WSRC-TS-95-0019
S-TSR-S-00001

TECHNICAL SAFETY REQUIREMENTS
DEFENSE WASTE PROCESSING FACILITY
SAVANNAH RIVER SITE

DEFENSE WASTE PROCESSING FACILITY

TECHNICAL SAFETY REQUIREMENTS

Revision 66

October 2019

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List of Acronyms and Abbreviations

AC	Alternating Current
ADPs	Antifoam degradation products
AIT	Analyzer Indicator/ Transmitter
ALARA	As Low as Reasonably Achievable
ANS	American Nuclear Society
ASTM	American Society for Testing and Materials
CLFL	Composite Lower Flammability Limit
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CMSD	Crane Maintenance Shield Door
CPC	Chemical Process Cell
CRO	Control Room Operator
CRM	Control Room Manager
CSTF	Concentration, Storage, and Transfer Facilities
DBE	Design Basis Earthquake
DBT	Design Basis Tornado
DC	Direct Current
DCS	Distributed Control System
DG	Diesel Generator
DOE	Department of Energy
DSA	Documented Safety Analysis (also called FSAR)
DWPF	Defense Waste Processing Facility
DWTT	Decontamination Waste Treatment Tank
FCV	Flow Control Valve
FE	Flow Element
FESV	Failed Equipment Storage Vault
FI	Flow Indicator
FIC	Flow Indicator / Controller

(continued)

List of Acronyms and Abbreviations (continued)

FISL	Flow Indicating Switch Low
FIT	Flow Indicator / Transmitter
FSAR	Final Safety Analysis Report
FSO	Facility Support Operator
GC	Gas Chromatograph
GWSB	Glass Waste Storage Building
HEME	High-Efficiency Mist Eliminator
HEPA	High-Efficiency Particulate Air
IDP	Inhalation Dose Potential
in. wc	inches water column
IPI	Installed Process Instrumentation
kW	Kilowatt
LCO	Limiting Condition for Operation
LCS	Limiting Control Setting
LCS	Local Control Station
LDB	Leak Detection Box
LFL	Lower Flammability Limit
LI	Level Indicator
LPPP	Low Point Pump Pit
LPPP-PPT	LPPP Precipitate Pump Tank
LPPP-SPT	LPPP Sludge Pump Tank
LPPP-RPT	LPPP Recycle Pump Tank
LW	Liquid Waste
M&TE	Measuring and Test Equipment
MC	Melter Cell
MCC	Motor Control Center
MFT	Melter Feed Tank
MST	Monosodium Titanate

(continued)

List of Acronyms and Abbreviations (continued)

mg/l	milligrams per liter
NCSA	Nuclear Criticality Safety Assessment
NCSE	Nuclear Criticality Safety Evaluation
NFPA	National Fire Protection Association
PI	Pressure Indicator
PISL	Pressure Indicating Switch Low
PFSFT	Process Frit Slurry Feed Tank
PM	Preventive Maintenance
pph	pounds per hour
ppm	parts per million
PPT	LPPP Precipitate Pump Tank
PPV	Pump Pit Ventilation
PRFT	Precipitate Reactor Feed Tank
psig	pounds per square inch gauge
PVVH	Process Vessel Vent Header
PVV	Process Vessel Ventilation
QA	Quality Assurance
RC	Radiological Control
RCT	Recycle Collection Tank
RPC	Remote Process Cell
RPT	Recycle Pump Tank
RTD	Resistance Temperature Detector
SAC	Specific Administrative Control
SAR	Safety Analysis Report
SAV	Safety Analysis Value
scfm	standard cubic feet per minute
SCT	Shielded Canister Transporter
SE	Strip Effluent

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List of Acronyms and Abbreviations (continued)

SEFT	Strip Effluent Feed Tank
SL	Safety Limit
SME	Slurry Mix Evaporator
SMECT	Slurry Mix Evaporator Condensate Tank
SPC	Salt Process Cell
SPT	Sludge Pump Tank
SR	Surveillance Requirement
SRAT	Sludge Receipt and Adjustment Tank
SRS	Savannah River Site
SSRT	Salt Solution Receipt Tank
SWPF	Salt Waste Processing Facility
TI	Temperature Indicator
TOC	Total Organic Carbon
TSR	Technical Safety Requirements
USQ	Unreviewed Safety Question
USQE	Unreviewed Safety Question Evaluation
vol.%	volume percent
WAC	Waste Acceptance Criteria
wc	water column
WCP	Waste Compliance Plan
WTC	Weld Test Cell
wt %	weight percent
°C	degrees Celsius
°F	degrees Fahrenheit

Revision Log

Revision Number	Approval Date	Revision Number	Approval Date
0	N/A	29	July, 2004
1	N/A	30	September, 2005
2	November, 1995	31	July, 2006
3	December, 1995	32	October, 2006
4	January, 1996	33	April, 2007
5	March, 1996	34	April, 2007
6	April, 1996	35	July, 2007
7	June, 1996	36	November, 2007
8	October, 1996	37	July, 2008
9	November, 1996	38	July, 2009
10	March, 1997	39	October, 2010
11	April, 1997	40	July, 2010
12	October, 1997	41	January, 2011
13	April, 1998	42	April, 2011
14	June, 1998	43	June, 2011
15	August, 1998	44	July, 2011
16	March, 1999	45	November, 2011
17	February, 2000	46	December, 2012
18	February, 2000	47	March, 2013
19	April, 2000	48	April, 2013
20	July, 2000	49	May, 2013
21	July, 2000	50	May, 2013
22	May, 2001	51	May, 2013
23	May, 2001	52	December, 2013
24	July, 2001	53	November, 2014
25	January, 2002	54	April, 2015
26	January, 2003	55	May 2015
27	February, 2003	56	June, 2015
28	July, 2003	57	August, 2015

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Revision Log (continued)

Revision Number	Approval Date	Description
58	September, 2015	Annual Update for 2015. Renumbered sections per STAR 2015-CTS-001335. Incorporated resolutions to CRDB comments. General format and pagination clean-up.
59	April, 2016	Added LCO 3.1.2, Table, and Bases to the front matter. Revised Section 5.2.2 to include the minimum staffing requirements when the Saltstone Facility is destaffed.
60	July 2016	Added GWSB #1 Canister Handling Administrative Control, 5.8.2.35.
61	February, 2017	Annual Update for 2016. Incorporated resolutions to CRDB comments. Deleted LCOs 3.1.2, 3.1.8 and 3.3.1. Revised LCOs 3.7.1 and 3.9.1 for consistency. Revised Chemical Controls Administrative Control, 5.8.2.23, Waste Tank Contents (SAC), 5.8.2.14, and Seismic Event Response (SAC), 5.8.2.30. Added Retained Hydrogen Program (SAC), 5.8.2.36. Added Melter Off-Gas Flammability Control Program Administrative Control, 5.8.2.37. Deleted Administrative Control, 5.8.2.32. Revised Section 5.6 for consistency with the TSR Methodology Manual. General format and pagination clean-up and consistency changes.
62	March, 2018	Updated text for LPPP jumpers page 6.1-6 to separate SE jumpers to their own SSC with a description to contain their contents following a DBE.
63	March, 2018	Annual Update for 2017. Incorporated resolutions to CRDB comments. Added “SR 4.0.4 not applicable” note to SR 4.1.6.44. Added “ADPs” to Acronym list. Corrected typos/grammar.
64	April, 2018	General minor changes to resolve HGR PISA; addresses recovery times in 3.1.4, 3.1.5, and 3.4.3 and associated Bases.

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Revision Log (continued)

Revision Number	Approval Date	Description
65	April 2019	Annual Update for 2018. Revisions to Section 1.2 (Definitions) and 1.6 (Modes). Incorporated resolutions to CRDB comment resulting in revisions to all LCOs/Bases. Corrected typos/grammar.
66	October 2019	Incorporated TSR Revision 2019-A. Integration of initial SWPF. Revised LCO 3.1.6 for SGN supply. Revised LCOs 3.1.9 and 3.4.3 for purge flows. Added LCO 3.4.1 LPPP-PPT Temperature Control and LCO 3.4.2 LPPP-PPT Agitator Power Monitoring. Revised Nuclear Criticality Safety Program 5.8.2.9 and Transfer Control Program (SAC) 5.8.2.20. Added Material Tracking Program (SAC) 5.8.2.38 and Excavation Activities (SAC) 5.8.2.39. Deleted SEFT Dilution Program (SAC) 5.8.2.31 and 512-S Filter-Only Salt Waste Treatment (SAC) 5.8.2.33. Revised Table 6.1.2-1 Design Features. General format and pagination clean-up and consistency changes.

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Section 1

Use and Application

1.0 USE AND APPLICATION

1.1 Introduction and Scope

1.1.1 Technical Safety Requirement Applicability

This document contains Technical Safety Requirements (TSRs) for the Defense Waste Processing Facility (DWPF) in S Area. The TSRs contain operating limits, Surveillance Requirements (SRs), and administrative controls necessary to protect the health and safety of the public and to minimize the potential consequence to workers from the uncontrolled release of radioactive or other hazardous materials.

The TSRs are applicable whenever radioactive material is present in the applicable PROCESS AREA.

1.1.2 Methodology

10 CFR 830 governs the methodology and format used in the development of the TSRs. DOE Standard 3009 requires that TSRs be considered for any equipment that is classified as Safety Class or Safety Significant. Chapter 4 and 9 of WSRC-SA-6, DWPF's Final Safety Analysis provides the justification for which structures, systems and components are safety class and safety significant. The requirements placed on the equipment and personnel by this document ensure the safety of the offsite public and onsite worker from chemical and radiological hazards associated with this FACILITY.

1.2 Definitions

----------**NOTE**----------
Defined terms in this list appear in capitalized type throughout the remainder of this TSR.

Term	**Definition**
ACTIONS	That part of a TSR that prescribes Required Actions to be taken under designated Conditions within specified Completion Times.
COMPOSITE LOWER FLAMMABILITY LIMIT (CLFL)	That concentration of a composite of combustible material in air below which ignition will not occur.
CRITERIA	Evaluative CRITERIA, based upon DOE Orders and SRS guidance, that establish a chemical and radiological consequence threshold used in determining process variables important to safety.
DEINVENTORY PLAN	A plan, used to authorize and direct the removal of jumpers or other equipment, including vessels, that cannot be performed within the framework required by the TSR for OPERATION, STANDBY, and SHUTDOWN.
FACILITY	All processes, PROCESS AREAS, and necessary support equipment defined by the Final Safety Analysis Report (FSAR) that are used to perform the mission of DWPF. This term also applies to items, such as staff or procedures, identified in the TSR that perform a function for the FACILITY (e.g., FACILITY Manager).
IMMEDIATELY	IMMEDIATELY is used as a Completion Time when a Condition cannot be permitted to continue and the corresponding Required Action must be initiated without delay and continued until the Required Action is completed or compliance with the associated Limiting Condition for Operation (LCO) statement is restored, or the LCO is no longer applicable.

(continued)

1.2 Definitions (continued)

INSTRUMENT LOOP	The combination of the input device, any signal conditioning elements, and output devices that are required to complete the TSR action of monitoring, protecting, and/or controlling a parameter and/or piece of equipment. Specific INSTRUMENT LOOP numbers are presented in the LCOs, any instrument that has the required accuracy and meets the Surveillance Requirements for the instrument in question may be substituted for that instrument.
INSTRUMENT LOOP CALIBRATION	The adjustment, as necessary, of the loop such that it responds within the required range and accuracy to known values of input. The calibration shall encompass the INSTRUMENT LOOP (i.e., alarm) and may be performed by any series of sequential, overlapping, or total loop steps such that the entire loop is calibrated.
INSTRUMENT LOOP CHECK	The qualitative verification of acceptable performance by observation of INSTRUMENT LOOP behavior. This verification, where possible, includes a comparison of the INSTRUMENT LOOP with another independent INSTRUMENT LOOP, known values, or other circuits/systems monitoring the same variable.
INSTRUMENT LOOP SETPOINT	The value at which the given INSTRUMENT LOOP alarms, or activates a specified interlock. The setpoint value is the value given in the LCOs, plus or minus the INSTRUMENT LOOP CALIBRATION accuracy.
INSTRUMENT LOOP TEST	The injection of a simulated or actual signal (e.g., setpoint value) into the INSTRUMENT LOOP, at the output of the transmitter when practical, to verify OPERABILITY of the alarm, interlock, and/or trip functions (as specified in the Bases of the Surveillance Requirement).

