TO: NRC DCC

VERMONT YANKEE CONTROLLED DOCUMENT TRANSMITTAL FORM

SECTION 1

DOCUMENT TITLE: IMPLEMENTING PROCEDURES TO THE E-PLAN

COPY NUMBER: 54

CHANGE NUMBER: #191

ISSUE DATE: March 12, 2001

INSTRUCTIONS:

a. Attached is an authorized controlled copy to the above listed document for retention as your assigned copy.

b. Review the revised material.

c. Incorporate new change into the controlled document by document issue date, if applicable.

d. Ensure that those who use the document are aware of the change.

e. Destroy all superseded pages.

f. Destroy obsolete forms and insert new forms into the files.

g. Sign and date this form and return to the Executive Secretary (ES) or Document Control Center (DCC).

h. Complete appropriate change information on VY Controlled Document Record of Changes.

TRANSMITTED BY: Diane Malone
ES or DCC Signature

AFTER COMPLYING WITH THE ABOVE INSTRUCTIONS, PLEASE RETURN TO THE ES OR DCC WITHIN 10 DAYS OF THE ISSUE DATE.

SECTION 2

The undersigned acknowledges completion of the preceding instructions.

Signature of Recipient: _____ Date: _____

A045

Eplan Implementing Plant Procedures

To: Eplan Implementing Procedure Controlled Set Holders

From: Diane McCue

Date: 03/12/01

Re: VY Eplan Implementing Procedure Change #191, Instruction Sheet

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A complete Index is provided.

REVISIONS: Please replace the following procedures: -

Proc/Rev #	**Procedure Title**
OP 3534/3	Post Accident Sampling of Plant Stack Gaseous Releases

LPC's: The fol.lowing LPC should be incorporated into the appropriate procedures:

Proc/Rev #	**LPC #**	**Procedure Title**
OP 3507/29	1	Emergency Rad Exposure Control

FYI - New 3-ring binders for both EPlan and EPIPs will be distributed over the next week.

VERMONT YANKEE EMERGENCY PLAN IMPLEMENTING PROCEDURES

TABLE OF CONTENTS

March 15, 2001

VERMONT YANKEE NUCLEAR POWER STATION

OPERATING PROCEDURE

OP 3534

REVISION 3

POST ACCIDENT SAMPLING OF PLANT STACK GASEOUS RELEASES

USE CLASSIFICATION: **CONTINUOUS**

LPC No.	Effective Date	Affected Pages

Implementation Statement: N/A

Issue Date: 03/15/2001

TABLE OF CONTENTS

PURPOSE

To outline the special procedures necessary to collect samples of plant vent stack gaseous releases, perform analyses and interpret results during post accident conditions.

No Technical Specifications Sections apply to this procedure.

DISCUSSION

Plant vent stack gaseous effluents are sampled and analyzed to determine actual release mixtures and concentrations of radioactive materials being discharged to the environment during accident conditions. This information is then utilized to determine dose impact to the public.

During post accident conditions, system samples may be highly radioactive. Because of the high radiation levels, these samples require special handling. This procedure outlines the special handling required. The Chemistry Manager is responsible for implementation of this procedure.

During certain postulated accidents, the availability of on-site counting equipment may be compromised. In these instances, post accident samples may be counted at laboratories at Yankee Atomic in Rowe, Massachusetts or Maine Yankee in Wiscasset. A determination will be made by the Operations Support Center Coordinator's Assistant, in conjunction with the Radiological Assistant at the Emergency Operations Facility/Recovery Center, as to the most appropriate alternative laboratory facility to be used, based on existing conditions.

Table 1 is provided for use by the OSC Coordinator's Assistant and the sampling and analysis teams in their evaluation of sampling conditions prior to obtaining the isotopic results after analysis. The information contained in this table is generated from design basis accident assumptions and this fact should be taken into account in the use of this table.

VYOPF 3534.02, Sample Accountability Log shall be utilized to track the location of emergency samples collected in accordance with this procedure. Stack sampling kit inventory is controlled by OP 3506, Emergency Equipment Readiness Check.

