Arkansas Nuclear One - Administrative Services
Document Control
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Document Update Notification

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DOCUMENT NO: **OP-1905.003**

TITLE: **RAD PROTECTION REQUIREMENTS FOR POST-ACCIDENT SAMPING OF RC**

REVISION NO: **007-00-0**

CHANGE NO: **AP-07**

SUBJECT: **PERMANENT CHANGE (PC)**

☒ ***If this box is checked, please sign, date, and return.***

☐ *ANO-1 Docket 50-313*

☐ *ANO-2 Docket 50-368*

Signature Date

A001

ENTERGY OPERATIONS INCORPORATED
ARKANSAS NUCLEAR ONE

TITLE: Rad Protection Requirements For Post-Accident Sampling of RC SET #103	PROC/WORK PLAN NO. 1905.003	CHANGE NO. 007-00-0
	WORK PLAN EXP. DATE	TC EXP. DATE
	SAFETY-RELATED ☒YES ☐NO	IPTE ☐YES ☒NO
	TEMP ALT ☐YES ☒NO	

When you see these ***TRAPS***	Get these ***TOOLS***
Time Pressure	Effective Communication
Distraction/Interruption	Questioning Attitude
Multiple Tasks	Placekeeping
Over Confidence	Self Check
Vague or Interpretive Guidance	Peer Check
First Shift/Last Shift	Knowledge
Peer Pressure	Procedures
Change/Off Normal	Job Briefing
Physical Environment	Coaching
Mental Stress (Home or Work)	Turnover

VERIFIED BY	DATE	TIME

FORM TITLE:	FORM NO.	CHANGE NO.
VERIFICATION COVER SHEET	1000.006A	048-00-0

ENTERGY OPERATIONS INCORPORATED
ARKANSAS NUCLEAR ONE

TITLE:1905.003	PROC/WORK PLAN NO. 1905.003	CHANGE NO. 007-00-0
☒PROCEDURE ☐WORK PLAN, EXP. DATE_____		PAGE 1 OF 1

TYPE OF CHANGE:
☐ NEW ☒ REVISION ☐ PC ☐ TC ☐ DELETION
Procedure or Work Plan ☐ EZ EXP. DATE:_____

AFFECTED SECTION: (Include step # if applicable)	DESCRIPTION OF CHANGE: (For each change made, include sufficient detail to describe reason for the change.)
All Sections	Complete rewrite to implement the provisions of ANO-1 Technical Specification Ammendment No. 208, and ANO-2 Technical Specification Ammendment No. 218: NRC Approval of PASS Elimination approved in NRC letter 0CNA070003.

1.0 PURPOSE

The purpose of this procedure is to specify radiological protection requirements to be followed when obtaining a post-accident reactor coolant liquid sample.

2.0 SCOPE

This procedure applies to post accident sampling of the Unit One and Unit Two reactor coolant system with less than or equal to 5% clad failure for the determination of failed fuel for emergency classification determination. This procedure also applies to sampling of the reactor coolant system, containment sump and containment air during any failed fuel level to determine the extent of the reactor core damage.

3.0 REFERENCES

3.1 REFERENCES USED IN DEVELOPING THIS PROCEDURE:

3.1.1 ANO Emergency Plan

3.1.2 ANO's EAL Bases Document

3.1.3 1607.001, "Reactor Coolant System Sampling"

3.1.4 2607.001, "Unit 2 Reactor Coolant System Sampling"

3.1.5 1203.019, "High Activity in Reactor Coolant"

3.1.6 2203.001, "High Activity in RCS"

3.1.7 LIR L00-0005, Dose Assessment for RCS sampling during Fuel Cladding failure.

3.2 REFERENCES USED IN CONJUNCTION WITH THIS PROCEDURE:

3.2.1 1607.001, "Reactor Coolant System Sampling"

3.2.2 2607.001, "Unit 2 Reactor Coolant System Sampling"