(continued)

1.2 Definitions (continued)

LOWER FLAMMABILITY LIMIT (LFL)	That concentration of a combustible material in air below which ignition will not occur.
MODE	The status or operating condition of a PROCESS AREA. Section 1.6 describes the individual MODES
OPERABLE / OPERABILITY	A system, subsystem, component, or device shall be OPERABLE when it is capable of performing its specified function(s) and when all necessary support equipment required for the system, subsystem, component, or device, to perform its function(s), is also capable of performing its related support function(s). The OPERABILITY of a system, subsystem, component, or device shall be verified by performing SRs at the identified frequency.
PROCESS AREA	A defined DWPF FACILITY area, tank, or process.
RESPONSE PLAN	An approved FACILITY document that specifies, based on existing conditions, the detailed plan of action for restoring compliance with the TSRs. The philosophy, use, and content of RESPONSE PLANS are outlined in Administrative Controls Section 5.4 of this TSR.

1.3 Logical Connectors

PURPOSE

The purpose of this section is to explain the meaning of logical connectors.

Logical connectors are used in this TSR to discriminate between, and yet connect, conditions, Required Actions, completion times, surveillances, and frequencies. The only logical connectors that appear in the TSR are "**AND**" and "**OR**." The physical arrangement of these connectors constitutes logical conventions with specific meanings.

BACKGROUND

Several levels of logic may be used to state ACTIONS. These levels are identified by the placement (or nesting) of the logical connectors and by the number assigned to each Required Action. The first level of logic is identified by the first digit of the number assigned to an Required Action and the placement of the logical connector in the first level of nesting (i.e., left-justified with the number of the Required Action). The successive levels of logic are identified by additional digits of the Required Action number and by successive indentions of the logical connectors.

When logical connectors are used to state a condition, only the first level of logic is normally used. In this case, the logical connector is left-justified with the condition statement. In a few cases, successive levels of logic are used and are identified solely by indenting the logical connector, since subparts of a condition statement are not numbered separately.

When logical connectors are used to state a completion time, surveillance, or frequency, only the first level of logic is used.

(continued)

1.3 Logical Connectors (continued)

EXAMPLES

The following examples illustrate the use of logical connectors.

EXAMPLE 1.3-1

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO is not met.	A.1 Verify . . . **AND** A.2 Restore . . .	

In this example, the logical connector "**AND**" is used to demonstrate that while in Condition A, both Required Actions A.1 and A.2 must be completed.

(continued)

1.3 Logical Connectors (continued)

EXAMPLE 1.3-2

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO is not met.	A.1 Trip . . .	
	OR	
	A.2.1 Verify . . .	
	AND	
	A.2.2.1 Reduce . . .	
	OR	
	A.2.2.2 Perform . . .	
	OR	
	A.3 Align . . .	

This example represents a more complicated use of logical connectors. Required Actions A.1, A.2, and A.3 are alternative choices. Only one of these choices must be performed, as indicated by the use of the logical connector "**OR**" and its left-justified placement in the table. Any one of these three Required Actions may be chosen. If Required Action A.2 (in this example A.2 has two actions A.2.1 and A.2.2) is chosen, then both Required Actions A.2.1 and A.2.2 must be performed, as indicated by the logical connector "**AND**." Required Action A.2.2 (in this example A.2.2 has two actions A.2.2.1 and A.2.2.2) is met by performing Required Action A.2.2.1 or A.2.2.2. The indented position of the logical connector "**OR**" indicates that Required Actions A.2.2.1 and A.2.2.2 are alternative choices. Only one of these Required Actions must be performed.

1.4 Completion Times

PURPOSE	The purpose of this section is to establish the Completion Time convention and to provide guidance for its use.
BACKGROUND	LCOs specify minimum requirements for ensuring safe operation of the FACILITY. The ACTIONS section associated with an LCO states Conditions that describe the ways in which the requirements of the LCO can fail to be met. One or more Required Actions and associated Completion Times are specified with each stated Condition.
DESCRIPTION	The Completion Time is the amount of time allowed for completing a Required Action. The Completion Time starts when the LCO condition is discovered (e.g., inoperable equipment or variable not within limits), provided the FACILITY is in a MODE or specified condition stated in the Applicability Section of the LCO. Required Actions must be completed prior to the expiration of the specified Completion Time. A condition remains in effect, and the Required Actions apply until the condition no longer exists, or the PROCESS AREA is not within the LCO applicability. Certain LCO Required Actions specify Completion Times that are to be performed periodically (e.g., XXX **AND** Every 24 Hours thereafter). For subsequent performances after the initial performance, an extension of the time interval to 1.25 times the stated frequency, as measured from the previous performance, is allowed by LCO 3.0.2 to accommodate operational flexibility. If situations are discovered that require entry into more than one condition at a time within a single LCO (multiple conditions), the Required Actions for each condition must be performed within the associated Completion Time. When in multiple conditions, separate Completion Times are tracked for each condition, starting from the time of discovery of the situation that required entry into the condition. If multiple situations are discovered which require entry into a single LCO condition for independent equipment or PROCESS AREA(s), the Required Actions for each situation must be

(continued)

1.4 Completion Times (continued)

performed within the associated Completion Times. Separate Completion Times are tracked for the individual situations (each piece of equipment or PROCESS AREA). Equipment is considered independent if an "**OR**" separates the equipment in condition statement.

In some cases, IMMEDIATELY is used as a special Completion Time. There is not a definitive time frame associated with IMMEDIATELY. However, the Required Action using IMMEDIATELY as a Completion Time shall be pursued without delay and continued until the Required Action is completed. Use of IMMEDIATELY implies the highest priority for completion.

EXAMPLES

The following examples illustrate the use of Completion Times with different types of conditions and changing conditions.

EXAMPLE 1.4-1

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One purge exhaust fan is inoperable.	A.1 Restore the inoperable purge exhaust fan to OPERABLE status.	7 Days
B. The Required Action and/or associated Completion Time of Condition A are not met.	B.1 Place the affected tank in STANDBY.	8 Hours

(continued)

1.4 Completion Times (continued)

EXAMPLES

When a purge exhaust fan is declared inoperable, Condition A is entered. If the purge exhaust fan is not restored to OPERABLE status within 7 Days, Condition B is entered, and the Completion Time clocks starts for Required Action B.1. If the inoperable purge exhaust fan is restored to OPERABLE status after Condition B is entered, the Required Action of Condition B may be terminated.

When a second purge exhaust fan is declared inoperable while the first purge exhaust fan is still inoperable, Condition A is not re-entered for the second purge exhaust fan. LCO 3.0.3 is entered, since the ACTIONS do not include a condition for more than one inoperable purge exhaust fan. The Completion Time clock for Condition A does not stop after LCO 3.0.3 is entered, but it continues to be tracked from the time Condition A was initially entered.

While in LCO 3.0.3, if one of the inoperable purge exhaust fans is restored to OPERABLE status and the Completion Time for Condition A has <u>not</u> expired, LCO 3.0.3 may be exited and operation continued in accordance with Condition A.

While in LCO 3.0.3, if one of the inoperable purge exhaust fans is restored to OPERABLE status and the Completion Time for Condition A has expired, LCO 3.0.3 may be exited and operation continued in accordance with Condition B. The Completion Time for Condition B is tracked from the time that the Condition A Completion Time expired.

Upon restoring one of the purge exhaust fans to OPERABLE status, the Condition A Completion Time is not reset, but it continues from the time the first purge exhaust fan was declared inoperable.

(continued)

1.4 Completion Times (continued)

EXAMPLES (continued)

EXAMPLE 1.4-2

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One INSTRUMENT LOOP is inoperable.	A.1 Perform SR 4.x.x.x.	Once every 8 Hours
	OR	
	A.2 Establish manual nitrogen flow.	8 Hours
B. The Required Action(s) and/or associated Completion Time(s) of Condition A are not met.	B.1 Place the affected tank in STANDBY.	8 Hours

Entry into Condition A offers a choice between Required Action A.1 and A.2. Required Action A.1 has a "once every" Completion Time. If Required Action A.1 is followed and the Required Action is not met within the Completion Time, Condition B is entered. If Required Action A.2 is followed, and the Completion Time of 8 Hours is not met, Condition B is entered.

If, after entry into Condition B, Required Action A.1 or A.2 is met, Condition B is exited and operation may then continue in Condition A.

1.5 Frequency

PURPOSE

The purpose of this section is to define the proper use and application of frequency requirements. Each SR has a specified frequency in which the surveillance must be met in order to meet the associated LCO. An understanding of the correct application of the specified frequency is necessary for compliance with the SR.

DESCRIPTION

Each Surveillance Requirement (SR) has a specified frequency in which the surveillance must be met in order to meet the associated LCO. An understanding of the correct application of the specified frequency is necessary for compliance with the SR.

The specified frequency is referred to throughout this section and in the safety requirements of Section 4.0, "Surveillance Requirement Applicability." The specified frequency consists of the requirements of the Frequency column of each SR as well as certain NOTES in the Surveillance Requirement column that modify performance requirements. Situations where a surveillance could be required (i.e., its frequency could expire), but where it is not possible or not desired that it be performed until sometime after the associated LCO is within its Applicability, represent potential SR 4.0.4 conflicts. To avoid these conflicts, the SR (i.e., the surveillance or the frequency) is stated such that it is only "required" when it can be and should be performed. With an SR satisfied, SR 4.0.4 imposes no restriction.

EXAMPLES

The following example illustrates the various ways that frequencies are specified. In this example, the LCO Applicability is OPERATION and STANDBY.

EXAMPLE 1.5-1

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.x.x.x	Perform an INSTRUMENT LOOP CHECK.	12 Hours

(continued)

1.5 Frequency (continued)

EXAMPLES (continued)

Example 1.5-1 contains the type of SR most often encountered in the TSR. The frequency specifies an interval (12 Hours) during which the associated surveillance must be performed at least one time. Performance of the surveillance initiates the subsequent interval. Although the frequency is stated as 12 Hours, an extension of the time interval to 1.25 times the stated frequency is allowed by SR 4.0.2 for operational flexibility. The 25% extension should be used on an “as needed” basis and should not be considered as a “normally relied on” frequency. The measurement of this Surveillance interval continues at all times, even when the SR is not required to be met according to SR 4.0.1 (such as when the equipment is inoperable, a variable is outside specified limits, or the FACILITY is outside the Applicability of the LCO). If an SR is not performed within the specified interval, then SR 4.0.3 becomes applicable for entering the ACTIONS and section 1.7 becomes applicable for reportability.

If the interval specified is exceeded while the FACILITY is not in a MODE or other specified condition in the Applicability of the LCO for which performance of the SR is required, the surveillance must be performed within the frequency requirements prior to entry into the MODE or other specified condition. Failure to do so would violate SR 4.0.4.

Special conditions may dictate when a surveillance is to be met. These conditions apply to the surveillance, the frequency, or both. They are "otherwise stated" conditions allowed by SR 4.0.1. They may be stated as clarifying NOTES in the surveillance, the frequency, or both.

(continued)

1.5 Frequency (continued)

1.5.1 Frequency Codes

SRs are an integral part of the LCO and ensure compliance with the LCO. The surveillances are performed on a frequency schedule as specified in the individual SR. The following table indicates each surveillance frequency and its meaning:

Notation	Frequency
4 hours	At least once every 4 hours
12 Hours	At least once every 12 hours
24 hours	At least once every 24 hours
7 Days	At least once every 7 days
1 Month or Monthly	At least once every 30 days
3 Months	At least once every 90 days
6 Months	At least once every 180 days
1 Year or Yearly	At least once every 365 days
18 Months	At least once every 545 days
2 Years	At least once every 730 days
5 Years	At least once every 1825 days
10 Years	At least once every 3650 days

1.6 Modes

This section defines the five MODES for the applicable PROCESS AREAS in DWPF. DWPF consists of many PROCESS AREAS that perform specific, independent functions in the accomplishment of the mission of the FACILITY. Because there are a number of PROCESS AREAS, and their operations can be performed independently of other PROCESS AREAS, a separate MODE designation can apply to each of the identified PROCESS AREAS. Support systems that service several PROCESS AREAS will have a MODE designation the same as the PROCESS AREA in the highest MODE. The MODE designation for the entire FACILITY will be designated by the PROCESS AREA in the highest MODE.

The hierarchy of MODES from highest to lowest is OPERATION, LIMITED PROCESSING, STANDBY, and SHUTDOWN. DEINVENTORIED is a MODE that is entered for the purpose of removing jumpers or other equipment, including vessels, or performing other tasks that cannot be performed within the framework required by the TSR for OPERATION, STANDBY, and SHUTDOWN. LIMITED PROCESSING is a MODE that is unique to the DWTT.

The MODE and PROCESS AREA Applicability of the LCOs is based upon the requirements defined in this section. If a PROCESS AREA does not meet the applicable MODE requirements (after declaration of that MODE), then entry into LCO 3.0.3 is required.

