The **Database Administrator** is responsible for the following:

- Importing data into EDMS.
- Maintaining the database.
- Identifying, recommending, and implementing improvements to the database.

The **Source Custodian** and **Alternate Source Custodian** responsibilities are detailed in the ES&H RPPM, Chapter 9, Control of Accountable Sealed Radioactive Sources, Source Custodian Section 9.3.3.

The **ES&H Coordinator** is responsible for assisting the staff and management in ES&H performance and compliance.

3.0 TRAINING AND MONITORING QUALIFICATIONS

Personnel conducting field activities shall complete the following:

3.1 Training

- Field personnel shall sign an Authorized Users List (EP2009-AUL) to affirm they have read and understand this document, and agree to operate within the stated constraints.
- Read SNL/NM Corporate Policy ESH100 Environment Safety & Health.
- Required department training and training identified in the primary hazard screening (PHS) results.
- Pre-job briefing required by the ES&H RPPM. (Note: Signing the Authorized Users List suffices for the pre-job briefing required by the ES&H RPPM.)
- Read *CPN 503 DR Hydroprobe® Moisture Gauge Operating Manual*.
- Read current version of PHS SNL05A01119, *CAMU Containment Cell Monitoring*.
- Read and sign PLA 04-01, *Health and Safety Plan for the Corrective Action Management Unit Containment Cell*.
- Familiarity with sections in the ES&H RPPM that pertain to sealed and controlled radioactive sources.
- OJT, as necessary, for new personnel performing existing field activities and/or for new/existing personnel performing NEW field activities. Document training by completing on OJT Form (EP 2009-OJT).
- Complete training courses listed in Table 3-1.

Table 3-1. Training Course List

Course Code	Course Title
CHM100	Chemical Safety
CHM103	Site Specific Chemical Safety
ELC105	Basic Electrical Safety (> 50 volts)
ENV100	Occupational Safety and Health Administration (OSHA) Health & Safety Basic Training - General Worker (40 HR)
ENV103	OSHA Health & Safety Training Refresher (8 HR)
ENV112	Hazardous Waste & Environmental Management Training
ESH100	ES&H Awareness
MCH200	Hand and Power Tool Safety
MED102	Standard First Aid
MED104	Heartsaver CPR
OTS101	Occupational Thermal Stress
PPE106	Personal Protective Equipment Training
RAD210	Radiological Worker I Training
RAD218	Radioactive Source Control for Source Custodians (note: Only required for source custodian.)

3.2 Monitoring

Personnel using the CPN probe are responsible for obtaining and wearing properly coded (neutron radiation) dosimeters during all operations. They are also responsible for returning the dosimeter to their Department Manager on the assigned dates.

4.0 HEALTH AND SAFETY

An activity level work evaluation has been performed on the activities described in this FOP and are detailed in safety case ALW 14-02 and associated annual reviews. The evaluation was performed in conjunction with PHS SNL05A01119. The PHS and activity level work evaluation help identify potential hazards that can be expected when performing the work. The potential hazards and their controls are detailed in plan (PLA) PLA 04-01. The control measures may include courses and training that are identified as part of the PHS results. This approach to identifying, rating, and controlling hazards is consistent with SNL's Integrated Safety Management System initiative.

In the event that minor changes/deviations in field activities need to be addressed in this FOP or minor updates to the FOP need to be added prior to the official revision/review process, the Field Technician shall discuss the change/deviation with the Field Operations Support Program Lead and submit a Minor Change/Deviation Form for Controlled Documents (EP 2009-MCD). The form is then reviewed and signed by the Field Operations Support Program Lead and the

Department Manager. The "Minor Change/Deviation to Technical Work Document" form and any possible attachments are filed with the original document, posted on the 4100 Controlled Documents website, and copies are kept with the field copy of the FOP.

4.1 Radiation Hazard

The CPN probe contains a 50.0 millicurie Am241/Be neutron source. Radiation levels provided by the manufacturer are:

30 centimeters (cm): 0.1 millirem per hour (mrem/hr) gamma, 1.8 mrem/hr neutron
Contact: 0.5 mrem/hr gamma, 1.7 mrem/hr neutron
Other: up to 30 mrem/hr neutron on contact if unshielded

Detailed ES&H RPPM requirements for use and storage of the CPN probe are listed below:

Engineering Controls: The CPN probe is locked in the ERFO2 storage shed when not in use.
Administrative Controls:
- Pre-Job Briefing shall be performed.
- TWDs (FOP and PHS).

Hold Points: None
Void Points: Contamination greater than ES&H RPPM Attachment 6-1 Radioactive Contamination Limits of 20 disintegrations per minute/100 centimeters^2 and radiation levels greater than 5 mrem/hr at 30 cm (gamma + neutron).
Alarming Equipment (or other special equipment): None
RCT Coverage: Intermittent
RCT required surveys:
- Semi-annual leak test (cycle group April and October)
- Monthly routine survey of storage area
- Transportation surveys when shipping CPN probe to manufacturer
- Job coverage surveys as needed

Source Custodian required inventory: Semi-annual (cycle group April and October)
Radiological Posting:
- Radioactive Materials Area
- Controlled Area

Frisking Requirements: None
TWD (this FOP) Sign-In Requirements: Initial

For more information on the CPN probe see Radiological Hazardous Materials Summary (Appendix A).

Extreme care shall be taken to ensure safe operation in accordance with this procedure and to keep radiation exposure as low as reasonably achievable (ALARA). If the CPN probe becomes stuck in an access tube or borehole shut down work immediately , proceed as directed in section 4.2 Work Shutdown.

4.2 Work Shutdown

In the event that work is stopped due to:

- safety-related issues,
- an injury incurred while performing the tasks identified in this procedure, or
- as the result of an audit,

the Field Technician shall immediately notify the Field Support Operations Team Lead, the Project Lead, and the Department Manager. The Field Technician shall seek the assistance of the Field Support Operations Team Lead for the mitigation of the hazard and the completion of a Work Resumption Authorization Form (EP 2009-WRA) as required by PRG 15-01, *Work Planning and Control*. The Department Manager shall sign the completed form prior to the restart of work.

