

Sequoyah Nuclear Plant

SURVEILLANCE INSTRUCTION

SI-401

RADIOACTIVE LIQUID WASTE
EFFLUENT - CONTINUOUS
RELEASES - STEAM GENERATOR
BLOWDOWN

Units 1 and 2

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DISTRIBUTION

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The last page of this instruction is Number 12

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1. TI procedure for evaluating technical specification compliance when discharge acceptance criteria is not satisfied.

Warren H. Kusey
10-4-77

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1.0 SCOPE

1.1 Description

- 1.1.1 Establish and document the radiochemical analyses required by the technical specifications for continuous liquid effluents.

1.2 Objective

- 1.2.1 Satisfy surveillance requirements for continuous releases from steam generator blowdown(s) as follows:

- a. Continuously monitoring liquid waste discharge by the use of radiation monitor setpoints (LCO 3.3.3.9, SR 4.3.3.9).
- b. Verify release concentrations (after dilution) of liquid wastes entering the unrestricted area meet 10CFR20, appendix B, Table II, column 2 concentrations (Table 4.11-1, section B, SR 4.11.1.1.3, Table 3.3-12 actions 28 and 30.)

NOTE: Dissolved and entrained noble gas concentration requirements are covered in SI-403.

- c. Verify instrumentation surveillance requirements for source check (Table 4.3-8 item 1b) and flow (Table 4.3-8 item 3b).

1.3 Frequency

NOTE: SI-401 for sections 1.3.1, 1.3.2, 1.3.3 covers a maximum surveillance period of one week (Sunday through Saturday midnight). All SI-401 performances will be initiated by the chemical laboratory.

1.3.1 All Modes - Prior to Initiating Release

- a. Verify isotopic concentrations (after dilution) of liquid wastes entering the unrestricted areas meet 10CFR20 limiting concentrations (including dissolved and entrained noble gases).

1.3.2 All Modes - Daily During Release

- a. Sample in proportion to flow discharged for day and obtain monitor response.

1.3.3 All Modes - Weekly

- a. Verify isotopic concentrations (after dilution) of liquid waste entering the unrestricted area meet 10CFR20 limiting concentrations (excluding dissolved and noble gases concentration greater than four half lives (decay corrected)).

1.3.4 All Modes - Once/8 hours

- a. Verify isotopic concentrations (after dilution) of liquid waste entering the unrestricted area meet 10CFR20 limiting concentrations (including dissolved and entrained noble gases).

1.4 Logic Sequence - Continuous Release

- 1.4.1 Operations decides to discharge steam generator blowdown to environment. Operations notifies the chemical laboratory to sample prior to initiating discharge (SI-401).
- 1.4.2 Chemical laboratory samples blowdown flash tank according to TI-16, method B.13 while pumping blowdown to the condensate system.
- 1.4.3 Chemical laboratory analyzes sample according to TI-12, method B.5, using SI-401 computer program, establishes monitor setpoint and allowable release flowrate. The lead chemical analyst, SE5, submits SI-401 data package to the shift engineer to review and approve for release to the environment (cooling tower blowdown).
- 1.4.4 Operations submits MR to adjust monitor setpoint. Operations, upon completion of MR releases blowdown according to SOI-15 and within limits noted on SI-401 data sheet 1.0.
- 1.4.5 Chemical laboratory proportionally samples the discharge daily. Chemical laboratory analyzes composite sample weekly for Tech. Spec. compliance. Chemical laboratory prepares portions (proportionally to amount discharged) of weekly composite for monthly and quarterly composites. Chemical laboratory initiates ensuing weeks SI-401. Cognizant Chemical Engineer prepares a technical specification evaluation (per TI punchlist) if limits are exceeded using available dilution flows.
- 1.4.6 Operations notifies chemical laboratory when release has been terminated.

NOTE: If radiation monitor is declared inoperable during release, operations notifies the chemical laboratory to sample once/8 hours (conditional SI-401).