1.6.1 OPERATION

OPERATION is a MODE in which the applicable PROCESS AREA (SRAT, SME, SEFT, PRFT, MFT, RCT, DWTT, Melter, LPPP-SPT, LPPP-PPT, or LPPP-RPT), support system, and/or FACILITY is capable of, or is presently performing its intended mission. TSR-controlled transfers, chemical additions, sludge and salt processing, feed preparation, and vitrification operations are permitted.

Unless prohibited by an LCO (including the respective ACTIONS), limited maintenance activities and performance of SRs are permitted during OPERATION.

1.6.2 LIMITED PROCESSING

LIMITED PROCESSING is a MODE in which operation of the applicable PROCESS AREA (DWTT), support systems, and/or FACILITY is restricted. TSR-controlled transfers, chemical additions, and decontamination activities are permitted.

Unless prohibited by an LCO (including the respective ACTIONS), limited maintenance activities and performance of SRs are permitted during LIMITED PROCESSING.

The DWTT contents shall be $\leq$ 70 ºC. Steam heating of the DWTT is prohibited.

(continued)

1.6 Modes (continued)

1.6.3 STANDBY

STANDBY is a MODE in which operation of the applicable PROCESS AREA (SRAT, SME, SEFT, PRFT, MFT, RCT, DWTT, Melter, LPPP-SPT, LPPP-PPT, or LPPP-RPT), support systems, and/or FACILITY is restricted. The affected TSR-related system shall be placed in a stable condition that is very unlikely to challenge LCOs or to result in an uncontrolled release of hazardous or radioactive material. Radioactive material is permitted in the PROCESS AREAS. In addition, tank and process sampling and tank agitation are permitted except where specifically prohibited by an ACTION. Transfers from sumps are permitted except where specifically prohibited by an ACTION for the receiving tank.

Unless prohibited by an LCO (including the respective ACTIONS), maintenance activities and SRs may be performed during STANDBY. A RESPONSE PLAN should be implemented if performance of maintenance activities requires an operation that is prohibited in STANDBY.

The following PROCESS AREA-specific requirements also apply during STANDBY:

SRAT

The SRAT contents shall be ≤ 70 ºC.

Cold feed chemical additions to the SRAT and/or steam heating of the SRAT is prohibited.

Radioactive process transfers are permitted to and from the SRAT, except from the SEFT and PRFT. Sampling of the contents of the SRAT and addition of water to the SRAT are permitted.

SME

The SME contents shall be ≤ 70 ºC.

Cold feed chemical additions to the SME and/or steam heating of the SME are prohibited.

Radioactive process transfers to and from the SME, sampling of the contents of the SME, and the addition of water and spent frit to the SME are permitted.

(continued)

1.6 Modes (continued)

1.6.3 STANDBY (continued)

SEFT and PRFT

Cold feed chemical additions to the SEFT and PRFT are prohibited.

Radioactive process transfers to and from the SEFT and PRFT, sampling of the contents of the SEFT and PRFT, and addition of water to the SEFT and PRFT are permitted.

MFT

Cold feed chemical additions to the MFT are prohibited.

Radioactive process transfers to or from the MFT, sampling of the contents of the MFT, and addition of water to the MFT are permitted.

RCT

Cold feed chemical additions to the RCT are prohibited.

Chemical and radiological waste additions from lab drains are permitted.

Radioactive process transfers to or from the RCT, sampling of the contents of the RCT, and addition of water to the RCT are permitted.

DWTT

The DWTT contents shall be $\leq$ 70 ºC.

Cold feed chemical additions to the DWTT and/or steam heating of the DWTT is prohibited.

Radioactive process transfers to or from the DWTT, sampling of the contents of the DWTT, and addition of water to the DWTT are permitted.

Melter

Radioactive process transfers (feeding) to the melter are prohibited. Melter heaters or other components may be temporarily deenergized or disabled for maintenance or other reasons.

LPPP-PPT, LPPP-SPT, and LPPP-RPT

Radioactive process transfers to the LPPP-PPT, LPPP-SPT, and LPPP-RPT are prohibited.

Radioactive process transfers from the LPPP-PPT, LPPP-SPT, and LPPP-RPT are permitted.

Transfers from the LPPP-PPT, LPPP-SPT, and LPPP-RPT sumps are permitted.

(continued)

1.6 Modes (continued)

1.6.4 SHUTDOWN

SHUTDOWN is a MODE in which operation of the applicable PROCESS AREA (SRAT, SME, SEFT, PRFT, MFT, RCT, DWTT, LPPP-SPT, LPPP-PPT, or LPPP-RPT), support systems, and/or FACILITY is stopped. The affected PROCESS AREA shall be placed in a stable condition that is very unlikely to challenge LCOs or to result in an uncontrolled release of hazardous or radioactive material. Radioactive material is permitted in the PROCESS AREAS. Transfers and processing of material in PROCESS AREAS is prohibited, except as allowed by an approved RESPONSE PLAN, or as permitted by the ACTIONS. Process sampling is permitted except where specifically prohibited by an ACTION. Unless prohibited by an LCO (including the respective ACTIONS), maintenance activities and SRs may be performed.

The following PROCESS AREA-specific requirements also apply during SHUTDOWN:

<u>SEFT, PRFT, SRAT, SME, MFT, RCT, and DWTT</u>

Transfers in and out of, cold feed chemical addition to, or steam heating of the affected PROCESS AREAS are prohibited.

Chemical and radiological waste additions from lab drains are permitted in the RCT.

The SRAT, SME, and DWTT contents shall be less than or equal to 70ºC.

Addition of water is permitted.

<u>LPPP-PPT, LPPP-SPT, and LPPP-RPT</u>

Radioactive process transfers to and from LPPP-PPT, LPPP-SPT, and LPPP-RPT are prohibited.

1.6.5 DEINVENTORIED

DEINVENTORIED is a MODE that is entered by a PROCESS AREA (SRAT, SME, SEFT, PRFT, MFT, RCT, DWTT, Melter, LPPP-SPT, LPPP-PPT, or LPPP-RPT), support system, or FACILITY to perform activities (e.g., removing jumpers or other equipment, including vessels) that cannot be performed within the framework required by the TSR for OPERATION, LIMITED PROCESSING, STANDBY, and SHUTDOWN. Entry into DEINVENTORIED, and operations conducted while in this MODE, shall be performed in accordance with an approved DEINVENTORY PLAN. Section 5.5 of the Administrative Controls details additional requirements related to the development and implementation of DEINVENTORY PLANS.

Section 2

Safety Limits

2.0 SAFETY LIMITS

2.1 Safety Limits

As defined in 10 CFR Part 830, Safety Limits (SLs) are limits on process variables associated with those safety class physical barriers, generally passive, that are necessary for the intended facility function and that are required to guard against the uncontrolled release of radioactive material. The Safety Analysis did not determine any one single limit that, if exceeded, could directly cause the failure of a barrier which prevents the release of radioactive materials, with the potential of consequences to the public above specified evaluation guidelines. Therefore, DWPF does not require any Safety Limits per Chapter 11 of the FSAR.

As defined in 10 CFR Part 830, Limiting Control Settings (LCSs) are settings on safety systems that control process variables to prevent exceeding a safety limit. No SLs have been identified for the FACILITY; therefore, there are no LCSs.

Section 3/4

Limiting Control Settings,

Limiting Conditions for Operation,

and Surveillance Requirements

3/4.0 APPLICABILITY

3.0 Limiting Conditions for Operation

3.0.1 Limiting Conditions for Operation (LCOs) shall be met for the MODES, PROCESS AREAS, or other conditions specified in the individual LCOs, except as provided in LCO 3.0.2.

3.0.2 Upon discovery of failure to satisfy an LCO statement, the associated ACTIONS shall be entered except as provided in LCO 3.0.6. If compliance with the associated LCO is restored or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required, unless otherwise stated. Conditions in an LCO's ACTIONS Section may be concurrently applicable.

The Completion Times for Required Action(s) are also applicable when a system or component is intentionally removed from service. Acceptable reasons for intentionally entering ACTIONS for an LCO include, but are not limited to, performance of Surveillance Requirements (SRs), preventive maintenance, corrective maintenance, or investigation of operational problems.

For Completion Time(s) in Required Action(s) that require periodic performance on a “once per…Days” or “every…Hours thereafter” basis, the specified Completion Time is met for each performance after the initial performance if the Required Action is performed within 1.25 times the interval specified. The 25% extension may be applied to any performance after the initial performance of all recurring Required Actions, unless otherwise stated in individual LCOs (This 25% extension should not be relied upon as a routine extension of the specified Completion Time).

(continued)

3/4.0 APPLICABILITY

3.0 Limiting Conditions for Operation (continued)

3.0.3 When an LCO is not met, and the associated ACTIONS are not met or an associated ACTION is not provided, steps shall be initiated, within 1 Hour, to place each affected PROCESS AREA in a MODE to which the LCO does not apply. The affected PROCESS AREA(S) shall be in that MODE within the next 24 Hours. If the affected PROCESS AREA has not been placed within a MODE in which the LCO does not apply within 24 Hours, then continued actions should be taken within the confines of a RESPONSE PLAN.

Some LCOs apply in OPERATION, STANDBY, and SHUTDOWN. In the event LCO 3.0.3 is entered from one of these LCOs, steps shall be initiated within 1 Hour to stop all sampling and transfers into and out of the affected PROCESS AREA(S) and to place any affected PROCESS AREA(S) which is in OPERATION to STANDBY. The affected PROCESS AREA(S) shall be in STANDBY within 24 Hours. In addition to stopping sampling and transfers and placing the PROCESS AREA(S) in STANDBY, an approved RESPONSE PLAN shall be developed and initiated within 24 Hours with the guidance of Administrative Control 5.4. The PROCESS AREA(S) shall be controlled in accordance with the approved RESPONSE PLAN until LCO compliance is restored.

Additionally, some LCOs do not address the associated Required Action(s) for a PROCESS AREA based on the PROCESS AREA MODE requirements. Upon discovery of a failure to satisfy a requirement for a PROCESS AREA MODE defined in Section 1.6 of this TSR, activities shall be initiated within 1 Hour to restore compliance with the affected PROCESS AREA MODE requirement(s) or transition the affected PROCESS AREA(S) to a MODE which satisfies the PROCESS AREA MODE requirements. The affected PROCESS AREA(S) shall be in compliance with the PROCESS AREA MODE requirement(s) or transitioned to a MODE which satisfies the PROCESS AREA MODE requirements within 24 Hours. If unable to complete the required compliance restoration or MODE transition within 24 Hours, an approved RESPONSE PLAN shall be developed and initiated within 24 Hours using the guidance in Administrative Control 5.4, RESPONSE PLANS, of this TSR. The PROCESS AREA(S) shall be controlled in accordance with the approved RESPONSE PLAN until PROCESS AREA MODE requirement(s) or LCO compliance is restored.

A TSR violation does not occur if there is a planned or purposeful entry into LCO 3.0.3 and a DOE approved RESPONSE PLAN is initiated prior to expiration of the Completion Times.

(continued)

3/4.0 APPLICABILITY

3.0 Limiting Conditions for Operation (continued)

3.0.3 (continued) When corrective measures are completed that permit operation in accordance with the PROCESS AREA MODE requirement, or the LCO or its ACTIONS, completion of the ACTIONS specified by LCO 3.0.3 is not required.

LCO 3.0.3 is applicable in all MODES. Exceptions to LCO 3.0.3 may be stated in the individual LCOs. LCO 3.0.3 shall not be interpreted to require placing a PROCESS AREA in a higher MODE (e.g., requiring a PROCESS AREA in SHUTDOWN to be placed in STANDBY) or to require placing a PROCESS AREA in DEINVENTORIED.

3.0.4 Entry into any MODE or other specified condition in the Applicability shall not be made unless the LCO(s) that apply in that MODE are met, or unless the associated ACTIONS permit continued operation of the affected PROCESS AREA in that MODE or other specified condition in the LCO Applicability for an unlimited period of time. This provision shall not prevent changes in MODES or other specified conditions of the individual LCO that are required by the ACTIONS. This provision also shall not prevent PROCESS AREA(s) from being placed in a lower MODE while in LCO Condition(s) which apply in both MODES (the current and proposed MODES) provided the LCO(s) ACTIONS that apply are being met.

Exceptions to LCO 3.0.4 may be stated in the individual LCOs.

3.0.5 Equipment removed from service or declared inoperable in order to comply with ACTIONS may be returned to service, under administrative control, to perform testing required to demonstrate OPERABILITY of the affected equipment or associated equipment. This is an exception to LCO 3.0.2 for the system or component returned to service under administrative control to perform the testing required to demonstrate OPERABILITY.

3.0.6 When a support system is inoperable and an LCO for that support system is specified in the TSR, the supported system is not required to be declared inoperable due solely to support system inoperability. Only the ACTIONS of the support system's LCO are required to be entered. This is an exception to LCO 3.0.2 for the supported system.