In the event that work is stopped due to:

- The CPN probe becoming lodged in an access tube, call Radiation Protection and inform them of the problem. An RCT will be dispatched to the site. Do not attempt to retrieve the probe in any manner that could possibly damage the probe or expose the source.
- The CPN probe sustaining extensive damage, maintain a safe distance from the probe (10 meters [m] or 33 feet [ft]). Immediately notify Radiation Protection. An RCT will be dispatched to the site.

The Field Technician shall also immediately notify the Field Support Operations Team Lead, the Project Lead, and the Department Manager. The Field Technician shall seek the assistance of the Field Support Operations Team Lead for the mitigation of the hazard and the completion of a Work Resumption Authorization Form (EP 2009-WRA) as required by PRG 15-01, *Work Planning and Control*. The Department Manager shall sign the completed form prior to the restart of work.

5.0 EQUIPMENT AND MATERIALS

5.1 Personal Protective Equipment

Personal protective equipment includes the following:

- safety boots
- safety glasses
- leather gloves (when handling resident pull cable or CPN interface cable)

5.2 Neutron Logging Equipment and Materials

The CPN 503DR system consists of the following (see Appendix B for photos):

- CPN probe
- CPN probe shielded control box
- Interface cable (12-ft length used to connect CPN probe to shielded control box for standard count)
- CPN shipping case (made of durable plastic)
- CPN cable reel mounted in vehicle (spooled with 375 ft of CPN interface cable)
- Battery charger

Additional equipment and materials includes the following:

- Logbook
- Power source (either 12volt DC to AC vehicle power inverter mounted in vehicle or AC outlets located near sampling locations)
- Key to unlock padlock on the ERFO2 storage shed (obtain key from the Project Lead)
- Key to unlock padlocks on primary sub-liner (PSL) monitoring subsystem vitrified clay pipes (VCP) and the Chemical Waste Landfill sanitary sewer (CSS) monitoring subsystem protective casings (obtain key from Project Lead)
- PSL monitoring subsystem specific:
  - PSL Neutron Count Log Form (LTS CAMU-2015-009)
  - Aluminum centralizer
  - 1 unistrut pulley fixture
  - 1 unistrut cable guide
  - 1 cable pulling attachment
  - Two-way radios
- CSS monitoring subsystem specific:
  - CSS Neutron Count Log Form (LTS CAMU-20015-010)
  - ¾-inch ratchet and socket (to remove polyvinylchloride [PVC] cap)
  - PVC support pulley fixture (tube and pulley cap)

6.0 FIELD PROCEDURES

6.1 CPN Probe Handling Requirements

The CPN probe is stored in the ERFO2 storage shed. It can only be used with the permission of the Source Custodian. The Field Technician must complete the following information on the Sign-Out/Sign-In Form (LTS 2015-004) when using the CPN probe:

- Field Technician name
- Source Custodian contacted prior to use

- Reason for using CPN probe
- CPN probe Source ID
- Sign-out date and time
- Sign-in date and time

The probe should always remain in the shielded control box unless in use. When the probe is outside the shielded control box, use the shielding blanket to cover the probe whenever possible. The operator should minimize their time near the probe. A distance of at least 1-m (3.3-ft) should be maintained. Do not leave the probe unattended, except when it is locked in the ERFO2 storage shed. The door to ERFO2 storage shed is clearly marked with a magenta and yellow placard labeled "Caution-Radioactive Materials." The CPN shielded control box and its storage case are labeled with the appropriate radioactive material warnings. These labels must be replaced immediately if damaged, obscured, or removed. Contact Radiation Protection to assist in the replacement of signs and/or labels. Personnel not performing the monitoring, but in the immediate area, need to be notified of the radiation hazard. Only a government vehicle may be used to transport the CPN probe.

A leak test survey is performed on the probe by radiation protection personnel, semi-annually (cycle group April and October). A source inventory is performed by the Source Custodian semi-annually (cycle group April and October). Both are requirements listed in the ES&H RPPM. A notice should be issued by the Device and Source Registrar indicating when the survey and inventory are due. In addition, a Source Status Label (Appendix C) is attached to the CPN shielded control box and its storage case stating when the leak test survey and semi-annual inventory were last performed and when they need to be updated.

If the CPN probe needs to be sent to the manufacturer for calibration and/or maintenance, follow the requirements listed in the ES&H RPPM. The CAMU Neutron Probe (Source) Checklist for Shipping & Receiving is provided in Appendix D that gives detailed directions for shipping and receiving. Update the Source Status Label (Appendix C) to "Active" or "Loaned" as necessary.

6.2 Standard Count

Charge the battery in the CPN probe shielded control box prior to use. A standard count will be taken each day the CPN probe is used (see page 21 of *CPN 503 DR Hydroprobe® Moisture Gauge Operating Manual*). Take five standard counts if the CPN probe is new, has been repaired, or the probe has not been used for six months. The standard count measurement is taken with the probe in the shielded control box. Always place the probe in the same location when taking standard counts to ensure consistency.

a. Place the CPN probe storage case on a sturdy, level surface (level ground is fine) at least 3 m (10 ft) from a hydrogen source or any large vertical surface, and at least 10 m (33 ft) from any other radioactive source.
b. Place the shielded control box on top of the standard count plate (a plate on top of the probe storage case). Leave the probe in the shielded control box.

c. Connect the CPN interface cable (10 foot length) between the probe and the shielded control box.
d. Press the "CLEAR" key to display "READY."
e. Press the "STD" key to get into the standard count menu.
f. Press the "STEP" key. This will display the current standard count.
g. Press the "STEP" key. This will display the current Chi squared (χ^2) value.
h. Press the "STEP" key. This will display "New Standard?"
i. Press "Enter."
j. Step back to a safe distance of at least 3 m (10 ft).