3.2.3 1203.019, "High Activity in Reactor Coolant"

3.2.4 2203.001, "High Activity in RCS"

3.2.5 1903.033, "Protective Action Guidelines for Rescue/Repair & Damage Control Teams"

3.3 RELATED ANO PROCEDURES:

3.3.1 1903.033, "Protective Action Guidelines for Rescue/Repair & Damage Control Teams"

3.4 REFERENCE TO NRC COMMITMENTS:

3.4.1 0CNA08005 (P-16724), Develop, implement, and maintain the capability for classifying fuel damage events at the Alert level threshold. This capability may utilize the normal sampling system or correlate normal sample system dose rates to coolant concentrations. section 5.1.

3.4.2 0CNA08005 (P-16725), Develop, implement, and maintain contingency plans for obtaining and analyzing highly radioactive samples of reactor coolant, the containment sump, and containment atmosphere. The contingency plans do not have to be demonstrated. Because these are contingency plans, the staff concludes that, in accordance with 10 CFR 50.47 and Appendix E to 10 CFR Part 50 for emergency plans, these contingency plans must be available to be used by the licensee during an accident; however, these contingency plans do not have to be carried out in emergency plan drills or exercises. Complete procedure

4.0 RESPONSIBILITY AND AUTHORITY

4.1 The Manager, Radiation Protection is responsible for the overall control and implementation of this procedure.

4.2 The Radiation Protection Supervisors are responsible for directing the Health Physics Technicians that carry out the provisions of this procedure.

5.0 INSTRUCTIONS

NOTE
For the purpose of this procedure, post accident sampling conditions exist when plant indications show or there is reason to believe that Reactor Coolant System I-131 activity is equal to or exceeds 10 uCi/gm.

[5.1 Post Accident Sampling For Emergency Action Level Classification]

5.1.1 Post accident sampling ≤5% clad failure will be performed via the normal sampling system.

5.1.2 Perform a pre-job briefing in accordance with procedure 1903.033, "Protective Action Guidelines for Rescue/Repair and Damage Control Teams".

5.1.3 Continuous Radiation Protection coverage is required during recirculation and sampling.

5.1.4 Ensure primary sample hood ventilation is operable and in use during post accident sampling if applicable.

5.1.5 Determine radiological protection requirements using the calculated dose rate information given in Attachment 1:

A. Electronic dosimeter alarm set points

B. Air Sampling

C. Respiratory protection

D. Anti-contamination protection

E. Multiple dosimetry

F. Use of shielding

CAUTION

Due to elevated activities in the RCS, samples returned to the auxiliary building sump may cause airborne conditions in the auxiliary building. Also, an increase in radioactive effluents from the plant may occur during this evolution.

5.1.6 Chemistry will align normal sampling system in accordance with procedure 1601.001 or 2601.001 for the affected unit, Unit 1 or Unit 2, respectively.

5.1.7 WHEN the required flush time is complete,
THEN Radiation Protection shall perform the following:

A. Determine the dose rate at 12 inches (30 cm) from the designated reactor coolant system sample pipe. See Attachment 2.

1. Unit One - SA-229, located overhead in the hallway on the south wall, elevation 354' (Attachment 2, Figure 1).

2. Unit Two - 2TCD-19, located inside door 230, overhead in the hallway room 2065, elevation 354' (Attachment 2, Figure 2).

5.1.8 Report the dose reading to the affected Control Room.

5.1.9 IF the dose rate indicates >5% clad failure,
THEN go to step 5.1.11.

5.1.10 IF the dose rate indicates ≤5% clad failure and operations request an RCS sample,
THEN allow Chemistry to sample in accordance with the appropriate procedure.

5.1.11 Request Chemistry secure sample. Sample lines should be flushed, if possible, to reduce radiation levels.

5.1.12 Secure sampling system and perform post sampling radiological actions.

5.2 Post Accident Sampling

WARNING

Worst case accident of 100 percent failed fuel would result in an anticipated specific activity of ten curies per milliliter of reactor coolant.