When a support system is inoperable and there is not an LCO for that support system specified in the TSR, the impact of the inoperability or degradation of the support system's function on the OPERABILITY of the supported system shall be evaluated. Upon determination that the supported system is inoperable, the ACTIONS of its LCO shall apply.

3/4.0 APPLICABILITY

4.0 Surveillance Requirements

4.0.1 SRs shall be met for the MODES, PROCESS AREAS, or other conditions specified for the applicable LCO, unless otherwise stated in the individual SR. Failure to meet an SR within the specified frequency shall constitute failure to meet the LCO except as provided in SR 4.0.3. SRs do not have to be performed on inoperable equipment or variables outside specified limits. However, successful performance of applicable surveillances is necessary to return equipment to OPERABLE status.

4.0.2 The specified frequency of each SR is met if the SR is performed within 1.25 times the interval specified in the frequency. The 25% extension allowance is not applicable to non-periodic or conditional SRs. (This 25% extension is intended for operational flexibility both for scheduling and for performing surveillances. It should not be relied upon as a routine extension of the specified interval.)

If the periodic frequency statement for an SR contains applicability restrictions (e.g., every 24 Hours during OPERATION), the frequency shall be considered periodic and the 25% extension allowance may be applied. Frequency statements such as "Within 12 Hours prior to OPERATION", "During Installation" or "Within 30 Days following …" are conditional, and therefore the 25% extension allowance is not applicable.

(continued)

3/4.0 APPLICABILITY

4.0 Surveillance Requirements (continued)

4.0.3 Failure to perform an SR within the specified interval of SR 4.0.2, as well as any failure to meet an SR, shall constitute a failure to meet the OPERABILITY requirements of the LCO. The LCO ACTIONS shall be entered at the time it is determined that the SR has not been performed or is not met, except as provided below.

If it is discovered that an SR was not performed within the specified interval of SR 4.0.2, a delay period of 24 Hours or up to the limit of the specified frequency, whichever is less, is provided to permit completion of the SR prior to requiring the ACTIONS to be entered. If the SR is not performed within the delay period, entry into the applicable ACTION(S) occurs IMMEDIATELY upon expiration of the delay period. When the SR is performed within the delay period and the SR is not met, entry into the applicable ACTIONS occurs IMMEDIATELY upon failure to meet the SR. The delay period is not applicable to non-periodic or conditional SRs unless specifically noted in the frequency. Exceptions to the delay period of SR 4.0.3 are stated in the individual SRs. Use of this delay period is a TSR violation and must be reported to DOE per Section 5.9.2.

4.0.4 Entry into any MODE or other specified condition in the Applicability of an LCO shall not be made unless the SRs for the applicable LCOs have been met or the associated ACTIONS permit continued operation of the affected PROCESS AREA in that MODE or other specified condition in the LCO Applicability for an unlimited period of time. This provision shall not prevent passage through or to MODES as necessary to comply with ACTION(S).

Exceptions to SR 4.0.4 may be stated in the individual SRs.

3/4.1 CPC/SPC FLAMMABILITY CONTROL

3.1.1 CPC Flammability Monitoring

LCO 3.1.1 The hydrogen concentration in the SRAT shall be less than or equal to 60% of the LFL.

AND

The hydrogen concentration in the SME shall be less than or equal to 60% of the LFL.

AND

One SRAT gas chromatograph (AIT-8795 or AIT-8796) and local indicator (AX-8799), one SME gas chromatograph (AIT-8797 or AIT-8798) and local indicator (AX-8800) and associated LFL interlocks in Table 3.1.1-1 shall be OPERABLE.

MODE APPLICABILITY: OPERATION

PROCESS AREA APPLICABILITY: SRAT and SME

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. The hydrogen concentration in the SRAT is greater than 60%, but less than 80%, of the LFL. **OR** The hydrogen concentration in the SME is greater than 60%, but less than 80%, of the LFL.	---------------**NOTE**--------------- The interlock function should isolate the affected process vessel(s) from nitric and formic acid as well as stopping the addition from the PFSFT. --------------------------------------	
	A.1 Stop all transfers into the affected process vessel(s).	IMMEDIATELY
	AND	
	--------------**NOTE-1**-------------- Required Action A.2 should have been performed by interlock function. -------------------------------------- --------------**NOTE-2**-------------- The performance of Required Action A.2 for the SRAT should initiate the low steam flow interlock for the SRAT, as described in LCO 3.1.11. The interlock stops transfers from the SEFT and PRFT to the SRAT. --------------------------------------	
	A.2 Isolate the steam supply to the affected process vessel(s).	IMMEDIATELY
	AND	
	(continued)	

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	----------**NOTE**---------- Performance of Required Action A.3 requires entry into LCO 3.1.6 Condition B. ----------	
	A.3 Open fully the affected process vessel(s) manual purge flow control valve to maximize purge flow.	IMMEDIATELY
	AND	
	A.4 Stop all maintenance activities in the CPC.	IMMEDIATELY
	AND	
	A.5 Place the affected process vessel(s) in STANDBY.	Within 2 Hours after the affected process vessel's contents are ≤ 70°C

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. The hydrogen concentration in the SRAT is greater than or equal to 80% LFL. **OR** The hydrogen concentration in the SME is greater than or equal to 80% LFL.	----------**NOTE**---------- Required Actions B.1, B.2, B.3 and B.4 are the same as actions A.1, A.2, A.3, and A.4. ---------- B.1 Stop all transfers into the affected process vessel(s). **AND** ----------**NOTE**---------- The performance of Required Action B.2 for the SRAT should initiate the low steam flow interlock for the SRAT, as described in LCO 3.1.11. The interlock stops transfers from the SEFT and PRFT to the SRAT. ---------- B.2 Isolate the steam supply to the affected process vessel(s). **AND** (continued)	 IMMEDIATELY IMMEDIATELY

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	----------**NOTE**---------- Performance of Required Action B.3 requires entry into LCO 3.1.6 Condition B. ----------	
	B.3 Open fully the affected process vessel(s) manual purge flow control valve to maximize purge flow.	IMMEDIATELY
	AND	
	B.4 Stop all maintenance activities in the CPC.	IMMEDIATELY
	AND	
	B.5 Stop the affected process vessel(s) agitator, sample pump and transfer pump(s).	IMMEDIATELY
	AND	
	B.6 Place the affected process vessel(s) in STANDBY.	Within 2 Hours after the affected process vessel's contents are ≤ 70°C.

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Both SRAT Gas Chromatographs (AIT-8795 and AIT-8796), local indication (AX-8799) or associated interlocks are inoperable. **OR** Both SME Gas Chromatographs (AIT-8797 and AIT-8798), local indication (AX-8800) or associated interlocks are inoperable.	----------**NOTE**---------- The interlock functions associated with the Gas Chromatograph(s) should isolate the affected process vessel(s) from nitric and formic acid as well as stopping the addition from the PFSFT. ---------- C.1 Stop all transfers into the affected process vessel(s). **AND** ----------**NOTE-1**---------- Required Action C.2 should be performed by interlock function. ---------- ----------**NOTE-2**---------- The performance of Required Action C.2 for the SRAT should initiate the low steam flow interlock for the SRAT, as described in LCO 3.1.11. The interlock stops transfers from the SEFT and PRFT to the SRAT. ---------- C.2 Isolate the steam supply to the affected process vessel(s). **AND** (continued)	IMMEDIATELY IMMEDIATELY

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.3 Stop all maintenance activities in the CPC.	IMMEDIATELY
	AND	
	C.4 Place the affected process vessel(s) in STANDBY.	Within 2 Hours after the affected process vessel's contents are ≤ 70°C

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.1.1	Verify that the LFL concentration in the SRAT is less than or equal to 60% locally at AX-8799.	12 Hours
SR 4.1.1.2	Verify that the LFL concentration in the SME is less than or equal to 60% locally at AX-8800.	12 Hours
SR 4.1.1.3	Perform an INSTRUMENT LOOP CALIBRATION on the SRAT gas chromatographs LFL function (AIT-8795 and AIT-8796) See Table 3.1.1-1.	7 Days
SR 4.1.1.4	Perform an INSTRUMENT LOOP CALIBRATION on the SME gas chromatographs LFL function (AIT-8797 and AIT-8798) See Table 3.1.1-1.	7 Days
SR 4.1.1.5	Perform an INSTRUMENT LOOP TEST on the SRAT gas chromatograph Hi LFL interlock functions detailed in Table 3.1.1-1.	1 Year
SR 4.1.1.6	Perform an INSTRUMENT LOOP TEST on the SME gas chromatograph Hi LFL interlock functions detailed in Table 3.1.1-1.	1 Year

Table 3.1.1-1 CPC Flammability Monitoring Instrumentation and Automatic Interlocks

Process Area	Required Instrumentation	Setpoint	Mode	LCO Condition
SRAT	LFL Monitoring			
	i. GC #1 (AIT-8795)	N/A	OPERATION	LCO 3.1.1 Condition C
	ii. GC #2 (AIT-8796)	N/A	OPERATION	LCO 3.1.1 Condition C
	iii. LFL Hi Interlock (1)	≤ 60% LFL	OPERATION	LCO 3.1.1 Condition C
	iv. GC Indication (AX-8799)	N/A	OPERATION	LCO 3.1.1 Condition C
SME	LFL Monitoring			
	i. GC #1 (AIT-8797)	N/A	OPERATION	LCO 3.1.1 Condition C
	ii. GC #2 (AIT-8798)	N/A	OPERATION	LCO 3.1.1 Condition C
	iii. LFL Hi Interlock (2)	≤ 60% LFL	OPERATION	LCO 3.1.1 Condition C
	iv. GC Indication (AX-8800)	N/A	OPERATION	LCO 3.1.1 Condition C

Footnotes:

(1) The SRAT LFL Hi Hardwired Interlock will:
- Close FCV-3000 (steam), FCV-0716 (nitric), and FCV-2045 (formic)

(2) The SME LFL Hi Hardwired Interlock will:
- Close FCV-3080 (steam), FCV-3119 (nitric), and FCV-2044 (formic)
- Stop the PFSFT transfer pump.

CROSS-REFERENCES:

TITLE	NUMBER
1. SRAT, SME, SMECT, and DWTT Flammability Control - Operation	3.1.3
2. CPC Purge Source	3.1.6
3. SRAT Temperature and Steam Flow Monitoring	3.1.11

3/4.1 CPC/SPC FLAMMABILITY CONTROL

3.1.2 CPC Temperature Requirements

LCO 3.1.2 This LCO has been deleted.

3/4.1 CPC/SPC FLAMMABILITY CONTROL

3.1.3 SRAT, SME, SMECT, and DWTT Flammability Control - Operation

LCO 3.1.3 The Primary purge system shall supply a purge flow to the SRAT greater than or equal to 222 scfm.

AND

The Primary purge system shall supply a purge flow to the SME greater than or equal to 86 scfm.

AND

The Primary purge system shall supply a purge flow to the SMECT greater than or equal to 12 scfm.

AND

The Primary purge system shall supply a purge flow to the DWTT greater than or equal to 61 scfm.

AND

The CPC purge header pressure shall be greater than or equal to 72 psig.

AND

The CPC Purge Header Pressure Indicator (PI-1233) shall be OPERABLE.