The shielded control box will chirp. This indicates it has begun counting to determine a new standard count. The counting will continue for approximately four minutes before a new standard count value is displayed. Record this value in the logbook and continue:

k. Press the "ENTER" key. This will save the new standard count.
l. Press the "STD" key to get into the standard count menu.
m. Press the "STEP" key. This will display the new χ^2. The new standard count is good if the χ^2 is between 0.75 and 1.25. Record this value in the logbook.
If the new χ^2 is not between 0.75 and 1.75 start at step **d**. again. (Refer to the discussion on statistics and other standard count information presented in Chapter 2 of the *CPN 503 DR Hydroprobe® Moisture Gauge Operating Manual*.)
n. Press the "STEP" key. This will display the previous standard count. Record this value in the logbook.
o. Press the "CLEAR" key. This will display "READY."

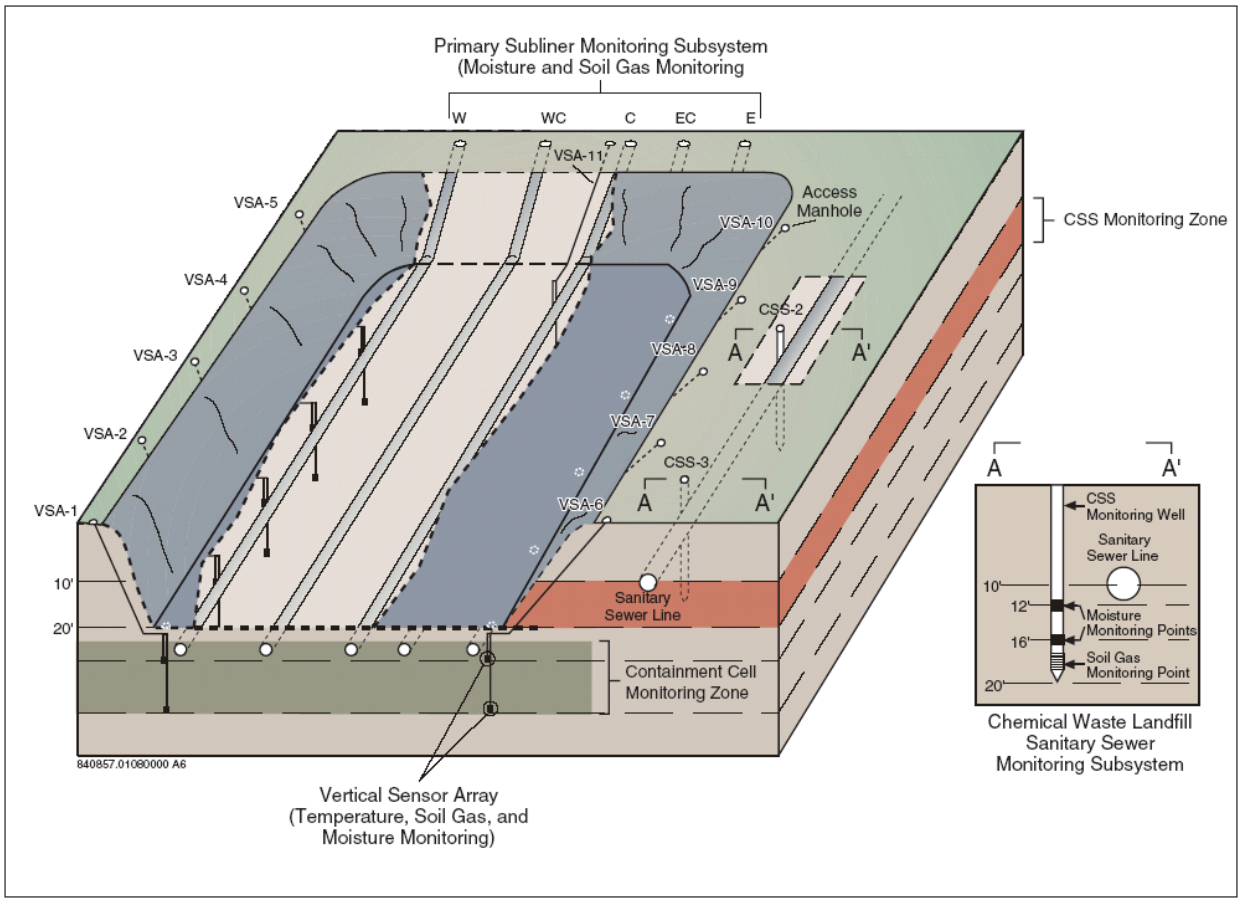
After taking the standard count verify that the sampling time is set for 64 seconds. Press the "TIME" key. If the display shows "64," press "ENTER" and the probe is ready for field measurements. If the display shows something other than "64", use the "STEP" key to scroll through the time choices until "64" is displayed. Press "ENTER," and the probe is ready for field measurements.

6.3 Neutron Logging the PSL Monitoring Subsystem VCPs

The PSL monitoring subsystem consists of five horizontal VCP runs buried in the wicking layer under the CAMU containment cell (Figure 6-1). The ends of the VCP runs are connected to 6-inch nominal PVC access pipes located on the north and south ends of the CAMU containment cell. These PVC pipes are used to access the PSL system.

Each VCP must be checked for clear passage by passing the empty aluminum centralizer through the VCP immediately prior to passing the aluminum centralizer with the CPN probe. If the empty aluminum centralizer becomes lodged in a VCP, the obstruction must be cleared prior to passing the aluminum centralizer with the CPN probe through the VCP.

Figure 6-1. Schematic of PSL and CSS Monitoring Subsystems



At the CAMU containment cell, south end:

- Position the CPN cable reel in line with the VCP access tube to be measured.
- Pull some cable from the CPN cable reel and thread it through the unistrut pulley assembly with the pulley end towards the cable reel.

The end of the CPN probe interface cable that feeds off the reel will be inserted into the aluminum centralizer.

- Loosen the three allen screws that hold the slotted end cap on the aluminum centralizer.
- Insert the end of the CPN probe interface cable through the slotted end cap.
- Reattach the slotted end cap to the aluminum centralizer and secure the three allen screws.
- Unlock the protective steel casing cap and remove the 6-inch PVC cap from the VCP access tube with the resident pull cable attached to the carabiner and PVC cap.
- Remove the resident pull cable from the carabiner and 6-inch PVC cap and attach it to the locking swivel link located on the end of the aluminum centralizer.