ATTACHMENTS

1.	VYOPF 3534.01	Post Accident Stack Sampling
2.	VYOPF 3534.02	Stack Sample Accountability Log
3.	Appendix A	Deleted
4.	Table 1	VY - Dose Rates (R/hr) at Different Sampling Stations at Different Times After Shutdown[c]

REFERENCES

1. Technical Specifications

   a. None

2. Administrative Limits

   a. None

3. Other

   a. "Assessment of the Vermont Yankee High-Range Particulate and Iodine Stack Monitor" Rev. 1, Science Applications International Corporation, Rockville, Md. dated December 7, 1984 (iodine plate-out factor)
   b. NUREG 0737, Sec. II.B.3
   c. OP 0642, Sample Valve Lineup and Control
   d. OP 2611, Stack Effluent Sampling and Analysis
   e. DP 2630, Analytical Instrumentation
   f. DP 2631, Radiochemical Instrumentation
   g. OP 3506, Emergency Equipment Readiness Check
   h. OP 3510, Off-Site and Site Boundary Monitoring
   i. OP 3536, In-Plant Air Sample Analysis with Abnormal Conditions
   j. AP 6807, Collection, Temporary Storage and Retrieval of QA Records

PRECAUTIONS

1. During sampling, communications should be maintained using either a portable radio or a Gai-Tronics.

2. High levels of Kr^{88} may cause an interference with I^{131} identification. If this is suspected, purge sample if possible or count sample again at a later time.

PREREQUISITES

1. Post accident sampling equipment and tools (kit in Chemistry Lab).

2. Copy of OP 2611, Stack Effluent Sampling and Analysis (from Chemistry file).

3. Stack PASS valves lined up according to OP 0642, Sample Valve Lineup and Control (18 month Surveillance requirement).

4. Take a dose rate meter.

5. Evaluate whether or not respiratory protection should be worn during sampling.

6. Evaluate with RP whether or not extremity dosimetry and high range pocket dosimeters should be worn during sampling.

7. Dose commitment limits have been established and should be adhered to for all Post Accident Sampling. Consult with the OSC Coordinator for specific instructions. Table 1 should be consulted by the OSC Coordinator and sample team members for information concerning expected dose rates.

PROCEDURE

A. Low Dose Rate Stack Iodine/Particulate and Gas Sampling (Utilize VYOPF 2611.032 and 2611.04 to record all data)

1. If dose rates permit, (<1 R/hr at Stack Victoreen Room door or dose commitment has been established) the samples will be taken the same as the routine stack iodine/particulate and gaseous grab samples utilizing OP 2611, VYOPF 2611.03 and 2611.04 except as specified below, otherwise proceed to Section B.

a. No background determination will be made during post accident sampling.

b. A dose rate will be determined on the gas grab container and filter holder prior to removal of the samples. A dose commitment (review Table 1) will be established by the OSC Coordinator for this sample prior to the sample being removed. The dose rate will be used to determine that the dose commitment will not be exceeded. If it appears from the dose rate survey that the dose commitment will be exceeded, the sample should not be taken until the need for the sample is re-evaluated.

c. A vehicle should be used to transport the samples from the stack to the point of analysis to maximize the distance between the sample and the person doing the sampling and to minimize the transport time. A shield may be used to minimize the exposure rate during transportation (e.g., concrete blocks or lead blankets etc., in car trunk).

d. If the Main Chemistry Lab and Counting Room are accessible, the sample will be taken to the Main Chemistry Lab and placed in an isolated area.

e. The noble gases should be purged from the charcoal cartridge prior to counting using plant air, bottled air or nitrogen. A purge rate and duration should be utilized to approximately equal 1 cfm for 10 minutes.

f. Prepare and count samples per OP 0631 (dead time limit $<20\%$) or Section E (High Activity...) as applicable based on dead time:

> **NOTE**
>
> Obtain sample time and volume (cc) from VYOPF 2611.04 for respective samples.

1) Separate the particulate and cartridge filters.

2) Wrap samples to secure activity.

3) Count particulate filter 500 seconds (minimum) as "General" isotopic to obtain results as μCi/cc.

4) Count the cartridge 250 seconds (minimum) per side as "General" isotopic to obtain results as μCi/cc.

5) Count the gas grab sample 500 seconds (minimum) as "General" isotopic to obtain results as μCi/cc.

g. If the Chemistry Lab and Counting Room are not accessible, the charcoal cartridge can be purged as in Step e. above and counted using an RM-14 as in OP 3510, a SAM-2 (outlined in Section D) or transported to an off-site multi-channel analyzer for analysis. The particulate filter can be counted this way also but need not be purged prior to counting.