MODE APPLICABILITY: OPERATION

PROCESS AREA APPLICABILITY: SRAT, SME, and DWTT

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------**NOTE**---------- This Condition is not entered due to one inoperable flow instrument on a process vessel. ---------- A. The Primary purge system flow to the SRAT is less than 222 scfm. **OR** The Primary purge system flow to the SME is less than 86 scfm. **OR** The Primary purge system flow to the DWTT is less than 61 scfm.	----------**NOTE**---------- The interlock function for the SRAT and SME should isolate the affected process vessel(s) from nitric and formic acid as well as stopping the addition from the PFSFT. ---------- A.1 Stop all transfers into the affected process vessel(s). **AND** (continued)	IMMEDIATELY

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	----------**NOTE-1**---------- Required Action A.2 should be performed by interlock function for the SRAT and SME. ---------- ----------**NOTE-2**---------- The performance of Required Action A.2 for the SRAT should initiate the low steam flow interlock for the SRAT, as described in LCO 3.1.11. The interlock stops transfers from the SEFT and PRFT to the SRAT. ----------	
	A.2 Isolate the steam supply to the affected process vessel(s).	IMMEDIATELY
	AND	
	A.3 Establish a purge flow within the STANDBY limits to the affected process vessel(s) using any available source.	IMMEDIATELY
	AND	
	A.4 Place the affected process vessel(s) in STANDBY.	Within 2 Hours after the affected process vessel's contents are $\leq$ 70ºC

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------**NOTE-1**---------- This Condition is not entered due to one inoperable flow instrument on the SMECT. ---------- ----------**NOTE-2**---------- This Condition is not to be exited until the Required Action B.3 has been completed and the purge flow maintained until the minimum amount of vessel purge volume per Table 3.1.4-2 has been supplied for the SMECT. ---------- B. The Primary purge system flow to the SMECT is less than 12 scfm.	B.1 Stop all transfers into the SRAT and SME. **AND** ----------**NOTE**---------- The performance of Required Action B.2 should initiate the low steam flow interlock for the SRAT, as described in LCO 3.1.11. The interlock stops transfers from the SEFT and PRFT to the SRAT. ---------- B.2 Isolate steam to the SRAT and SME. **AND** (continued)	IMMEDIATELY IMMEDIATELY

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)		----------**NOTE**---------- If the purge is less than the LCO requirement prior to supplying the minimum amount of vessel purge volume per Table-3.1.4-2, then the subsequent Completion Time for the Required Action B.3 is reduced by the amount of time used to re-establish purge flow for the prior losses for the SMECT. ----------
	B.3 Establish a purge flow greater than or equal to 12 scfm to the SMECT using any available source.	Within the recovery time of Table 3.1.4-1 for the SMECT
	AND	
	B.4 Place the SRAT and SME in STANDBY.	Within 2 Hours after the affected process vessel's contents are $\leq$ 70ºC

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------**NOTE**---------- This Condition is not entered solely due to inoperable Pressure Indicator (PI-1233) unless entering due to Required Actions and/or associated Completion Time of Condition D are not met. ---------- C. CPC Purge Header Pressure Indicator (PI-1233) reading is less than 72 psig. **OR** Required Actions and/or associated Completion Time of Condition D are not met.	C.1 Stop all transfers into the SRAT, SME, and DWTT. **AND** ----------**NOTE**---------- The performance of Required Action C.2 should initiate the low steam flow interlock for the SRAT, as described in LCO 3.1.11. The interlock stops transfers from the SEFT and PRFT to the SRAT. ---------- C.2 Isolate steam to the SRAT, SME, and DWTT. **AND** C.3 Place the SRAT, SME, and DWTT in STANDBY.	IMMEDIATELY IMMEDIATELY Within 2 Hours after the vessel's contents are $\leq$ 70ºC

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. CPC Purge Header Pressure Indicator (PI-1233) is inoperable.	----------**NOTE**---------- LCO 3.0.4 is not applicable. ---------- D.1 Verify the Safety Grade nitrogen system is not supplying the purge flow. **AND** D.2 Restore inoperable equipment to OPERABLE status.	1 Hour **AND** Every 4 Hours thereafter 72 Hours

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.3.1	Verify that the Primary purge system flow to the SRAT is greater than or equal to 222 scfm locally.	12 Hours
SR 4.1.3.2	Verify that the Primary purge system flow to the SME is greater than or equal to 86 scfm locally.	12 Hours
SR 4.1.3.3	Verify that the Primary purge system flow to the SMECT is greater than or equal to 12 scfm locally.	12 Hours
SR 4.1.3.4	Verify that the CPC Purge Header Pressure Indicator (PI-1233) is reading greater than or equal to 72 psig.	12 Hours

(continued)

SURVEILLANCE REQUIREMENTS: (continued)

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.3.5	Perform an INSTRUMENT LOOP CALIBRATION on the CPC Purge Header Pressure Indicator (PI-1233).	1 Year
SR 4.1.3.6	Verify that the Primary purge system flow to the DWTT is greater than or equal to 61 scfm locally.	12 Hours

CROSS-REFERENCES:

TITLE	NUMBER
1. CPC Flammability Monitoring	3.1.1
2. SRAT, SME, SMECT, and DWTT Flammability Control – Limited Processing, Standby, and Shutdown	3.1.4
3. CPC Purge Source	3.1.6
4. SRAT Temperature and Steam Flow Monitoring	3.1.11

3/4.1 CPC/SPC FLAMMABILITY CONTROL

3.1.4 SRAT, SME, SMECT, and DWTT Flammability Control - Limited Processing, Standby, and Shutdown

LCO 3.1.4 The purge flow to the SRAT shall be greater than or equal to 142 scfm.

AND

The purge flow to the SME shall be greater than or equal to 51 scfm.

AND

The purge flow to the SMECT shall be greater than or equal to 12 scfm.

AND

The purge flow to the DWTT shall be greater than or equal to 23 scfm.

----------**NOTE**----------

Purge can be supplied by either of the two CPC Purge Systems (Primary Purge or the Safety Grade Nitrogen Purge system).

MODE APPLICABILITY:

SRAT:	STANDBY and SHUTDOWN
SME:	STANDBY and SHUTDOWN
DWTT:	LIMITED PROCESSING, STANDBY, and SHUTDOWN

PROCESS AREA APPLICABILITY: SRAT, SME, and DWTT

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------**NOTE-1**--------- This Condition is not entered due to one inoperable flow instrument on a process vessel. ---------- ----------**NOTE-2**--------- This Condition is not to be exited until the Required Action A.1 has been completed and the purge flow maintained until the minimum amount of vessel purge volume per Table 3.1.4-2 has been supplied for the affected vessel(s). ----------		----------**NOTE**---------- If the purge is less than the LCO requirement prior to supplying the minimum amount of vessel purge volume per Table 3.1.4-2, then the subsequent Completion Time for the Required Action A.1 is reduced by the amount of time used to re-establish purge flow for the prior losses for the affected vessel(s). ----------
A. The purge flow to the SRAT is less than 142 scfm. **OR** The purge flow to the SME is less than 51 scfm. **OR** The purge flow to the SMECT is less than 12 scfm. **OR** The purge flow to the DWTT is less than 23 scfm.	A.1 Establish a purge flow greater than or equal to the minimum purge requirement for the affected process vessel(s) using any available source.	Within the recovery time of Table 3.1.4-1 for the affected process vessel(s)

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.4.1	Verify that the purge flow to the SRAT is greater than or equal to 142 scfm locally.	12 Hours
SR 4.1.4.2	Verify that the purge flow to the SME is greater than or equal to 51 scfm locally.	12 Hours
SR 4.1.4.3	Verify that the purge flow to the SMECT is greater than or equal to 12 scfm locally.	12 Hours
SR 4.1.4.4	Verify that the purge flow to the DWTT is greater than or equal to 23 scfm locally.	12 Hours

Table 3.1.4-1
SRAT Recovery Times (Time to CLFL)

		← CONSERVATIVE ←																									
		70° C		65° C		60° C		55° C		50° C		45° C		40° C		35° C		30° C		25° C		20° C		15° C		10° C	
	Liquid Volume gal	Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min	
↑ CONSERVATIVE ↑	10928	0	17	0	22	0	27	0	31	0	36	0	41	0	47	0	53	0	59	1	07	1	15	1	26	1	38
	10500	0	25	0	32	0	38	0	45	0	52	0	59	1	07	1	15	1	24	1	35	1	48	2	03	2	21
	10000	0	35	0	44	0	52	1	01	1	11	1	20	1	31	1	42	1	55	2	10	2	28	2	49	3	15
	9500	0	45	0	56	1	07	1	19	1	30	1	43	1	56	2	11	2	27	2	47	3	10	3	37	4	11
	9000	0	56	1	09	1	23	1	36	1	51	2	06	2	22	2	40	3	01	3	25	3	54	4	28	5	12
	8500	1	07	1	23	1	39	1	55	2	12	2	30	2	49	3	11	3	36	4	05	4	40	5	22	6	16
	8000	1	19	1	37	1	56	2	15	2	34	2	55	3	18	3	43	4	13	4	47	5	29	6	20	7	25
	7500	1	32	1	53	2	14	2	35	2	58	3	21	3	48	4	17	4	51	5	32	6	21	7	21	8	39
	7000	1	46	2	09	2	32	2	56	3	22	3	49	4	19	4	53	5	32	6	19	7	16	8	27	9	59
	6500	2	00	2	26	2	52	3	19	3	47	4	18	4	51	5	30	6	14	7	08	8	14	9	37	11	26
	6000	2	16	2	44	3	13	3	42	4	14	4	48	5	25	6	08	6	59	8	00	9	16	10	52	12	59
	5500	2	42	3	15	3	48	4	23	5	00	5	40	6	25	7	16	8	16	9	28	10	58	12	51	15	21
	5000	3	12	3	51	4	31	5	13	5	57	6	44	7	37	8	37	9	48	11	14	13	01	15	14	18	12
	4500	3	50	4	36	5	24	6	13	7	05	8	02	9	05	10	17	11	41	13	23	15	30	18	09	21	41
	4000	4	38	5	33	6	30	7	29	8	32	9	39	10	55	12	21	14	03	16	05	18	38	21	48	26	03
	3500	5	40	6	46	7	55	9	07	10	23	11	45	13	17	15	02	17	05	19	34	22	39	26	30	31	39
	3000	7	02	8	24	9	49	11	17	12	51	14	33	16	26	18	35	21	08	24	12	28	00	32	46	39	08
	2500	8	57	10	41	12	28	14	20	16	19	18	28	20	51	23	35	26	48	30	41	35	31	41	33	49	38
	2000	11	51	14	07	16	28	18	55	21	32	24	21	27	30	31	06	35	19	40	26	46	48	54	44	65	22
	1500	16	41	19	51	23	08	26	35	30	13	34	11	38	35	43	37	49	32	56	41	65	36	76	44	91	36
	1000	26	21	31	20	36	30	41	54	47	38	53	50	60	45	68	40	77	58	89	13	103	14	120	43	144	06

NOTE: If a questionable value of temperature or volume is present, the conservative value of liquid temperature (higher temperature is conservative) and volume (higher volume is conservative) shall be used. The temperature and volume used for the recovery time determination is the liquid temperature value that existed prior to entry into this Condition. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach CLFL. Recovery times are not re-calculated for conditions that increase the vapor space or decrease the liquid level or temperature during purge recovery.

(continued)

Table 3.1.4-1 (continued)
SME Recovery Times (Time to CLFL)

		← CONSERVATIVE ←																									
		70° C		65° C		60° C		55° C		50° C		45° C		40° C		35° C		30° C		25° C		20° C		15° C		10° C	
	Liquid Volume gal	Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min	
↑ CONSERVATIVE ↑	11298	0	11	0	15	0	19	0	23	0	27	0	31	0	35	0	39	0	44	0	49	0	55	1	01	1	08
	11000	0	17	0	22	0	28	0	33	0	39	0	45	0	51	0	57	1	04	1	11	1	19	1	28	1	39
	10500	0	26	0	35	0	43	0	52	1	00	1	09	1	18	1	28	1	38	1	50	2	03	2	17	2	34
	10000	0	37	0	48	0	59	1	10	1	22	1	34	1	47	2	00	2	15	2	31	2	49	3	09	3	33
	9500	0	47	1	01	1	15	1	30	1	45	2	01	2	17	2	34	2	53	3	14	3	37	4	04	4	36
	9000	0	59	1	16	1	33	1	51	2	10	2	29	2	49	3	10	3	33	3	59	4	29	5	03	5	43
	8500	1	12	1	31	1	52	2	13	2	35	2	58	3	22	3	47	4	15	4	47	5	24	6	06	6	56
	8000	1	25	1	47	2	11	2	36	3	02	3	28	3	56	4	27	5	00	5	38	6	23	7	14	8	15
	7500	1	40	2	05	2	32	3	00	3	30	4	00	4	33	5	08	5	48	6	33	7	25	8	26	9	41
	7000	1	55	2	24	2	54	3	26	3	59	4	34	5	11	5	52	6	38	7	30	8	32	9	45	11	14
	6500	2	12	2	44	3	18	3	53	4	31	5	10	5	52	6	39	7	31	8	32	9	44	11	09	12	56
	6000	2	30	3	05	3	43	4	23	5	04	5	48	6	36	7	28	8	28	9	38	11	02	12	41	14	47
	5500	2	59	3	41	4	25	5	12	6	01	6	53	7	49	8	51	10	02	11	24	13	03	15	01	17	30
	5000	3	34	4	24	5	17	6	12	7	09	8	11	9	17	10	31	11	55	13	33	15	30	17	49	20	45
	4500	4	18	5	17	6	20	7	25	8	34	9	47	11	06	12	33	14	13	16	10	18	29	21	15	24	45
	4000	5	14	6	25	7	40	8	58	10	21	11	48	13	23	15	08	17	07	19	27	22	15	25	34	29	46
	3500	6	26	7	52	9	24	10	59	12	39	14	25	16	20	18	27	20	52	23	42	27	06	31	07	36	13
	3000	8	03	9	50	11	43	13	41	15	45	17	55	20	17	22	55	25	54	29	24	33	35	38	34	44	52
	2500	10	20	12	36	15	00	17	30	20	06	22	52	25	52	29	11	32	59	37	24	42	43	49	01	57	01
	2000	13	47	16	48	19	58	23	15	26	41	30	20	34	16	38	39	43	38	49	28	56	27	64	46	75	18
	1500	19	34	23	49	28	16	32	54	37	53	42	59	48	31	54	39	61	38	69	48	79	37	91	17	106	04
	1000	31	13	37	56	44	58	52	15	59	34	67	36	76	18	85	56	96	56	109	46	125	11	143	31	166	45

NOTE: If a questionable value of temperature or volume is present, the conservative value of liquid temperature (higher temperature is conservative) and volume (higher volume is conservative) shall be used. The temperature used for the recovery time determination is the liquid temperature value that existed prior to entry into this Condition. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach CLFL. Recovery times are not re-calculated for conditions that increase the vapor space or decrease the liquid level or temperature during purge recovery.