2.0 INSTRUCTIONS

2.1 Prior to Release

2.1.1 Operations Responsibility

- 2.1.1.1 Notify the chemical laboratory to sample steam generator blowdown flash tank prior to discharge.

NOTE: Flash tank contents at this time will be pumped to the condensate system.

- 2.1.1.2 Insert monitor [1-RM-90-120(121)] or [2-RM-90-120(121)] check source and verify monitor response. Record monitor identification, check source response, monitor operability and operator initials on data sheet 1.0.

NOTE: If monitor does not respond immediately notify the shift engineer - Do not release to the cooling tower blowdown.

2.1.2 Chemical Laboratory Responsibility

- 2.1.2.1 Sample the steam generator blowdown flashtank in accordance with TI-16 method B.13 while contents are being routed to the condensate system.
- 2.1.2.2 Analyze the sample according to Technical Instruction No. 12, Method B.5 using SI-401 computer program for total MPC fraction, individual isotopic concentrations and dissolved and entrained noble gas concentrations. Record the total MPC fraction (before dilution) on SI-401 data sheet 1.0.
- NOTE: Dissolved and entrained noble gas concentrations will be included in computer printout but will not be logged on SI data sheet.
- 2.1.2.3 Compute monitor response in CPM according to TI-18 section C using SI-401 computer program (TI-12). Record the calculated monitor response on SI-401 data sheet 1.0 and TI-37 logsheet A.17 for applicable unit.
- 2.1.2.4 Compute monitor setpoint in CPM according to TI-18 section C using SI-401 computer program. Record value on SI-401 data sheet 1.0 (must be \geq CPM value calculated in step 2.1.2.3) and TI-37 logsheet A.17 for appropriate unit.
- 2.1.2.5 Determine the allowable discharge flowrate (GPM) using total MPC (before dilution), after dilution total MPC (≤ 0.75), total dissolved noble gases ($\leq 2.0 \times 10^{-4}$ $\mu\text{Ci/ml}$ after dilution) concentration and dilution flowrate (1500 GPM per unit) in accordance with TI-12 method B.5 computer program and record on SI-401 data sheet 1.0. Attach TI-12 evaluation to SI-401 data package.

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- 2.1.2.6 If steam generator blowdown flashtank is okay to be released (or being released), assign a release permit number to SI-401 data package in accordance with TI-18 section D and record on data coversheet and data sheet 2.0. TI-18 logsheets attachments A and B (section D).

Example: 79-035-14-5
(year (79) - total number of releases for year to date (035) - tank number (14-unit 1) fifth release for year from tank (14))

- 2.1.2.7 Transmit SI-401 data package to the shift engineer for review and approval to release (or continue) to the environment (cooling tower blowdown).

2.2 Release of Steam Generator Blowdown Flashtank

2.2.1 Operations Responsibility

- 2.2.1.1 Operator initiates maintenance request to have instrument mechanic(s) set radiation monitor alarm/trip set at the value (CPM) computed in step 2.1.2.4. Record maintenance request number and monitor identification on data sheet 2.0 and attach a copy of the completed maintenance request to SI-401 data package.

NOTE: Flashtank contents will be pumped at this time to the condensate system.

- 2.2.1.2 Record radiation monitor reading prior to the initiation of release on data sheet 2.0.

- 2.2.1.3 After completion of the adjustment of the alarm/trip setpoint, initiate the discharge according to SOI-15 at a flowrate less than or equal to the computed value in step 2.1.2.5.

NOTE: Attach a copy completed SOI-15 working package to SI-401 data package.

- 2.2.1.4 Transmit SI-401 package to the lead chemical laboratory analyst (SE5) to complete their applicable portion(s) of the SI-401 data package.

- 2.2.1.5 Notify the chemical laboratory when release has been terminated (discharge to cooling tower blowdown) and when the radiation monitor(s) has been declared inoperable.