INITIALS

h. Report all results as μCi/cc to the OSC Coordinator. _____

i. Log all samples on VYOPF 3534.02 for accountability. _____

B. High Dose Rate Post Accident Iodine/Particulate Sampling using a Silver Zeolite Cartridge at the Stack Post-Accident Sampling Panel

> **NOTE**
>
> Continuous sampling can be established by replacing the cartridge/filter assembly at periodic time intervals. This practice will be initiated and terminated at the request of the PED or TSC Coordinator in consultation with the Chemistry Manager or RP Manager.

1. A dose commitment has been established prior to the sample being drawn.

_____

2. Notify the OSC of intent to sample. _____

CAUTION

If sample dose rates are greater than 1 R/hr, consider using the lead shielded pig.

3. If required, obtain lead shielded pig for transportation, a loaded filter holder, tongs, and evacuated 14 ml vial. Shield pig is in room west of stack base.

_____

4. Obtain vehicle and portable radio, then proceed to stack base (vehicle not necessary if pig is not required).

_____

NOTE

A gas sample may be obtained while drawing an iodine sample, however, the rotometer flow rate may need to be adjusted.

5. Align the 3-way sample valve to allow through flow with the needle isolated. (SRS-2 at T) _____

6. OPEN filter outlet (SRS-24) valve. _____

7. Ensure bypass valve (SRS-25) is CLOSED. _____

8. Note time and start pump by turning switch ON. _____

CAUTION

Dose rates will increase when flow is established. Do not exceed established dose commitment. If it appears that dose commitment will be exceeded, notify OSC Coordinator for further instructions.

NOTE

A gas sample may be obtained while drawing an iodine sample, however, the rotometer flow rate may need to be adjusted.

9. Adjust flow through rotometer to approximately 452 cc/min. _____

   a. Note pressure gauge reading.

10. Run pump for 10 minutes. _____

11. Disengage inlet quick disconnect. _____

12. Run pump for 15-30 sec. to purge gases from holder. (Sampling times may vary due to radionuclide concentrations.)

_____

13. Record information on VYOPF 3534.01. _____

WARNING

DOSE RATES ON FILTER HOLDER MAY BE HIGH. USE TONGS TO REMOVE FILTER HOLDER TO MINIMIZE EXPOSURE TO EXTREMITIES.

14. Disengage outlet quick disconnect. _____

15. Remove filter holder. _____

16. Secure pump. _____

17. Close valve SRS-24. _____

18. Log all samples on VYOPF 3534.02 for accountability. _____

19. Place filter holder assembly into lead shield pig and place pig in back of vehicle (if pig is required).

_____

20. Install a fresh filter holder assembly onto panel. _____

21. Return to the Chemistry Lab. Prepare and count samples per OP 0631 (dead time limit <20%) or Section E (High Activity...) as applicable based on dead time:

NOTE

Obtain sample time and volume (cc) from VYOPF 3534.01 for respective samples.

a. Separate the particulate and cartridge filters.

b. Wrap samples to secure activity.

c. Count particulate filter 500 seconds (minimum) as "General" isotopic to obtain results as μCi/cc.

d. Count the cartridge 250 seconds per side (minimum) as "General" isotopic to obtain results as μCi/cc.

_____

22. Multiply iodine results from the previous step by 1.67 (plate out correction factor for stack PAS sampler - (References 3.a)). Report corrected iodine and particulate sample results to OSC Coordinator in μCi/cc.

_____

C. Gas Sampling

NOTE

Vials can be evacuated in lab prior to sampling or by using hand vacuum pump.

NOTE

An iodine sample may be obtained while drawing a gas sample, however, the rotometer flow rate may need to be adjusted.

1. Perform Steps B.1 through B.4 above. _____

2. Align the 3-way sample valve to allow through flow with the needle isolated. (SRS-2 at T)

_____

3. OPEN bypass (SRS-25) valve. _____

4. Start pump, wait for line to purge ~30 sec. _____

5. Place evacuated vial (14 ml gas bottle) on top of hypodermic needle.

_____

6. Rotate the 3-way sample valve clockwise 90° to allow flow from the inlet to the needle and isolating the discharge. (SRS-2 at ⊣)

_____

WARNING

DOSE RATES ON SAMPLE VIAL MAY BE HIGH. IT MAY BE NECESSARY TO USE TONGS AND/OR SHIELDED TRANSPORT CART TO MINIMIZE EXPOSURE.

7. After the pressure indicator equilibrates near zero, using tongs remove the sample vial and place in lead pig (if used).