(continued)

Table 3.1.4-1 (continued)
SMECT Recovery Times (Time to CLFL)

		← CONSERVATIVE ←																	
		50° C		45° C		40° C		35° C		30° C		25° C		20° C		15° C		10° C	
	Liquid Volume gal	Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min	
↑ CONSERVATIVE ↑	11263	0	40	0	46	0	53	0	59	1	07	1	14	1	23	1	32	1	43
	11000	0	56	1	04	1	13	1	22	1	32	1	42	1	54	2	06	2	20
	10500	1	27	1	40	1	53	2	06	2	21	2	37	2	55	3	14	3	36
	10000	2	00	2	18	2	35	2	54	3	14	3	36	4	01	4	27	4	57
	9500	2	36	2	58	3	21	3	45	4	11	4	39	5	11	5	45	6	25
	9000	3	14	3	41	4	10	4	39	5	12	5	47	6	27	7	11	8	01
	8500	3	55	4	28	5	02	5	38	6	17	7	01	7	50	8	43	9	46
	8000	4	39	5	18	5	58	6	41	7	28	8	20	9	19	10	25	11	42
	7500	5	26	6	11	6	58	7	49	8	44	9	46	10	57	12	15	13	49
	7000	6	17	7	09	8	03	9	02	10	07	11	19	12	43	14	17	16	10
	6500	7	12	8	11	9	14	10	21	11	36	13	01	14	40	16	31	18	46
	6000	8	12	9	19	10	30	11	47	13	13	14	52	16	48	19	00	21	41
	5500	9	16	10	31	11	52	13	20	14	59	16	54	19	09	21	45	24	58
	5000	10	27	11	51	13	21	15	02	16	55	19	08	21	45	24	49	28	40
	4500	11	43	13	17	14	59	16	53	19	03	21	35	24	39	28	17	32	53
	4000	13	07	14	51	16	45	18	54	21	23	24	19	27	53	32	11	37	43
	3500	14	39	16	34	18	42	21	08	23	57	27	21	31	31	36	37	43	19
	3000	16	21	18	29	20	52	23	37	26	51	30	46	35	40	41	45	49	55
	2500	21	24	24	11	27	18	30	53	35	06	40	12	46	34	54	31	65	08
	2000	29	03	32	50	37	04	41	54	47	37	54	31	63	08	73	52	88	13
	1500	41	57	47	24	53	29	60	27	68	40	78	36	90	58	106	24	127	02
	1000	67	55	76	44	86	33	97	49	111	03	127	05	147	02	171	56	205	13

NOTE: If a questionable value of temperature or volume is present, the conservative value of liquid temperature (higher temperature is conservative) and volume (higher volume is conservative) shall be used. The temperature used for the recovery time determination is the liquid temperature value that existed prior to entry into this Condition. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach CLFL. Recovery times are not re-calculated for conditions that increase the vapor space or decrease the liquid level or temperature during purge recovery.

(continued)

Table 3.1.4-1 (continued)
DWTT Recovery Times (Time to CLFL)

		← CONSERVATIVE ←																									
		70° C		65° C		60° C		55° C		50° C		45° C		40° C		35° C		30° C		25° C		20° C		15° C		10° C	
	Liquid Volume gal	Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min	
↑ CONSERVATIVE ↑	11298	1	02	1	35	2	22	3	24	4	44	6	22	8	11	10	04	11	52	13	30	14	55	16	01	16	55
	11000	1	29	2	18	3	26	4	55	6	50	9	09	11	45	14	26	17	02	19	22	21	24	22	59	24	17
	10500	2	16	3	29	5	12	7	26	10	20	13	49	17	43	21	46	25	39	29	11	32	14	34	38	36	36
	10000	3	02	4	40	6	58	9	58	13	49	18	27	23	40	29	03	34	14	38	56	43	01	46	13	48	50
	9500	3	48	5	51	8	43	12	27	17	16	23	04	29	34	36	17	42	46	48	38	53	44	57	44	61	01
	9000	4	35	7	02	10	27	14	55	20	41	27	38	35	25	43	28	51	14	58	16	64	23	69	10	73	06
	8500	5	21	8	13	12	09	17	22	24	04	32	10	41	13	50	35	59	37	67	49	74	56	80	31	85	07
	8000	6	07	9	25	13	50	19	46	27	25	36	38	46	57	57	39	67	57	77	17	85	25	91	47	97	02
	7500	6	53	10	36	15	30	22	10	30	44	41	05	52	39	64	39	76	12	86	41	95	48	102	57	108	52
	7000	7	40	11	43	17	09	24	32	34	02	45	29	58	18	71	35	84	23	96	01	106	07	114	03	120	37
	6500	8	26	12	50	18	48	26	53	37	18	49	51	63	55	78	29	92	31	105	17	116	22	125	05	132	17
	6000	9	12	13	57	20	26	29	14	40	33	54	12	69	29	85	20	100	36	114	29	126	34	136	03	143	53
	5500	9	59	15	03	22	03	31	33	43	46	58	31	75	01	92	08	108	39	123	38	136	41	146	56	155	25
	5000	10	46	16	11	23	43	33	56	47	05	62	57	80	42	99	07	116	53	133	01	147	05	158	07	167	15
	4500	12	58	19	24	28	25	40	39	56	22	75	20	96	32	118	31	139	42	158	56	175	40	188	48	199	39
	4000	15	45	23	28	34	21	49	07	68	05	90	56	116	29	142	56	168	25	191	31	211	37	227	22	240	23
	3500	19	17	28	43	42	03	60	05	83	15	111	08	142	18	174	33	205	34	233	42	258	07	277	15	293	03
	3000	24	03	35	48	52	23	74	50	103	38	138	16	176	58	216	58	255	26	290	15	320	29	344	08	363	37
	2500	30	46	45	47	66	58	95	36	132	21	176	30	225	47	276	42	325	37	369	52	408	14	438	13	462	54
	2000	40	54	60	51	88	58	126	57	175	40	234	09	299	24	366	44	431	24	489	49	540	26	579	56	612	26
	1500	57	53	86	06	125	48	179	27	248	11	330	40	422	36	517	26	608	23	690	31	761	34	816	59	862	30
	1000	91	59	136	47	199	47	284	50	393	44	524	21	669	49	819	45	963	28	1093	05	1205	07	1292	24	1363	58

NOTE: If a questionable value of temperature or volume is present, the conservative value of liquid temperature (higher temperature is conservative) and volume (higher volume is conservative) shall be used. The temperature used for the recovery time determination is the liquid temperature value that existed prior to entry into this Condition. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach CLFL. Recovery times are not re-calculated for conditions that increase the vapor space or decrease the liquid level or temperature during purge recovery.

Table 3.1.4-2
SRAT Purge Volume vs. Liquid Volume and Temperature

		CONSERVATIVE →												
		T=70 C	T=65 C	T=60 C	T=55 C	T= 50 C	T= 45 C	T=40 C	T=35 C	T=30 C	T=25 C	T=20 C	T=15 C	T=10 C
	Liquid Volume (gallons)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)
CONSERVATIVE ↓	10928	826	847	866	883	898	913	928	943	958	975	992	1012	1034
	10500	1160	1190	1215	1238	1260	1281	1302	1323	1346	1368	1394	1422	1454
	10000	1553	1592	1626	1657	1686	1714	1742	1771	1801	1832	1867	1906	1950
	9500	1950	1998	2040	2078	2114	2150	2185	2222	2260	2300	2345	2395	2453
	9000	2349	2406	2457	2502	2546	2588	2631	2676	2723	2773	2827	2889	2962
	8500	2752	2818	2877	2930	2980	3030	3081	3134	3190	3249	3315	3390	3479
	8000	3160	3234	3300	3360	3418	3476	3534	3596	3661	3731	3808	3897	4003
	7500	3571	3653	3726	3794	3859	3924	3991	4061	4137	4217	4307	4411	4535
	7000	3986	4075	4156	4231	4304	4377	4452	4531	4617	4708	4811	4931	5077
	6500	4406	4501	4590	4672	4752	4833	4916	5005	5102	5205	5322	5460	5628
	6000	4829	4931	5027	5116	5203	5292	5385	5484	5591	5707	5840	5997	6189
	5500	5312	5422	5525	5622	5716	5812	5913	6020	6136	6262	6405	6575	6783
	5000	5815	5933	6043	6148	6249	6353	6461	6575	6701	6836	6990	7173	7397
	4500	6341	6468	6586	6697	6806	6917	7032	7155	7289	7434	7599	7794	8035
	4000	6896	7031	7156	7275	7391	7509	7632	7763	7906	8060	8236	8444	8700
	3500	7486	7629	7762	7888	8011	8136	8267	8405	8557	8721	8908	9129	9400
	3000	8120	8271	8412	8545	8675	8807	8945	9092	9252	9425	9623	9857	10144
	2500	8812	8972	9120	9260	9398	9537	9682	9837	10006	10188	10397	10643	10946
	2000	9586	9754	9909	10057	10201	10348	10501	10663	10841	11033	11252	11511	11829
	1500	10484	10660	10823	10978	11129	11283	11443	11614	11800	12001	12231	12503	12836
	1000	11600	11785	11955	12117	12276	12436	12604	12782	12977	13188	13429	13713	14060

NOTE-1: This note is applicable only when the purge is less than the LCO requirement for five minutes or less. If the purge is restored within 5 minutes, then maintaining the minimum required purge flow continuously for a minimum of 20 minutes satisfies the required purge volume. If purge flow is subsequently less than the LCO requirement during this 20 minutes required purge, then the purge volumes per this table apply.

NOTE-2: The liquid temperature and volume used for the purge volume determination are the values used for purge recovery time per Table 3.1.4-1.

NOTE-3: The purge time can be calculated by dividing the purge volume by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

(continued)

Table 3.1.4-2 (continued)
SME Purge Volume vs. Liquid Volume and Temperature

		→ CONSERVATIVE →												
		T=70 C	T=65 C	T=60 C	T=55 C	T= 50 C	T= 45 C	T=40 C	T=35 C	T=30 C	T=25 C	T=20 C	T=15 C	T=10 C
	Liquid Volume (gallons)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)
↓ CONSERVATIVE ↓	11298	456	472	485	497	507	517	526	534	543	552	561	571	582
	11000	652	675	694	710	724	738	751	764	776	789	802	816	833
	10500	984	1018	1046	1070	1092	1112	1132	1151	1171	1190	1211	1233	1259
	10000	1322	1364	1402	1434	1463	1490	1517	1543	1570	1596	1625	1656	1693
	9500	1664	1715	1762	1802	1838	1872	1906	1939	1973	2007	2044	2085	2133
	9000	2010	2070	2125	2173	2217	2258	2299	2340	2382	2424	2469	2520	2581
	8500	2361	2430	2493	2549	2600	2648	2696	2745	2795	2846	2901	2963	3038
	8000	2716	2794	2865	2929	2987	3043	3098	3155	3213	3273	3338	3412	3502
	7500	3076	3162	3242	3314	3379	3442	3505	3570	3638	3707	3783	3870	3977
	7000	3440	3535	3624	3703	3776	3845	3917	3990	4067	4147	4235	4335	4460
	6500	3810	3914	4012	4098	4177	4254	4334	4416	4503	4594	4694	4810	4955
	6000	4185	4300	4405	4498	4584	4668	4756	4848	4945	5048	5162	5295	5461
	5500	4615	4742	4854	4955	5048	5138	5232	5331	5437	5548	5671	5815	5995
	5000	5065	5204	5324	5432	5532	5629	5728	5835	5949	6068	6201	6355	6549
	4500	5541	5690	5818	5933	6040	6144	6248	6362	6484	6611	6753	6918	7125
	4000	6047	6204	6341	6463	6576	6687	6798	6918	7047	7183	7334	7509	7729
	3500	6588	6754	6898	7027	7148	7265	7383	7509	7646	7789	7949	8134	8366
	3000	7173	7347	7499	7635	7763	7887	8012	8144	8288	8439	8608	8803	9045
	2500	7816	7998	8158	8301	8436	8567	8699	8837	8989	9147	9325	9529	9782
	2000	8540	8731	8898	9049	9190	9328	9467	9612	9771	9937	10123	10336	10598
	1500	9389	9587	9768	9925	10073	10218	10364	10515	10680	10854	11047	11269	11539
	1000	10455	10661	10836	11002	11159	11312	11466	11626	11798	11979	12181	12412	12688

NOTE-1: This note is applicable only when the purge is less than the LCO requirement for five minutes or less. If the purge is restored within 5 minutes, then maintaining the minimum required purge flow continuously for a minimum of 20 minutes satisfies the required purge volume. If purge flow is subsequently less than the LCO requirement during this 20 minutes required purge, then the purge volumes per this table apply.