2.2.2 Chemical Laboratory Responsibility

2.2.2.1 Daily

- a. Using FR-15-25 flow chart (located on elevation 662 of turbine building near the bottom of condenser hotwell for each unit), evaluate the quantity of water discharged from blowdown system to the environment for day to sample time.

(Note: (1) Evaluation of flow and flashtank to be sampled within the last hour of day (11pm-11:59pm) for that day. (2) If FR-15-25 is declared inoperable, immediately notify the shift engineer (using SIL C10, attachment F) to terminate discharge to the cooling tower blowdown and note in the remarks section) and record on data sheet 2.0 and TI-37 logsheet A.17.

- b. Sample steam generator blowdown flashtank according to TI-16 method B.13 proportionally to flow discharged (step 2.2.2.1) according to TI-12 method C.5 daily until termination of release to environment (note in remarks section of data sheet 2.0 when release was terminated and by whom) or end of week (through Saturday evening). Observe monitor response (1(2)-RM-90-120(121)) and record on SI data sheet 2.0 daily.

2.2.2.2 Weekly

- a. At the end of each week, analyze the composite for gamma emitting isotopes (including I131) according to TI-12 Method B.5.

NOTE: Decay correct to the weighted midpoint of release for week.

- b. Determine the average total MPC fraction (before and after dilution), total volume (released and dilution) for week according to TI-12, method B.5 SI-401 computer program and record on data sheet 2.0 and TI-37 logsheet A.17. If the after dilution acceptance criteria is not met, immediately notify the cognizant engineer (chemical) to perform the technical specification evaluation per TI (punchlist) and attach to SI data package.

- 2.2.2.3 Add to the monthly and quarterly composites (continuous release) bottles proportionate volume from the weekly composite according to flow discharged to the environment. Each unit will have separate composites.

2.3 Monitoring Steam Generator Blowdown During Period of Radiation Monitor Inoperability

2.3.1 Operations Responsibility

2.3.1.1 Notify the chemical laboratory when the steam generator blowdown discharge radiation monitor is declared inoperable.

2.3.1.2 Notify the chemical laboratory when the radiation monitor has been declared operable.

2.3.2 Chemical Laboratory Responsibility

2.3.2.1 Sample the steam generator blowdown flashtank according to TI-16, method B.13. Record date, time of samples on SI-401 data sheet 3.0.

2.3.2.2 Analyze the sample according to TI-12, method B.4 (gross gamma) SI-401 acomputer program and record total activity on data sheet 3.0. Report data to the shift engineer using a SILC10 form, attachment.

NOTE: Also include gross gamma activity after dilution based on grab sample and instantaneous release flowrate (FR-15-25) and dilution flowrate (1500 GPM - normally) on SILC10, attachment F. Record data on TI-37 logsheet A.17.

3.0 ACCEPTANCE CRITERIA

3.1 Acceptance criteria is noted on applicable data sheet for each parameter monitored.

4.0 ACTION REQUIRED

4.1 Notify the shift engineer and cognizant chemical engineer or chemical engineering associate of any out of limit specifications.

4.2 Prepare a proportional sample volume from weekly composite for monthly and quarterly composites (each unit).

4.3 If the total MPC fraction (after dilution at the cooling tower blowdown), allowable release flowrate is exceeded then the cognizant chemical engineer will prepare a written evaluation for technical specification compliance and attach to SI-401 data package based on dilution available.

(Example: SI-401 after dilution MPC = 1.15 (data sheet 2.0) and unit 2 not in operation and blowdown (total) of 20,000 GPM. The additional dilution flow for calculational purposes is 6500 GPM. NOTE: 9000 GPM - Radwaste tanks; 3000 GPM for condensate tanks, 8000 GPM available for evaluating compliance).