- Install the aluminum centralizer into the VCP access tube.
- Install the unistrut pulley assembly onto the access tube unistrut support and secure it with the locking pin.
- Notify the north end by radio that the assembly is ready to be pulled through to the north end of the access tube.

At the CAMU containment cell, north end:

- Unload the CPN probe.
- Unlock and remove the 6-inch PVC cap from the VCP access tube.
- Install the unistrut cable guide onto the unistrut support of the VCP access tube (Appendix B, photos).
- Disconnect the resident pull cable from the 6-inch PVC cap and carabiner.
- Thread the cable through the cable guide.
- Reattach the cable to the carabiner and 6-inch PVC cap.
- Notify the south end and begin pulling the cable using the cable pulling attachment.

At the CAMU containment cell, south end:

- While the aluminum centralizer and cable are being pulled through the access tube, the CPN interface cable is played out from the CPN cable reel at the south end until the aluminum centralizer and CPN interface cable emerge at the north end.

At the CAMU containment cell, north end:

- Notify the south end when the aluminum centralizer assembly arrives.
- Remove the unistrut cable guide and pull out the aluminum centralizer with about 3 ft of CPN interface cable.
- Loosen the three allen screws that hold the slotted end cap on the aluminum centralizer.
- Attach the CPN interface cable to the CPN probe.
- Remove the CPN probe from the shielded control box and insert it into the aluminum centralizer.
- Reattach the slotted end cap to the aluminum centralizer and secure the three allen screws.

With the aluminum centralizer and CPN probe situated at the proper starting point, the cable reel footage counter must be initialized to zero. There is a mark on the outside of the aluminum centralizer that indicates the end of the CPN probe. This mark must be aligned with the end of the access tube.

- Notify the south end to slowly reel in the centralizer/probe assembly until the mark aligns with the end of the access tube.
- Set the cable reel footage counter to zero.
- The south end notifies the north end that the cable reel footage counter has been zeroed.

- The north end will then reinstall the unistrut cable guide onto the access tube unistrut support.
- The CPN shielded control box is returned to the south end to be hooked up to the connector located on the hub of the cable reel.

At the CAMU containment cell, south end:

- Connect the CPN interface connector located at the hub of the cable reel to the CPN shielded control box.
- Reel in the interface cable and place the probe/centralizer at the first location to be logged indicated on the PSL Neutron Count Log Form (LTS CAMU-2015-009).
- Follow the procedures and log the neutron count at the first location. Write the value down on the PSL Neutron Count Log Form (LTS CAMU-2015-009).
- Continue to move the centralizer/probe assembly to each predetermined location in the VCP to collect neutron counts.
- When all sample data have been collected for an access tube, reel in the cable until the probe assembly is at the top of the south end of the access tube.
- Remove the unistrut pulley assembly and pull the centralizer/probe assembly from the access tube.
- Disconnect the resident pull cable from the centralizer/probe assembly and connect it to the carabiner/6-inch PVC cap.
- Place the 6-inch PVC cap on the access tube and secure.
- Close and lock the protective steel casing cap.
- Remove the CPN probe from the aluminum centralizer and place it back in the shielded CPN shielded control box.

At the CAMU containment cell, north end:

- Remove the unistrut pulley assembly from the access tube.
- Be sure the resident pull cable is attached to the 6-inch PVC end cap.
- Place the 6-inch PVC cap on the access tube and secure.
- Close and lock the protective steel casing cap.

Repeat this procedure for the remaining PSL monitoring subsystem access tubes. Appendix B provides photos of the equipment setup at a PSL monitoring subsystem location.

6.4 Neutron Logging the CSS Monitoring Subsystem Boreholes

The CSS monitoring subsystem boreholes are 20- to 21-ft long 2-inch steel pipes with screens on the bottom of each pipe. The six CSS monitoring subsystem borehole pipes are sunk into the ground, vertically, in the vicinity of the CSS (see Figure 7-1). The top 2 ft of each pipe that protrudes above the ground is protected by a 12-inch well casing with a locking lid.

At the CSS monitoring subsystem well:

- Position the CPN cable reel in line with the borehole to be measured.
- Unlock the protective steel casing cap.
- Remove screw-on-PVC cap. Use the ¾-inch ratchet and socket if necessary.
- Place the PVC support tube (with holes facing the cable reel) over the borehole 2-inch pipe.
- Connect the interface cable connector at the hub of the CPN cable reel to the CPN shielded control box.
- Pull some cable from the CPN cable reel and thread it through the pulley cap.
- Attach the CPN interface cable to the CPN probe.
- Remove the CPN probe from the shielded control box and insert it into the PVC support tube.
- Place the pulley cap on the PVC support tube.
- Feed the CPN interface cable off the reel to lower the CPN probe until it is at the bottom of the CSS monitoring subsystem borehole.
- Take up the cable slack with the CPN probe just touching the bottom of the borehole. Set the cable footage counter on the cable reel to zero feet and inches.
- Use the handle on the cable reel to raise the CPN probe to each of the two predetermined sample locations indicated on the CSS Neutron Count Log Form (LTS CAMU-2015-010). Take readings at each location by pressing START and record the neutron count values on the CSS Neutron Count Log Form (LTS CAMU-2015-010).
- Use the cable reel to raise the CPN probe up into the PVC tube. View the CPN probe entering the PVC tube through the holes in the PVC tube.
- Remove the pulley cap from the PVC tube.
- Remove the CPN probe from the PVC tube and place it in the shielded control box.
- If another borehole is to be logged, the cables may be left connected while moving to the next location.

Repeat the procedures outline above at the next borehole location. Appendix B provides photos of the equipment setup at a borehole location.

6.5 Inspection of Monitoring Equipment and Locations

Inspection of the monitoring equipment and locations shall be performed at time of the monitoring event. Inspections shall be document on the following forms:

- CAMU Post-Closure Quarterly Inspection Form – VZMS CSS Soil Moisture/Soil Gas Monitoring Locations & Equipment (LTS CAMU-2015-001). .

- CAMU Post-Closure Quarterly Inspection Form – VZMS PSL Soil Moisture Monitoring Locations & Equipment (LTS CAMU-2015-003).