NOTE-2: The liquid temperature and volume used for the purge volume determination are the values used for purge recovery time per Table 3.1.4-1.

NOTE-3: The purge time can be calculated by dividing the purge volume by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

(continued)

Table 3.1.4-2 (continued)
SMECT Purge Volume vs. Liquid Volume and Temperature (continued)

		→ CONSERVATIVE →								
		T= 50 C	T=45 C	T=40 C	T=35 C	T=30 C	T=25 C	T=20 C	T=15 C	T=10 C
	Liquid Volume (gallons)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)
↓ CONSERVATIVE ↓	11263	683	709	733	757	781	806	834	871	937
	11000	932	967	1000	1033	1067	1102	1143	1198	1296
	10500	1410	1463	1514	1565	1617	1673	1739	1828	1987
	10000	1898	1968	2036	2105	2176	2253	2344	2467	2687
	9500	2395	2482	2568	2654	2745	2842	2958	3114	3395
	9000	2901	3006	3108	3212	3322	3440	3581	3771	4110
	8500	3417	3539	3659	3781	3910	4049	4215	4438	4834
	8000	3944	4083	4220	4360	4509	4669	4860	5116	5566
	7500	4482	4638	4793	4951	5119	5300	5517	5805	6309
	7000	5031	5205	5376	5553	5742	5945	6186	6507	7062
	6500	5593	5783	5973	6168	6377	6603	6871	7224	7829
	6000	6167	6374	6582	6797	7027	7276	7570	7957	8611
	5500	6754	6979	7205	7440	7692	7965	8288	8708	9410
	5000	7356	7598	7843	8098	8374	8672	9024	9480	10229
	4500	7972	8232	8496	8773	9073	9398	9782	10276	11073
	4000	8605	8882	9167	9467	9792	10147	10564	11099	11946
	3500	9254	9550	9855	10180	10533	10919	11374	11954	12856
	3000	9924	10239	10566	10916	11299	11720	12217	12848	13811
	2500	11017	11339	11674	12032	12424	12855	13361	14000	14956
	2000	12277	12605	12948	13313	13714	14152	14667	15308	16249
	1500	13790	14125	14473	14846	15253	15699	16218	16859	17773
	1000	15745	16085	16439	16817	17231	17681	18204	18841	19715

NOTE-1: This note is applicable only when the purge is less than the LCO requirement for five minutes or less. If the purge is restored within 5 minutes, then maintaining the minimum required purge flow continuously for a minimum of 20 minutes satisfies the required purge volume. If purge flow is subsequently less than the LCO requirement during this 20 minutes required purge, then the purge volumes per this table apply.

NOTE-2: The liquid temperature and volume used for the purge volume determination are the values used for purge recovery time per Table 3.1.4-1.

NOTE-3: The purge time can be calculated by dividing the purge volume by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

(continued)

Table 3.1.4-2 (continued)
DWTT Purge Volume vs. Liquid Volume and Temperature

		CONSERVATIVE →												
		T=70 C	T=65 C	T=60 C	T=55 C	T= 50 C	T= 45 C	T=40 C	T=35 C	T=30 C	T=25 C	T=20 C	T=15 C	T=10 C
	Liquid Volume (gallons)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)
CONSERVATIVE ↓	11298	510	544	575	602	624	643	657	667	675	681	684	687	688
	11000	728	777	821	859	891	917	937	952	963	970	976	979	981
	10500	1094	1167	1232	1289	1337	1376	1406	1429	1446	1457	1465	1470	1473
	10000	1460	1557	1644	1720	1784	1836	1876	1907	1929	1943	1953	1960	1965
	9500	1825	1947	2056	2151	2231	2295	2346	2384	2412	2430	2442	2451	2457
	9000	2191	2337	2468	2582	2678	2755	2816	2861	2894	2916	2931	2942	2949
	8500	2557	2727	2879	3012	3124	3215	3285	3338	3377	3403	3420	3432	3440
	8000	2923	3117	3291	3443	3571	3674	3755	3816	3860	3889	3909	3923	3932
	7500	3288	3507	3703	3874	4018	4134	4225	4293	4343	4376	4398	4414	4424
	7000	3654	3897	4115	4305	4464	4594	4694	4770	4826	4862	4887	4904	4916
	6500	4020	4287	4526	4735	4911	5053	5164	5247	5309	5349	5376	5395	5408
	6000	4386	4677	4938	5166	5358	5513	5634	5725	5791	5835	5865	5886	5900
	5500	4751	5067	5350	5597	5805	5973	6103	6202	6274	6322	6354	6376	6391
	5000	5119	5459	5764	6030	6253	6434	6575	6681	6759	6810	6845	6869	6885
	4500	5599	5961	6287	6571	6811	7004	7155	7269	7352	7407	7444	7470	7487
	4000	6108	6493	6839	7142	7397	7603	7763	7884	7973	8031	8071	8099	8117
	3500	6652	7059	7426	7747	8017	8236	8407	8535	8629	8691	8734	8762	8782
	3000	7240	7670	8058	8397	8682	8913	9094	9230	9329	9395	9440	9470	9491
	2500	7887	8339	8747	9104	9405	9649	9839	9982	10088	10157	10204	10236	10258
	2000	8616	9090	9519	9894	10210	10466	10666	10817	10927	11000	11050	11084	11106
	1500	9470	9966	10414	10807	11139	11407	11617	11775	11891	11967	12019	12055	12079
	1000	10543	11060	11528	11939	12286	12567	12786	12952	13073	13153	13207	13245	13270

NOTE-1: This note is applicable only when the purge is less than the LCO requirement for five minutes or less. If the purge is restored within 5 minutes, then maintaining the minimum required purge flow continuously for a minimum of 20 minutes satisfies the required purge volume. If purge flow is subsequently less than the LCO requirement during this 20 minutes required purge, then the purge volumes per this table apply.

NOTE-2: The liquid temperature and volume used for the purge volume determination are the values used for purge recovery time per Table 3.1.4-1.

NOTE-3: The purge time can be calculated by dividing the purge volume by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

CROSS-REFERENCES:

TITLE	NUMBER
1. CPC Purge Source	3.1.6

3/4.1 CPC/SPC FLAMMABILITY CONTROL

3.1.5 MFT and RCT Flammability Control

LCO 3.1.5 The purge flow to the MFT shall be greater than or equal to 49 scfm.

AND

The purge flow to the RCT shall be greater than or equal to 7 scfm.

----------**NOTE**----------

Purge can be supplied by either of the two CPC Purge Systems (Primary Purge or the Safety Grade Nitrogen Purge system).

MODE APPLICABILITY: OPERATION, STANDBY, and SHUTDOWN

PROCESS AREA APPLICABILITY: MFT and RCT

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------**NOTE-1**--------- This Condition is not entered due to one inoperable flow instrument on a process vessel. ---------- ----------**NOTE-2**--------- This Condition is not to be exited until the Required Action A.1 has been completed and the purge flow maintained until the minimum amount of vessel purge volume per Table 3.1.5-2 has been supplied for the affected vessel(s). ----------		----------**NOTE**---------- If the purge is less than the LCO requirement prior to supplying the minimum amount of vessel purge volume per Table 3.1.5-2, then the subsequent Completion Time for the Required Action A.1 is reduced by the amount of time used to re-establish purge flow for the prior losses for the affected vessel(s). ----------
A. The purge flow to the MFT is less than 49 scfm. **OR** The purge flow to the RCT is less than 7 scfm.	A.1 Establish a purge flow greater than or equal to the minimum purge requirement for the affected process vessel(s) using any available source.	Within the recovery time of Table 3.1.5-1 for the affected process vessel(s).

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.5.1	Deleted	
SR 4.1.5.2	Verify that the purge flow to the MFT is greater than or equal to 49 scfm locally.	12 Hours
SR 4.1.5.3	Verify that the purge flow to the RCT is greater than or equal to 7 scfm locally.	12 Hours

Table 3.1.5-1
MFT Recovery Time (Time to CLFL)

		CONSERVATIVE ←																													
		80 C		75 C		70 C		65 C		60 C		55 C		50 C		45 C		40 C		35 C		30 C		25 C		20 C		15 C		10 C	
	Liquid Volume (gal)	Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min	
↑ CONSERVATIVE ↑	11089	0	08	0	11	0	16	0	21	0	26	0	31	0	36	0	41	0	47	0	53	0	59	1	06	1	14	1	22	1	32
	10500	0	14	0	20	0	27	0	35	0	44	0	52	1	01	1	10	1	20	1	30	1	40	1	52	2	05	2	20	2	38
	10000	0	19	0	27	0	37	0	48	0	59	1	11	1	24	1	36	1	49	2	03	2	17	2	34	2	52	3	13	3	38
	9500	0	25	0	36	0	48	1	01	1	16	1	31	1	47	2	03	2	19	2	37	2	56	3	18	3	42	4	09	4	42
	9000	0	32	0	44	0	59	1	16	1	34	1	52	2	11	2	31	2	51	3	13	3	37	4	04	4	35	5	09	5	51
	8500	0	40	0	54	1	12	1	31	1	52	2	14	2	37	3	00	3	25	3	51	4	20	4	53	5	31	6	13	7	05
	8000	0	48	1	05	1	25	1	48	2	12	2	37	3	04	3	31	4	00	4	31	5	05	5	45	6	30	7	22	8	26
	7500	0	57	1	17	1	40	2	06	2	33	3	02	3	32	4	04	4	37	5	13	5	54	6	40	7	34	8	36	9	53
	7000	1	07	1	30	1	56	2	25	2	56	3	28	4	02	4	38	5	16	5	58	6	45	7	38	8	42	9	56	11	27
	6500	1	19	1	44	2	14	2	46	3	20	3	57	4	35	5	15	5	58	6	45	7	39	8	41	9	55	11	22	13	11
	6000	1	32	2	00	2	33	3	09	3	47	4	27	5	09	5	54	6	42	7	36	8	37	9	48	11	14	12	56	15	04
	5500	1	51	2	24	3	03	3	46	4	31	5	18	6	07	7	00	7	57	9	01	10	13	11	37	13	18	15	18	17	51
	5000	2	13	2	54	3	40	4	30	5	24	6	19	7	18	8	20	9	28	10	43	12	09	13	48	15	48	18	10	21	11
	4500	2	41	3	30	4	25	5	25	6	29	7	35	8	45	9	59	11	20	12	49	14	31	16	30	18	52	21	42	25	16
	4000	3	17	4	16	5	23	6	35	7	52	9	11	10	35	12	04	13	41	15	28	17	30	19	52	22	44	26	07	30	25
	3500	4	03	5	16	6	37	8	06	9	39	11	16	12	58	14	46	16	43	18	53	21	21	24	15	27	42	31	50	37	03
	3000	5	06	6	36	8	18	10	07	12	03	14	03	16	09	18	23	20	47	23	28	26	31	30	06	34	23	39	28	45	56
	2500	6	34	8	29	10	39	12	59	15	26	17	59	20	38	23	28	26	31	29	55	33	48	38	19	43	46	50	13	58	25
	2000	8	46	11	20	14	13	17	18	20	32	23	54	27	25	31	08	35	10	39	39	44	45	50	43	57	53	66	24	77	11
	1500	12	28	16	07	20	10	24	32	29	05	33	49	38	45	43	59	49	38	55	55	63	04	71	27	81	29	93	26	108	35
	1000	19	54	25	42	32	08	39	02	46	15	53	43	61	30	69	44	78	39	88	32	99	49	113	00	128	49	147	38	171	30

NOTE: The values used for the recovery time determination are the liquid temperature and volume that existed prior to entry into this Condition. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (higher temperature is conservative) and volume (higher volume is conservative) shall be used. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach flammable conditions. Recovery times are not re-calculated for conditions that decrease the liquid temperature or volume during purge recovery.