SI DATA PACKAGE COVER SHEET

RADIOACTIVE LIQUID WASTE EFFLUENT - CONTINUOUS RELEASES ..
STEAM GENERATOR BLOWDOWN

Unit _____

Performed By _____
Analyst(s)

Date _____

List of data sheets attached.

<u>Instruction No.</u>	<u>Data Sheet No.</u>	<u>Pages</u>
SI-401	2.0	1
SI-401	2.0	2
TI-12	Evaluation	NA
TI-(Punchlist)	Tech. Spec. evaluation - if required	NA
SOI-15	Working copy (copy)	NA
MR# _____	Copy	NA

Were technical specification criteria satisfied? _____ Yes _____ No
If criteria were not satisfied, notify the shift engineer who completes the following:

Was a limiting condition for operation violated?
_____ Yes (explain in remarks) _____ No (explain in remarks)
Verified By _____ Date _____
Shift Engineer Time _____

Reason for test:

_____ Required by schedule (continuation of release)
_____ Initiation of release to cooling tower blowdown
_____ Inoperable radiation monitor (RM-90-120, 121)
_____ Other (explain) _____

Review of Test Results

Chemical Engineering Associate _____ Date _____

Review and Approval of Test Results

Lead Chemical Engineer _____ Date _____

Cognizant Chemical Engineer _____ Date _____

QA Review of Test Results

QA Staff _____ Date _____

Remarks _____

DATA SHEET 1.0
Unit _____

RADIOACTIVE LIQUID WASTE EFFLUENT - CONTINUOUS RELEASES
STEAM GENERATOR BLOWDOWN

Release Number _____ (step 2.1.2.6)

I. Pre-Release Requirements

Procedure Step	Description	Data	Initials	Acceptance Criteria
2.1.1.2	Radiation Monitor Source Check operable	-RM-90- _____ CPM Yes/NO (circle one)	_____ _____ _____	NA NA Yes
2.1.2.2	Total MPC fraction	_____	_____	NA
2.1.2.3	Calculated Monitor Response	_____ CPM	_____	NA
2.1.2.4	Monitor Setpoint	_____ CPM	_____	1.25 *(value in Step 2.1.2.3)
2.1.2.5	Dilution flowrate allowable flowrate - discharge	1500 GPM _____ GPM	_____ _____	NA NA
	Calculated after dilution MPC total	_____	_____	≤ 0.75
2.1.2.7	Shift Engineer approval to release to environment or to continue discharging	_____ Date _____ Time	_____ _____	NA

Remarks: _____

Note: General: As soon as any parameter is found out of limits, notify the shift engineer using a SILC10 form, attachment F. After completing entire data package obtain shift engineer signature on data coversheet to show acknowledgement of out of limit specifications. Note in remarks section.

- (1) If monitor is declared inoperable or does not respond to check source immediately notify the shift engineer. Do not release to the cooling tower blowdown.

DATA SHEET 2.0
Unit _____

RADIOACTIVE LIQUID WASTE EFFLUENT - CONTINUOUS RELEASES
STEAM GENERATOR BLOWDOWN

Date Sheet 2.0 - Sections 2.2.1.1, 2.2.1.2, 2.2.1.3 are operations responsibility.
Data Sheet 2.0 - Sections 2.2.2.1, 2.2.2.2, 2.2.2.3 are chemical responsibility.

Release Number ____ - ____ - ____ - ____ (step 2.1.2.6)

II Release Blowdown to Cooling Tower Blowdown

Procedure Step	Description	Data	Initials	Acceptance Criteria
2.2.1.1	Radiation Monitor Setpoint complete (MR number)	(MR#) -RM-90	Operator	NA
2.2.1.2	Monitor Reading	_____ CPM	_____	NA
2.2.1.3	Discharge per SOI-15 at _____ GPM	_____ GPM	_____	< Value in Step 2.1.2.5 (Datasheet 1.0)
2.2.2.1	Flow (gpd), monitor (CPM) - DAILY			
	(FR-15-25) Flow (GPD) (1)	(RM-90-120,121) CPM (1)	DATE	TIME INITIALS
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
2.2.2.2b	MPC-before dilution (AVG)	_____	_____	NA
	MPC-after dilution (AVG)	_____	_____	≤ 0.75
	Total Discharge Volume	_____ gals	_____	NA
	Total Dilution Volume	_____ gals	_____	NA
2.2.2.3	Addition to composites (monthly and quarterly) complete	YES/NO (Circle one)	_____	YES