8. Immediately rotate the 3-way sample valve 180° to purge the needle. (SRS-2 at ⊢)

9. Record sample time on VYOPF 3534.01.

10. After at least 10 seconds, rotate the 3-way valve clockwise 90°. (SRS-2 at T)

11. CLOSE bypass valve (SRS-25).

12. Secure the pump.

13. Place sample in pig (if pig is used) in back of vehicle and return to the Chemistry Lab for analysis.

14. Count the gas sample 500 seconds (minimum) as "General" isotopic to obtain results as μCi/cc per Section E (high activity). If the dead time on the MCA is $>20\%$ when counting the gas vial, remove aliquot sample to achieve $<20\%$ dead time.

15. Report sample results (as μCi/cc) and submit VYOPF 3534.01 to OSC Coordinator.

16. Log all samples and aliquots on VYOPF 3534.02 for accountability.

D. Sample Analysis with MCA Inoperable

NOTE

If it is necessary to do Plant Vent Stack gas sampling with the MCA out of service, accurate iodine results can be achieved by analyzing the iodine cartridge as follows.

NOTE

If Silver Zeolite cartridges are used, purging is not necessary.

1. Purge the noble gases from the charcoal cartridge per Section A.1.e).

_____

2. Wrap the charcoal/zeolite cartridge to protect the detector from contamination.

_____

3. Deliver to Radiation Protection personnel for analysis using the SAM II per OP 3536.

_____

4. Obtain sample analysis net count per minute and SAM II efficiency. _____

5. Calculate the iodine-131 concentration as follows:

$$I^{131}\ \mu Ci/cc = \frac{(C)(4.5 \times 10^{-10})}{(E)(V)(T)}$$

_____

Verified by: _____

Where:
- C = Net counts (cpm) (sample counts-background counts)
- E = Efficiency
- V = Flow rate of sample (liters/min)
- T = Duration of sample (min)

4.5×10^{-10} = Constant

6. Use of Silver Zeolite Sampler Cartridges

   a. If I^{131} concentration calculated in Step D.5 (from above) is greater than or equal to 1×10^{-6} $\mu Ci/cc$ I^{131}, then resample and verify results using silver zeolite cartridge (except omit purge step outlined in Step D.1.

_____

Verified by: _____

b. Report results to OSC Coordinator and record results in logbook.

_____

7. Log all samples on VYOPF 3534.02 for accountability. _____

E. Counting Techniques for Highly Radioactive Samples

NOTE

If sample size or dilutions can be used to permit a sample to be counted by conventional techniques, this should be done. If this is not possible, the following techniques can be used.

1. Use of the MCA at extended distances.

NOTE

If general area dose rate in the Counting Room exceeds 5 mR/hr, the use of the MCA at extended distance with shield top removed is prohibited (LAI-417B).

a. Open the shield top from the 10% germanium detector. _____

b. Using rod and holder, suspend the sample above the detector at a distance that will give a dead time of $<20\%$ (must be >1 ft.).

_____

c. Measure the distance from the sample to the top of the detector.

_____

d. Count the sample using a 2" filter paper geometry efficiency. _____

NOTE

Step e. or f. below may be used to calculate sample activity.

e. Analyze the sample using the MCA selection for "PASS Elevated Samples"

OR

f. Calculate the sample activity as follows:

$\mu Ci/ml = (X)\ (d^2)\ (17)$

NOTE

The below correction factor must be re-evaluated if the detector geometry for the filter paper with a 2" shelf is modified at the time the efficiency calibration (DP 2631) is performed.

where: X = μCi/ml from isotopic printout
d = distance in ft. measured in E.1.c above
17 = correction factor μCi/ml

_____

Verified by: _____

2. Use of portable instruments.

NOTE

If neither conventional methods or those in Step E.1 can be used,a portable gamma survey meter can be used to determine sample activities.

a. If the MCA is available, it can be used to give a qualitative measure of major isotopes. If it is not available, an assumption must be made based on what is known about the sample at the time.

b. Measure the radiation level of the sample at 1 meter. _____

c. Calculate the sample activity as follows:

$$\mu Ci/ml = \frac{(R/hr \text{ at } 1 \text{ meter})(10^6)}{(T)\ (V)}$$

_____

Verified by: _____

where: 10^6 = μCi/Ci
V = sample volume (milliliters)
T = R/hr @ 1 meter/Ci

Values for T (R/hr @ 1 meter/Ci)

Time	Degassed Liquid*	Containment Air**
1 hr	0.60	0.41
4 hr	0.43	0.28
8 hr	0.35	0.22
12 hr	0.31	0.18
24 hr	0.26	0.14

*Assumed mix of 0% of core noble gas inventory, 50% of core halogen inventory and 1% of core solids inventory. For convenience, the mix ratio is expressed as 00/50/1 (% NOBLE GAS/% HALOGENS/% SOLIDS)

**Assumed mix of 100/50/1.

FINAL CONDITIONS

1. Submit all forms for review and filing as per AP 6807. _____

2. If any portion of the PASS Panel is found to be inoperable, submit a Work Order and report the problem at the daily Operations Planning meeting.