7.0 WASTE MANAGEMENT

No waste is generated from neutron logging and inspection activities.

8.0 QUALITY ASSURANCE

Quality assurance objectives for soil moisture determination at the CAMU includes conforming to the sampling and analysis plans for the PSL and CSS monitoring system detailed in Sections H.6 and H.8 of the Permit; and conforming to the standardized monitoring procedures outline in this FOP.

9.0 DATA MANAGEMENT

9.1 Data Collection Locations and Frequency

CSS monitoring subsystem

The CSS monitoring subsystem is comprised of six borehole locations (CSS-1 through CSS-6). Data is collected from two monitoring depths at each of the six locations. See CSS Neutron Count Log Form (LTS CAMU-2015-010) for details. Data is collected quarterly (every three months).

PSL monitoring subsystem

The PSL monitoring subsystem is comprised of five VCP locations with the number of monitoring points at each location in parentheses: West (34), West-Central (35), Central (35), East-Central (35), and East (34). See PSL Neutron Count Log Form (LTS CAMU-2015-009) for details. Data is collected quarterly.

9.2 Data Submittal Process

The steps of the data flow process and the personnel associated with each step are defined below.

Field Technician

1. As the neutron count data is collected and recorded on the field forms, it is compared to the previous quarter monitoring result values to see if there are any anomalies.
2. Anomalies are noted and the field forms are submitted to the Project Lead.

Project Lead

1. The Project Lead enters the neutron count data into a Microsoft® Visual Fox Pro program and verifies the entries. The program performs the following functions:
   a. It converts neutron count data to soil moisture (percent mass) by using a previously determined correlation equation.
   b. It converts the data into an EDMS file format. This file format allows the data to be readily downloaded into the EDMS database.
2. The EDMS formatted file is e-mailed to the Database Administrator.

Database Administrator

The Database Administrator imports the data file received from the Project Lead into EDMS.

10.0 RECORDS

Field documentation data records shall be processed according to the Permit which includes maintaining a facility operating record. Field documentation data records shall also be maintained at the SNL/NM Records Center.

11.0 REFERENCES

New Mexico Environment Department (NMED), January 2015. Resource Conservation and Recovery Act Facility Operating Permit, EPA ID No. NM5890110518, to the U.S. Department of Energy/Sandia Corporation, for the Sandia National Laboratories Hazardous and Mixed Waste Treatment and Storage Units and Post-Closure Care of the Corrective Action Management Unit," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, January 26, 2015.

InstroTek, Inc. (formerly CPN Company). CPN 503 DR Hydroprobe® Moisture Gauge Operating Manual, 4057 Port Chicago Hwy STE 100, Concord, California. http://instrotek.com/

Sandia National Laboratories, "Health and Safety Plan for the Corrective Action Management Unit (CAMU) Containment Cell," PLA 04-01 (current version), Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, Corporate Policy ESH100 Environment Safety & Health (current version), Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, "Work Planning and Control," PRG 15-01 (current version), Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, MN471016, Radiological Protection Procedures Manual (current version), Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories Primary Hazard Screening, SNL05A01119 (current version), "CAMU Containment Cell Monitoring," Sandia National Laboratories, Albuquerque, New Mexico.

APPENDIX A
Radiological Hazardous Materials Summary

RADIOLOGICAL HAZARDOUS MATERIALS SUMMARY

General Information

Type of device:	– Neutron Moisture Probe
Manufacturer:	– CPN International, Inc.
Model Number:	– CPN 503DR
Serial Number:	– #H30039459 (primary instrument), #H300605758 (backup instrument)
Operating parameters:	– 6.5 mA Average 1.85 gigabecquerel (50 millicurie) Americium-241:Beryllium
Type of radiation:	– Gamma, Neutron
Sandia Device and Source Registrar ID#:	– RS00661 (primary instrument), RS02625 (backup instrument)
Location of device:	– TA-III, ERFO2 storage shed

The manufacturer's encapsulation of the source is a double sealed capsule CPN-131.
The manufacturer's shielding of the source is provided by silicon-base paraffin.

Source Custodian: Robert Ziock, Dept. 4131, 845-0485
Alternate Custodian: none

Radiation Levels (provided by manufacturer)

30 cm: 0.1 mrem/hr gamma, 1.8 mrem/hr neutron
Contact: 0.5 mrem/hr gamma, 1.7 mrem/hr neutron
Other: up to 30 mrem/hr neutron on contact if unshielded

Dosimetry

A TLD with a neutron code of 20 is required for personnel operating the CPN probe.

Training and Technical Work Documents

Operators of the CPN probe shall complete the following training:

- Field personnel shall sign an Authorized Users List (EP2009-AUL) to affirm they have read and understand this document, and agree to operate within the stated constraints.
- OJT as necessary, for new personnel performing field activities. Document training by completing on OJT Form (EP 2009-OJT).
- Read *CPN 503 DR Hydroprobe® Moisture Gauge Operating Manual*.
- OSHA 40-hr Hazardous Waste Operations Training.
- OSHA 8-hr Hazardous Waste Operations Training Refresher

RADIOLOGICAL HAZARDOUS MATERIALS SUMMARY (continued)

- Read PHS SNL05A01119, *CAMU Containment Cell Monitoring*.
- RAD210 Radiological Worker 1.
- Familiarity with sections in the ES&H RPPM that pertain to sealed and controlled radioactive sources.
- Read and sign PLA 04-01, *Health and Safety Plan for the Corrective Action Management Unit Containment Cell*.

ALARA protocol will be performed by the field personnel when using this instrument.

Postings

Postings at storage location include: "Controlled Area" and "Radioactive Materials"

Users of the instrument will be responsible for administrative controls while the probe is in use or transport.

Surveys & Inventory

A leak survey shall be performed on the CPN probe semi-annually (cycle group April and October) by an RCT.

A leak test survey shall also be performed on the CPN probe prior to transportation by the Packaging and Transportation group from the ERFO2 storage shed. This will occur only when the CPN probe is sent to the manufacturer for calibration/maintenance. Upon return to the ERFO2 storage shed from the manufacturer and prior to use of the CPN probe by a Field Technician, an additional leak test survey must be performed.