Remarks: _____

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DATA SHEET 2.0
Unit _____

RADIOACTIVE LIQUID WASTE EFFLUENT - CONTINUOUS RELEASES
STEAM GENERATOR BLOWDOWN

- NOTES: General: As soon as any parameter is found out of limits, notify the shift engineer using a SILC10 form, attachment F. After completing entire data package obtain shift engineer signature on data coversheet to show acknowledgement of out of limit specifications. Note in remarks section.
1. If flow recorder or radiation monitor is declared inoperable, have operator immediately stop the release to environment and note in remarks section (and coversheet).
 2. Notify the chemical engineering associate and cognizant chemical engineer of any out of limit specification. The cognizant engineer will then evaluate for technical specification compliance per TI (punchlist) and attach to the SI data package.

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DATA SHEET 3.0
Unit _____

RADIOACTIVE LIQUID WASTE EFFLUENT - CONTINUOUS RELEASES
STEAM GENERATOR BLOWDOWN

Data Sheet 3.0 Sections 2.3.1.1 and 2.3.1.2 are operations responsibility.
Date Sheet 3.0 Sections 2.3.2.1, 2.3.2.2, 2.3.2.3 are chemical responsibility.

Release Number ____ - ____ - ____ - ____

III Inoperable Radiation Monitor - Release to Cooling Tower Blowdown

Procedure Step	Description	Data	Initials	Acceptance Criteria
2.3.1.1 & 2.3.1.2	Notified Chem Lab of inoperable/ operable radiation monitor	Inoperable/Operable (circle one)	Operable Date Time	NA
2.3.2.1	Sampled flashtank discharge per TI-16 Method B.13	Date Time		< 8 hours between steps 2.3.1.1 and 2.3.2.1
2.3.2.2	Gross gamma activity ⁽¹⁾ (BD)	_____ $\mu\text{Ci/ml}$	_____	NA
	Gross gamma activity ⁽¹⁾ (AD)	_____ $\mu\text{Ci/ml}$	_____	$\leq 1 \times 10^{-7} \mu\text{Ci/ml}^{(2)}$
	Total gamma isotopic activity ⁽¹⁾ (BD)	_____ $\mu\text{Ci/ml}$	_____	NA
	Total MPC isotopic ⁽¹⁾ (AD)	_____	_____	$\leq 1.0^{(2)}$
	Instantaneous Flowrate- Discharge (FR-15-25)	_____ gpm	_____	NA
	Dilution Flowrate	1500 gpm	_____	NA
2.3.2.3	SI-401 section 2.3 rescheduled from time in step 2.3.2.1	Yes/No (circle one) _____ (date/time)	Analyst _____	----

Remarks: _____

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DATA SHEET 3.0
Unit _____

RADIOACTIVE LIQUID WASTE EFFLUENT - CONTINUOUS RELEASES
STEAM GENERATOR BLOWDOWN

- NOTES: General: As soon as any parameter is found out of limits, notify the Shift Engineer using a SILC10 form, attachment F. After completing the entire data package, obtain shift engineer signature on data coversheet to show acknowledgement of out of limit specification. Note in remarks section.
1. AD denotes "after dilution", BD - "before dilution".
 2. Notify the chemical engineering associate and cognizant engineer if out of limits. The cognizant engineer will on an individual basis evaluate for Technical Specification compliance per TI (punchlist) and attach evaluation to SI-401 data package.

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