Post accident sampling may be performed in the primary sample room or other areas of the plant using normal or evaluated sample points. Normally this type of sampling will not be performed in the early phase of an accident, but would rather be performed days or even months after the event.

Following is a list of actions that must be taken and/or considered prior to obtaining and analyzing any sample.

5.2.1 Perform a pre-job briefing in accordance with procedure 1903.033, "Protective Action Guidelines for Rescue/Repair and Damage Control Teams".

5.2.2 Radiological Considerations

A. Continuous Radiation Protection coverage is required during any re-circulation and sampling.

B. Upon establishment of recirculation or sample flow, Radiation Protection will monitor doserates.

C. Determine radiological protection requirements based upon expected conditions to address the following:

- Electronic dosimeter alarm set points
- Air Sampling
- Respiratory protection
- Anti-contamination protection
- Multiple dosimetry
- Use of shielding

D. Consider Self Contained Breathing Apparatus (SCBA) respiratory protection with double face plate is required to be worn by Nuclear Chemists and Health Physics technicians when taking and analyzing sample.

5.2.3 Ventilation Considerations

A. Consider ventilation needs during sampling.

B. Ensure sample hoods are in service (if applicable).

C. Ensure Auxiliary Building ventilation and monitoring system is operable and in service.

5.2.4 Sample Considerations

A. Pre-determine storage and disposal sites of used and unused portions of the sample.

B. Consider returning sample to the containment building if possible.

C Stationary lead glass shielding is to be used as appropriate

D. Transfer sample immediately to the sample pig and secure lid.

E. Perform sample preparations in the sample hood.

5.2.5 Chemistry will perform sampling and analysis using normal procedures for line-up and analysis or evaluated sampling along with the precautions developed in the previous steps.

6.0 ATTACHMENTS AND FORMS

6.1 ATTACHMENTS

6.1.1 Attachment 1 - "Estimated Radiation Levels for 5% Fuel Cladding Failure".

6.1.2 Attachment 2 - "Survey Points"

6.2 FORMS

None

ATTACHMENT 1

Estimated Radiation Levels for 5% Fuel Cladding Failure

Assumptions:

- Fuel cladding failure does not exceed 5%.
- Source term consists of iodine and noble gas isotopes.
- Source term specific activity at 0.5 hours post accident is approximately 8.35+03 µCi/ml (Unit 1) and 1.24E+04 µCi/ml (Unit 2).
- Individual performing sampling will maintain whole body approximately 1.5 feet from sample and extremities approximately 0.25 feet from sample when drawing sample, and will maintain whole body approximately 2 feet from sample and extremities approximately 1 foot from sample when analyzing sample.
- Sample times: collect sample, 0.5 min., analyze sample 3.0 min.

Radiation levels

Dose rates (mrem/hr) at the primary sample hood(s) as given in LIR L00-0005 for the body locations given above:

	SDE-ME (mrem/hr)	DDE (mrem/hr)	SDE-WB (mrem/hr)
Unit 1 (5%CF)	14669	5751	6049
Unit 2 (5%CF)	17593	6438	6595

Estimated doses to collect sample:

Unit 1

DDE	0.5 min. x	5751 mrem/hr. =	48 mrem
SDE-ME	0.5 min. x	14669 mrem/hr. =	122 mrem
SDE-WB	0.5 min x	6049 mrem/hr. =	50 mrem