Note: Anytime the CPN probe is shipped to the manufacturer, the status of the source must be change from "**Active**" to "**Loaned**" status prior to movement from the ERFO2 storage shed. This is done by completing a Radioactive Source Change Form (SF 2001-RS) and providing it to the administrator of the Device and Radioactive Source Tracking System (DARTS) at devsrc@sandia.gov. Upon return from the manufacturer and prior to use of the CPN probe by a Field Technician, the status of the source must be changed back to "**Active**" status by completing another SF 2001-RS form and providing it to the DARTS administrator.

Monthly routine surveys of the ERFO2 storage shed are performed by an RCT.

Inventory of the CPN probe is performed semi-annually (cycle group April and October) by the Source Custodian.

RADIOLOGICAL HAZARDOUS MATERIALS SUMMARY: (concluded)

Transport

- Only within TA-III by authorized field personnel. Any other transportation will be done by the Packaging and Transportation group.
- Instrument will be transported in the manufacturer's hard shell suitcase. The suitcase will be secured in the vehicle using tie-downs.
- A "Caution Radioactive Material" label must be affixed to the outside of the suitcase.
- If the CPN probe is used in the field for more than five days (without daily storage in the ERFO2 storage shed) or is transferred off-site, update the source location in the Radiation Protection Source Database.

Operational As Low As Reasonably Achievable (ALARA) Screen

The Operational ALARA Screen shall be performed by evaluating the following conditions. If any of the conditions apply to the radiological work an Operational ALARA Review shall be performed. [10 Code of Federal Regulations 835.1003(b)]

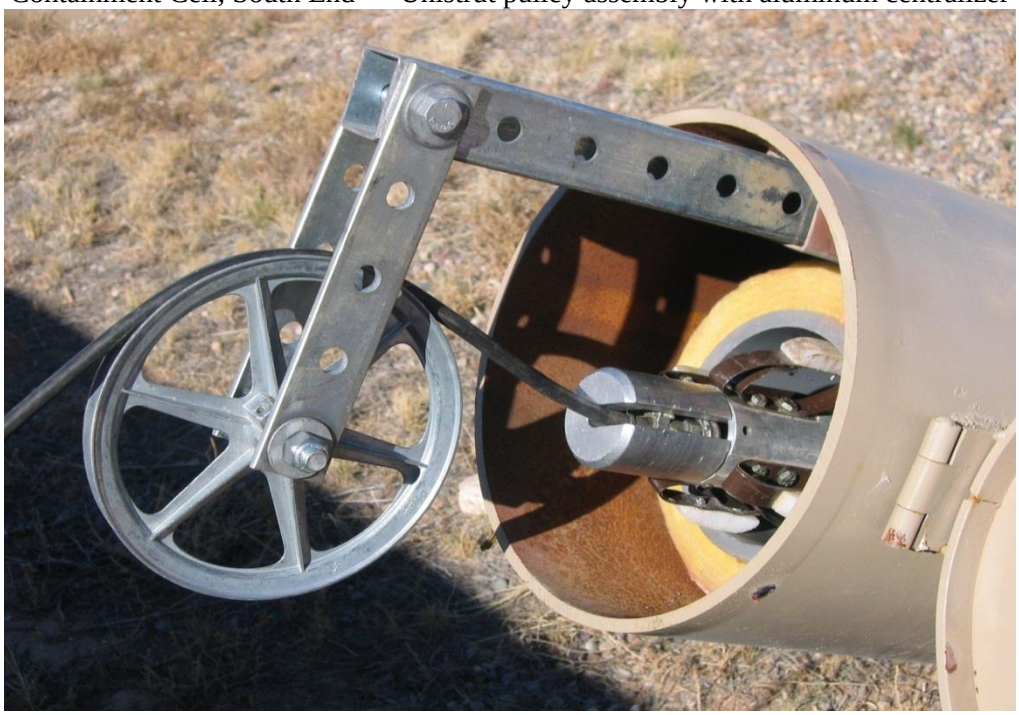
- Will the highest individual dose of >100 mrem total effective dose be expected to complete the work? No.
- Will the collective dose of >500 person-mrem total effective dose be expected to complete the work? No.
- Will airborne radioactivity in the accessible work area be expected to routinely meet or exceed the criteria for an airborne radioactivity area? No airborne radioactivity.
- Will removable contamination in the accessible work area be expected to routinely meet or exceed the criteria for a high contamination area? No removable contamination.
- Will hot particles be expected in the accessible work area? No hot particles.
- Will general area dose rates in the accessible work area be expected to routinely meet or exceed the criteria for a high or very high radiation area? No.
- Are dose rates of >50 µrem/hr expected in occupied areas for a period >1 week? No.

An Operational ALARA Review is not required based on the answers to the above questions.

APPENDIX B
Equipment Setup Photos and Diagrams

PSL Setup

Containment Cell, South End — Unistrut pulley assembly with aluminum centralizer



Containment Cell, North End — Unistrut cable guide with 6” PVC cap

CSS Setup

Equipment setup at CSS monitoring location

Cable reel used for PSL, CSS, and Correlation Drums

CPN probe/shielded control box and instrument case (probe contained in shielding)

CPN probe/shielded control box and instrument case (probe removed from shielding)

APPENDIX C
Source Status Label

Source Status Label

Example:

Source ID #: RS00661
Status: ACTIVE
Leak Test last performed: 4/11/05
Leak Test due by: 10/11/05
Semi-Annual Inventory Performed: 4/27/05
Semi-Annual Inventory due by: 10/27/05

Replace with "LOANED" status tag if the unit is sent in for calibration/maintenance. Upon return, immediately have a leak test survey performed to upgrade the status to "ACTIVE" and indicate status on a new tag. Notify Device & Source Registrar of any status or storage changes: 844-3415

IMPORTANT NOTICE: A printed copy of this document may not be the document currently in effect. The official version is located on the Sandia Restricted Network (SRN), 4100 Controlled Documents home page.