POST ACCIDENT STACK SAMPLING

FROM SECTION B AND C

INITIALS

.IGH DOSE RATE POST ACCIDENT IODINE AND PARTICULATE SAMPLING USING A SILVER ZEOLITE CARTRIDGE AT STACK POST-ACCIDENT SAMPLING PANEL

1. Record the following:
   Flow rate_____cc/min
   Start Time_____
   Stop Time_____
   Total Time_____min
   Sample Volume = Total time x Flow rate = _____cc. _____

2. Record Pressure Gauge reading:
   Pressure _____in Hg _____

3. Record results or attach isotopic printout form. _____

4. Multiply iodine results from previous step by 1.67 plate out factor. Record results on printout. _____

5. Copy all printouts and this form and retain for filing. _____

6. Report all results to the OSC Coordinator or their Assistant. _____

GAS SAMPLE

1. Record sample time:_____ _____

2. Log all samples on VYOPF 3534.02 for accountability. _____

3. Attach isotopic printout form. _____

4. Copy all printouts and this form and retain for filing. _____

5. Report all results to the OSC Coordinator or their Assistant. _____

Review by:_____
OSC Coordinator's Assistant

STACK SAMPLE ACCOUNTABILITY LOG

Sample Identification	Location (Update after each movement)	Date	Time	Initials

TABLE 1

VY - DOSE RATES (R/hr) AT DIFFERENT SAMPLING STATIONS AT DIFFERENT TIMES AFTER SHUTDOWN[c]

Time (hr)	Post-Accident Sampling Station	Containment Air Sampling Station	Vent Stack Sampling Room
1	4.5E-1[a]	6.0E+0[a]	1.0E+0[b]
3	1.9E-1	2.6E+0	5.1E-1
8	5.4E-02	1.1E+0	2.2E-1
24	6.8E-03	4.7E-1	5.8E-02
72	4.1E-03	3.1E-1	1.8E-02

NOTES:

a. Per Calculation VYC-70.

b. Per Calculation VYC-83, Vent Stack Only.

c. Dose Rates at other decay times are based on Table 11 of EDS Nuclear, Report No. 02-0180-1126, December 29, 1979.

LPC's

VERMONT YANKEE NUCLEAR POWER STATION

OPERATING PROCEDURE

OP 3507

REVISION 29

EMERGENCY RADIATION EXPOSURE CONTROL

USE CLASSIFICATION: **REFERENCE**

LPC No.	Effective Date	Affected Pages
1	02/22/01	3 of 7

Implementation Statement: N/A

Issue Date: 09/29/99

PROCEDURE

A. Emergency Radiation Exposure Control

1. Normal Plant Radiological Conditions

NOTE

- This section applies for tasks being conducted within areas that show no significant increase in general area (TEDE) dose rates from normal plant radiological conditions and each individual's dose commitment requirement is less than 1 rem.

---

a. An RP Representative or designated individual shall plan and control radiation exposure of personnel in accordance with the normal work process to ensure exposures are maintained within administrative limits.

2. Off-Normal Plant Radiological Conditions

NOTES

- This section applies for tasks being conducted within areas that show a significant increase in general area dose rates from normal plant radiological conditions which may result in any individual dose commitment of 1 rem or greater.

- Upon indication of off-normal Plant radiological conditions, Plant Emergency Personnel will immediately be authorized an Emergency Dose Limit of 4.5 Rem TEDE. Authorization to the 10 Rem limit (Protecting Valuable Property) 25 or 75 REM limit (Lifesaving or Protection of a Large Population) may only be made with the joint concurrence of the Shift Supervisor/Plant Emergency Coordinator or TSC Coordinator and the senior Radiation Protection representative.

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a. An RP Representative or designated individual shall:

1) Plan and control radiation exposure of personnel using VYOPF 3507.02, Emergency Radiation Exposure Briefing and Debriefing form.

2) Limit radiation exposure of personnel in accordance with the guidance contained in Appendix A.