Unit 2

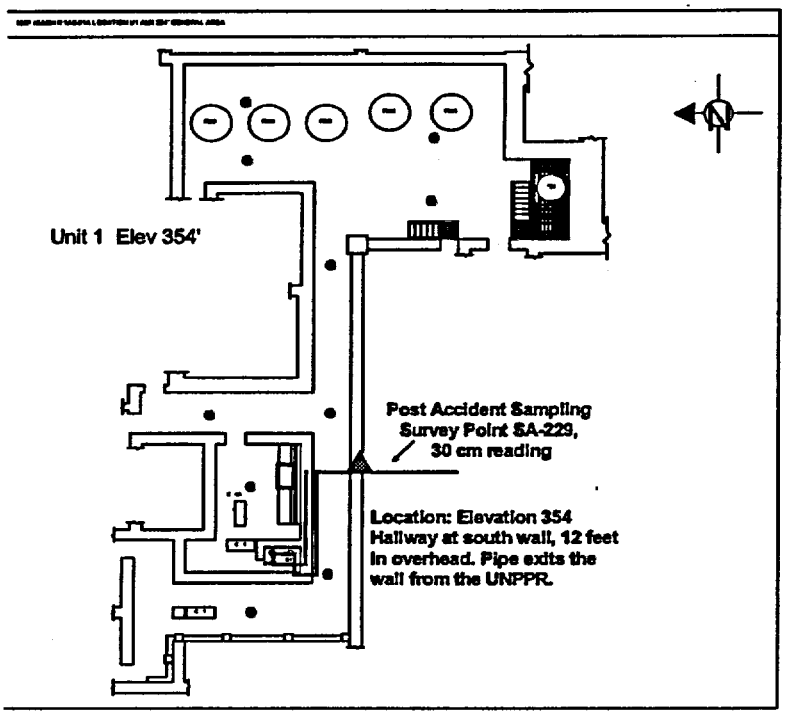
DDE	0.5 min. x	6438 mrem/hr. =	54 mrem
SDE-ME	0.5 min. x	17593 mrem/hr. =	147 mrem
SDE-WB	0.5 min x	6595 mrem/hr. =	55 mrem

Estimated contact dose rate for 1:1000 dilution of maximum 5% clad failure sample:

Unit 1 - 73 mrem/hr Unit 2 - 100 mrem/hr

ATTACHMENT 2

Survey Points



Survey Point, 30 cm - Δ

Figure 1 - Unit 1 Elev. 354 Survey Point

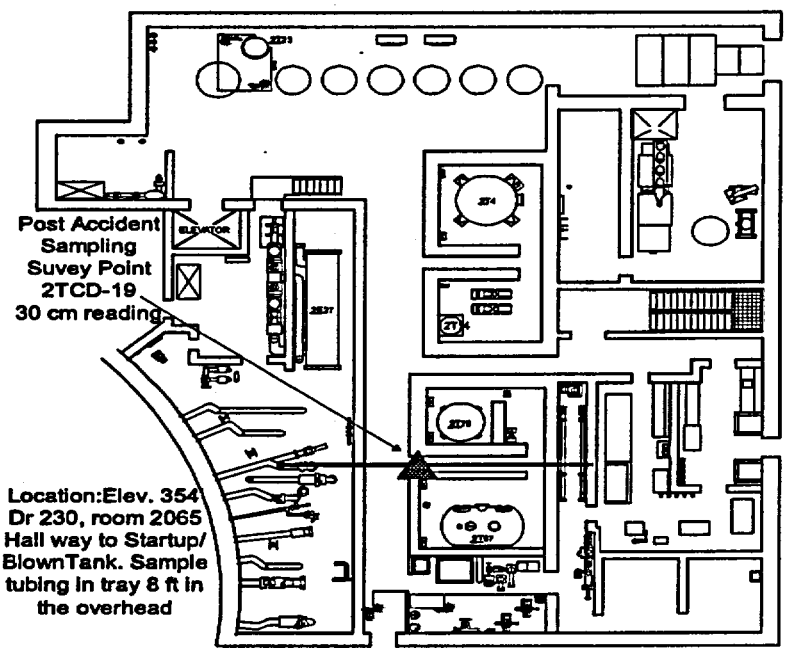


Figure 2 - Unit 2, Elev. 354 Survey Point