APPENDIX D
Neutron Probe (Source) Checklist for Shipping and Receiving

Neutron Probe (Source) Checklist for Shipping & Receiving
(To be completed by Source Custodian only)

Indicate Source Registrar ID # of neutron probe instrument to be shipped to manufacturer for calibration and/or repairs:

☐ RS00661 ☐ RS02625

Current status of the source indicated on instrument and instrument storage case label. (It should indicate that the source is "Active")

☐ Active ☐ Loaned

Notify a Radiological Control Technician (RCT) that the instrument will be sent offsite (to the manufacturer) for calibration and/or repairs and request a "Movement" and "Shipping" survey.

☐ RCT notified.

☐ RCT performed "Movement" and "Shipping" survey.

☐ RCT informed shipper of the "Movement" and "Shipping".

Request a change of status from "**Active**" source to "**Loaned**" status prior to movement from the ERFO2 storage shed. This is done by completing a Radioactive Source Change Form (SF 2001-RS) and providing it to the administrator of the Device and Radioactive Source Tracking System (DARTS) at devsrc@sandia.gov.

☐ Sent completed SF 2001-RS to DARTS administrator at devsrc@sandia.gov.

☐ Printed all e-mails to and from the DARTS administrator. Keep with instrument's records.

☐ Replace tag on the instrument and the instrument storage case indicating the status has been changed from "**Active**" to "**Loaned**."

☐ Removed nickel-cadmium batteries from instrument prior to shipping.

Complete shipping documentation (SHIPPER form) located at the following web address:

http://cfo.sandia.gov/logistics/Shipping/Page1WSF.htm

Neutron Probe (Source) Checklist for Shipping & Receiving (continued)

Attach all relevant documents electronically to the SHIPPER form as instructed. This includes:

- ☐ The "Information of Hazardous Material Shipments" form (provided on the SHIPPER website). Indicate on appropriate line the material to be shipped is CLASS 7-RADIOACTIVE MATERIALS.
- ☐ The "Movement" and "Shipping" survey that was performed by the RCT.
- ☐ The most recent "SPECIAL FORM" provided by the manufacturer (see SPECIAL FORM attached to this checklist).
- ☐ Copy of letter from the National Nuclear Security Administration Sandia Site Office to SNL Radiation Protection "Exemption of Department of Energy and its Prime Contractors from Nuclear Regulatory Commission Licensing Requirements" (see letter attached to this checklist).
- ☐ Copy of U.S. Department of Transportation (Pipeline and Hazardous Materials Safety Administration) International Certificate of Competent Authority Special Form Radioactive Materials Certificate USA/0632/S-96 (see certificate attached to this checklist).
- ☐ Copy of Radioactive Material License Number 1100-07 (see license attached to this checklist.
- ☐ A statement in the form of an e-mail from a Nuclear Criticality Safety Engineer (NCSE) that certifies the material remains below the DeMinimis requirements (see e-mail attached to this checklist).
- ☐ Print a hardcopy of all the forms and keep with instrument's records.
- ☐ Submit the SHIPPER form and all attachments.

A Customer Service Request (CSR) Form must be completed after the Shipper is submitted. The CSR Form can be accessed at: https://arsprod.sandia.gov/Logistics/LogisticsNM.jsp

- ☐ CSR Form completed and submitted.
- ☐ Instrument was picked up by shippers for delivery to the manufacturer. Source Custodian signed shipping form indicating instrument pickup.

The following will be completed upon return of the instrument to Sandia National Laboratories:

- ☐ The Source Custodian was notified that the instrument has been returned from the manufacturer and a delivery to the Source Custodian is arranged.
- ☐ Source Custodian signed for instrument and returned it to the ERFO2 storage shed.

Neutron Probe (Source) Checklist for Shipping & Receiving (concluded)

☐ Shipping papers were filed with the instrument's records.

Upon return from the manufacturer and prior to use of the CPN probe by a Field Technician, the status of the source must be changed back to "**Active**" status by completing another SF 2001-RS form and providing it to the DARTS administrator.

☐ Source Custodian immediately notifies the "Device Source Registrar" via e-mail that the instrument has been returned from the manufacturer to regular storage location at TA-III, ERFO2 storage shed.

☐ Source Custodian schedules leak test with an RCT.
Date leak test performed.

☐ Source Custodian e-mails "Device Source Registrar" a copy of the leak test results and request a "**Change of Status**" from "**Loaned**" source to "**Active**" if the leak test indicates that the source is intact.

☐ Print a hardcopy of all e-mails to and from the "Device and Source Registrar" and keep with instrument's records.

☐ Replace tag on the instrument and the instrument storage case indicating the status has been changed from "**Loan**" to "**Active**."

SPECIAL FORM

49CFR 173.476 **Approval of special form radioactive materials.**

(a) Each offeror of special form Class 7 (radioactive) materials shall maintain on file for at least one year after the latest shipment, and provide to the Associate Administrator on request, a complete safety analysis, including documentation of any tests, demonstrating that the special form material meets the requirements of Paragraph 173.469. An IAEA Certificate of Competent Authority issued for the special form material may be used to satisfy this requirement.

49CFR173.469 **Tests for special form radioactive materials**

(1) Impact Test	Free fall of capsule from a height of 9 meters onto a granite block of smooth surface. No shattering or breaking observed.
(2)Percussion Test	Capsule placed on a ¼" sheet of lead on concrete. Steel rod 25 mm in diameter by 330 mm long was dropped from a height of one meter. No shattering or breaking observed.
(3) Bending Test	Not applicable due to small length.
(4) Heat Test	Capsule heated to 800°C (1472°F) with a torch. Maintained for 10 minutes and allowed to air cool. Discoloration, but no melting or dispersement observed.

Leakage test performed after each test. No activity in excess of .005 microcuries (185 Bq) observed.

The radioactive material encapsulated in CPN International, Inc. stainless steel sealed source capsule, identified as model number **CPN-131,** has been tested for and is in compliance with the requirements for special radioactive material. IAEA Certificates of Competent Authority have been issued as follows:

CPN GAUGES	ACTIVITY & NUCLIDE	IAEA NO.
MC-1,2,3 & 501/DR	10 mCi Cs-137 and 50 mCi Am-241/Be	USA/0634/S and USA/0627/S
503/DR, MCM-2, MC-M	50 mCi Am-241/Be	USA/0627/S
MC-S-24	10 mCi Cs-137 and 50 mCi Am-241/Be	USA/0634/S and USA/0627/S
AC-2/R	100 mCi Am-241/Be	USA/0627/S

CPN International, Inc.
2830 Howe Road
Martinez, CA 94553
Phone: (925) 228-9770
Fax: (925) 228-3181

Douglas Carter
Radiation Safety Officer

September 8, 2003

A:RSO.spclform.doc

National Nuclear Security Administration
Sandia Site Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

NOV 2 8 2007

Mr. Brad Elkins
Manager Radiation Protection
Sandia National Laboratories, Org. 10328
P.O. Box 5800, MS-1103
Albuquerque, New Mexico 87185

Subject: Exemption of Department of Energy (DOE) and its Prime Contractors from Nuclear Regulatory Commission (NRC) Licensing Requirements

Dear Mr. Elkins:

The Atomic Energy Act of 1954, as amended, exempts the DOE and its prime contractors from the NRC licensing requirements. Accordingly, 10 CFR 30.11, 30.41, 40.14, 40.51, 70.11 and 70.42 provide for the lawful receipt by DOE and its prime contractors of by-product, source, and/or special nuclear material from an NRC licensee consistent with the applicable DOE-approved 10 CFR 835 Radiation Protection Plan. Sandia Corporation, which manages and operates Sandia National Laboratories under a prime contract with the DOE, is therefore authorized to receive all present and future shipments of such material. Please note that this memorandum addresses materials only and does not address or authorize the receipt of wastes containing by-product, source, and/or special nuclear material.

If you have any questions regarding this memorandum, please contact Donald Brady of my staff at (505) 845-6164.

Sincerely,

Daniel Pellegrino
Assistant Manager
Environment, Safety, Health & Quality Assurance

Enclosure

cc:
A. Blumberg, SNL/NM, Org. 11100, MS-0141

U.S. Department of Transportation

Pipeline and Hazardous Materials Safety Administration

East Building, PHH-23
1200 New Jersey Avenue SE
Washington, D.C. 20590

IAEA CERTIFICATE OF COMPETENT AUTHORITY
SPECIAL FORM RADIOACTIVE MATERIALS
CERTIFICATE USA/0632/S-96, REVISION 5

This certifies that the sources described have been demonstrated to meet the regulatory requirements for special form radioactive material as prescribed in the regulations of the International Atomic Energy Agency[1] and the United States of America[2] for the transport of radioactive material.

1. Source Identification - QSA Global, Inc. Model Nos. AX1, X.1, and X.1/2 (All models manufactured on or after May 17, 1977).

2. Source Description - Cylindrical double encapsulations made of stainless steel and tungsten inert gas or laser seal welded. Approximate outer dimensions of all models are 7.9 mm (0.31 in.) in diameter and 10.15 mm (0.4 in.) in length. Construction shall be in accordance with attached AEA Technology QSA, Inc. Drawing No. RBA10880, Rev. E.

3. Radioactive Contents - No more than either 3.7 GBq (100.0 mCi) of Americium-241 or 13.0 GBq (351.0 mCi) of Californium-252. The Am-241 is in oxide form and mixed with beryllium powder and pressed into a solid pellet. The Cf-252 is in the form of a metal wire or an oxide solid ceramic.

4. Quality Assurance - Records of Quality Assurance activities required by Paragraph 310 of the IAEA regulations[1] shall be maintained and made available to the authorized officials for at least three years after the last shipment authorized by this certificate. Consignors in the United States exporting shipments under this certificate shall satisfy the applicable requirements of Subpart H of 10 CFR 71.

5. Expiration Date - This certificate expires on March 31, 2013.

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[1] "Regulations for the Safe Transport of Radioactive Material, 1996 Edition (Revised), No. TS-R-1 (ST-1, Revised)," published by the International Atomic Energy Agency(IAEA), Vienna, Austria.

[2] Title 49, Code of Federal Regulations, Parts 100-199, United States of America.

(- 2 -)

CERTIFICATE USA/0632/S-96, REVISION 5

This certificate is issued in accordance with paragraph 804 of the IAEA Regulations and Section 173.476 of Title 49 of the Code of Federal Regulations, in response to the February 29, 2008 petition by QSA Global, Inc., Burlington, MA, and in consideration of other information on file in this Office.

Certified By:

Mar 13 2008
(DATE)

Robert A. Richard
Deputy Associate Administrator for Hazardous Materials Safety

Revision 5 - Issued to extend the expiration date.

From: Schwers, Norman F
Sent: Thursday, October 28, 2010 3:38 PM
To: Ziock, Robert
Cc: Colborg, Shawn P; Spangler, Richie
Subject: FW: De Minimis quantity

Robert,

Based on our conversation, you would like to ship this same item /material to the manufacturer for calibration.
Based on the material type and quantity remaining the same as the previous analysis, the material remains below the DeMinimis requirements.
No NCS controls are required for this material.
I have included Shawn and Richie on this email since I assume that it will pass through 957.
Please pass this along to any of the shipping and packaging personnel or transportation personnel that may need this review.
If you have any questions about this review, please contact me.

Norm Schwers
NCSE
nfschwe@sandia.gov
845-3346

From: Schwers, Norman F
Sent: Tuesday, January 27, 2009 10:39 AM
To: Ziock, Robert; Archibeque, Edward A; Garcia, Andy J; Kidd, Carter R; Gabaldon, Glen G
Subject: De Minimis quantity

Robert,

I just received you call for the Am-241 shipment.
According to your call, the material is 1.85GBq (1.85E9 Bq) and the SNL De Minimus limit is 1.27E12 Bq.
This is less then the de Minimis quantity and can be stored in 957c with no Nuclear Criticality Safety controls required.
I am not sure who you will be working with in transportation or at 957c, so I included a few of the personnel that I know.
If you have any questions, just let me know.
Thanks
Norm Schwers
845-3346