(continued)

Table 3.1.5-1 (continued)
RCT Recovery Time (Time to CLFL)

		← CONSERVATIVE ←																	
		50° C		45° C		40° C		35° C		30° C		25° C		20° C		15° C		10° C	
	Liquid Volume (gal)	Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min	
↑ CONSERVATIVE ↑	10479	2	53	3	18	3	43	4	10	4	38	5	09	5	43	6	20	7	01
	10000	4	03	4	38	5	13	5	50	6	30	7	13	8	01	8	51	9	50
	9500	5	22	6	07	6	53	7	42	8	34	9	31	10	34	11	42	13	01
	9000	6	45	7	42	8	40	9	41	10	47	11	59	13	20	14	48	16	29
	8500	8	15	9	24	10	35	11	50	13	10	14	39	16	20	18	09	20	16
	8000	9	51	11	13	12	37	14	07	15	44	17	32	19	34	21	48	24	26
	7500	11	34	13	09	14	49	16	35	18	30	20	39	23	06	25	48	29	01
	7000	13	25	15	15	17	11	19	14	21	29	24	02	26	56	30	11	34	05
	6500	15	25	17	31	19	43	22	06	24	44	27	42	31	08	35	01	39	42
	6000	17	34	19	57	22	28	25	12	28	15	31	43	35	45	40	22	45	59
	5500	21	00	23	50	26	51	30	06	33	44	37	52	42	41	48	11	54	53
	5000	25	11	28	35	32	11	36	05	40	25	45	21	51	07	57	41	65	41
	4500	30	19	34	25	38	44	43	26	48	38	54	34	61	29	69	23	79	00
	4000	36	48	41	45	47	00	52	41	58	59	66	10	74	32	84	06	95	44
	3500	45	10	51	15	57	41	64	39	72	23	81	10	91	26	103	08	117	23
	3000	56	24	63	59	72	00	80	41	90	19	101	17	114	03	128	38	146	24
	2500	72	11	81	53	92	09	103	14	115	33	129	33	145	52	164	30	187	11
	2000	95	57	108	51	122	28	137	12	153	32	172	07	193	46	218	29	248	36
	1500	135	41	153	54	173	08	193	57	217	02	243	16	273	49	308	44	351	14
	1000	215	19	244	13	274	43	307	42	344	17	385	52	434	16	489	35	556	57

NOTE: The values used for the recovery time determination are the liquid temperature and volume that existed prior to entry into this Condition. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (higher temperature is conservative) and volume (higher volume is conservative) shall be used. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach flammable conditions. Recovery times are not re-calculated for conditions that decrease the liquid temperature or volume during purge recovery.

Table 3.1.5-2
MFT Purge Volume vs. Liquid Volume and Temperature

		CONSERVATIVE →														
		T=80 C	T=75 C	T=70 C	T=65 C	T=60 C	T=55 C	T=50 C	T=45 C	T=40 C	T=35 C	T=30 C	T=25 C	T=20 C	T=15 C	T=10 C
	Liquid Volume (gallons)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)
CONSERVATIVE ↓	11089	634	673	704	730	753	772	788	804	819	833	848	862	877	894	913
	10500	1052	1115	1167	1210	1246	1278	1306	1332	1357	1381	1406	1430	1456	1485	1520
	10000	1412	1495	1564	1621	1670	1712	1750	1785	1818	1851	1885	1919	1955	1995	2044
	9500	1778	1880	1965	2037	2098	2150	2198	2242	2285	2327	2371	2414	2461	2513	2578
	9000	2151	2271	2371	2457	2529	2593	2651	2704	2756	2808	2862	2915	2974	3040	3122
	8500	2532	2668	2783	2882	2966	3040	3108	3171	3233	3295	3359	3424	3494	3574	3675
	8000	2920	3072	3201	3312	3407	3492	3570	3643	3715	3787	3862	3939	4022	4118	4239
	7500	3317	3483	3626	3748	3854	3950	4037	4120	4202	4286	4372	4461	4559	4671	4814
	7000	3723	3903	4057	4191	4307	4412	4510	4603	4696	4790	4889	4991	5104	5234	5400
	6500	4139	4331	4496	4640	4767	4881	4989	5092	5196	5302	5413	5529	5658	5808	6000
	6000	4564	4768	4944	5096	5232	5357	5474	5588	5702	5820	5945	6076	6223	6393	6613
	5500	5055	5273	5461	5625	5771	5904	6031	6153	6277	6404	6539	6681	6839	7023	7260
	5000	5572	5804	6005	6180	6336	6478	6613	6745	6877	7014	7159	7310	7480	7678	7931
	4500	6121	6367	6580	6766	6931	7083	7226	7366	7507	7653	7808	7970	8151	8361	8630
	4000	6707	6968	7193	7389	7564	7724	7876	8024	8174	8328	8492	8664	8857	9080	9363
	3500	7339	7613	7850	8057	8241	8410	8570	8727	8884	9048	9221	9403	9606	9841	10138
	3000	8028	8316	8565	8782	8975	9152	9320	9485	9651	9822	10005	10196	10410	10657	10966
	2500	8792	9094	9354	9581	9783	9969	10144	10317	10491	10671	10862	11062	11286	11544	11865
	2000	9659	9975	10247	10483	10694	10888	11072	11251	11433	11621	11821	12031	12265	12534	12864
	1500	10684	11013	11296	11543	11762	11964	12155	12342	12532	12728	12937	13155	13398	13677	14017
	1000	11983	12325	12620	12876	13105	13314	13513	13707	13904	14108	14325	14552	14804	15093	15440

NOTE-1: This note is applicable only when the purge is less than the LCO requirement for five minutes or less. If the purge is restored within 5 minutes, then maintaining the minimum required purge flow continuously for a minimum of 20 minutes satisfies the required purge volume. If purge flow is subsequently less than the LCO requirement after the initial 5 minutes and during this 20 minutes required purge, then the purge volumes per this table apply.

NOTE-2: The values used for the purge volume determination are the liquid temperature and volume that existed at the time of re-establishing the required purge flow. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (lower temperature is conservative) and volume (lower volume is conservative) shall be used. The purge volume must be re-determined if the liquid temperature or volume decreases, as these conditions increase the required purge volume.

NOTE-3: The purge time can be calculated by dividing the purge volume by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

(continued)

Table 3.1.5-2 (continued)
RCT Purge Volume vs. Liquid Volume and Temperature

		CONSERVATIVE →								
		T=50 C	T=45 C	T=40 C	T=35 C	T=30 C	T=25 C	T=20 C	T=15 C	T=10 C
	Liquid Volume (gallons)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)
CONSERVATIVE ↓	10479	886	909	931	952	974	996	1021	1052	1105
	10000	1182	1212	1240	1269	1298	1327	1360	1403	1475
	9500	1496	1533	1568	1604	1640	1678	1720	1775	1866
	9000	1814	1859	1901	1944	1988	2034	2086	2152	2263
	8500	2138	2189	2239	2290	2342	2396	2457	2535	2665
	8000	2466	2525	2583	2641	2701	2764	2836	2926	3074
	7500	2800	2867	2932	2998	3067	3139	3221	3324	3490
	7000	3140	3214	3287	3362	3440	3521	3613	3729	3914
	6500	3486	3568	3649	3732	3819	3910	4014	4144	4347
	6000	3838	3928	4017	4109	4206	4308	4424	4568	4790
	5500	4244	4340	4436	4535	4638	4747	4871	5024	5257
	5000	4672	4774	4876	4981	5092	5207	5338	5499	5741
	4500	5124	5233	5341	5452	5569	5691	5829	5996	6245
	4000	5605	5720	5834	5951	6075	6203	6347	6521	6776
	3500	6122	6243	6363	6486	6615	6749	6900	7080	7338
	3000	6684	6811	6937	7065	7200	7340	7496	7681	7942
	2500	7304	7437	7569	7703	7844	7989	8150	8340	8600
	2000	8007	8146	8283	8423	8569	8719	8886	9079	9337
	1500	8835	8979	9122	9267	9418	9574	9745	9942	10195
	1000	9882	10031	10179	10330	10486	10646	10822	11021	11268

NOTE-1: This note is applicable only when the purge is less than the LCO requirement for five minutes or less. If the purge is restored within 5 minutes, then maintaining the minimum required purge flow continuously for a minimum of 20 minutes satisfies the required purge volume. If purge flow is subsequently less than the LCO requirement after the initial 5 minutes and during this 20 minutes required purge, then the purge volumes per this table apply.

NOTE-2: The values used for the purge volume determination are the liquid temperature and volume that existed at the time of re-establishing the required purge flow. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (lower temperature is conservative) and volume (lower volume is conservative) shall be used. The purge volume must be re-determined if the liquid temperature or volume decreases, as these conditions increase the required purge volume.

NOTE-3: The purge time can be calculated by dividing the purge volume by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

CROSS-REFERENCES:

TITLE	NUMBER
1. CPC Purge Source	3.1.6

3/4.1 CPC/SPC FLAMMABILITY CONTROL

3.1.6 CPC Purge Source

LCO 3.1.6 The CPC Safety Grade nitrogen purge system, including associated instrumentation, and components in Table 3.1.6-1 shall be OPERABLE.

AND

The CPC/SPC vessels' purge flow instrumentation, indication, interlocks, local indicators, and pressure control valves in Table 3.1.6-1 shall be OPERABLE.

MODE APPLICABILITY: As specified in Table 3.1.6-1

PROCESS AREA APPLICABILITY: SEFT, PRFT, SRAT, SME, RCT, DWTT, and MFT

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. The CPC Safety Grade nitrogen purge source is not capable of supplying the required STANDBY purge flow to a Process Vessel(s) (SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, or MFT) for reason(s) other than Condition B.	A.1.1 If in OPERATION, verify the CPC Primary Purge System is providing the necessary purge to the affected Process Vessel(s) to satisfy LCO 3.1.3, LCO 3.1.5, and LCO 3.1.9.	1 Hour **AND** Every 4 Hours thereafter
	OR	
	A.1.2 If in LIMITED PROCESSING, STANDBY or SHUTDOWN, verify a CPC purge source is providing the necessary purge to the affected Process Vessel(s) to satisfy LCO 3.1.4, LCO 3.1.5, and LCO 3.1.9.	1 Hour **AND** Every 4 Hours thereafter
	AND	
	A.2 Restore capability of CPC Safety Grade nitrogen purge source to supply the required STANDBY purge flow to affected Process Vessel(s).	72 Hours

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. The Safety Grade nitrogen purge supply is inoperable for reason(s) other than Condition A. **OR** The Safety Grade nitrogen purge storage tanks have less than 936 in. wc of nitrogen.	B.1.1 If in OPERATION, verify the CPC Primary Purge System is providing the necessary purge to the affected Process Vessel(s) to satisfy LCO 3.1.3, LCO 3.1.5, and LCO 3.1.9.	1 Hour **AND** Every 4 Hours thereafter
	OR	
OR One or more Safety Grade Nitrogen Purge Isolation Check Valve(s) inoperable **OR** One or more Safety Grade nitrogen pressure control valve(s) (PCV-1233 and/or PCV-1234) are inoperable.	B.1.2 If in LIMITED PROCESSING, STANDBY or SHUTDOWN, verify a CPC purge source is providing the necessary purge to the affected Process Vessel(s) to satisfy LCO 3.1.4, LCO 3.1.5, and LCO 3.1.9.	1 Hour **AND** Every 4 Hours thereafter
OR Required Action and/or associated Completion Time of Condition E is not met.	**AND** B.2 Restore inoperable equipment to OPERABLE status.	72 Hours

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Deleted		
D. The SRAT purge flow interlocks (FSLL-3034A and FSLL-3034B) are inoperable. **OR** SME purge flow interlocks (FSLL-8856A and FSLL-8856B) are inoperable.	D.1 Stop all transfers into the affected Process Vessel(s). **AND** ----------**NOTE**---------- The performance of Required Action D.2 for the SRAT should initiate the low steam flow interlock for the SRAT, as described in LCO 3.1.11. The interlock stops transfers from the SEFT and PRFT to the SRAT. ---------- D.2 Isolate the steam supply to the affected Process Vessel(s) for the SRAT or SME. **AND** D.3 Place the affected Process Vessel(s) in STANDBY.	IMMEDIATELY IMMEDIATELY Within 2 Hours after the affected process vessel's contents are ≤ 70°C

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One Safety Grade nitrogen tank level indicator on a nitrogen tank required to establish minimum inventory requirements as shown in Table 3.1.6-1 is inoperable.	----------**NOTE**---------- LCO 3.0.4 is not applicable. ---------- E.1 Restore inoperable equipment to OPERABLE status.	7 Days
F. The SRAT or SME steam valve (FCV-3000 or FCV-3080) is inoperable. **OR** The SRAT or SME formic addition valve (FCV-2045 or FCV-2044) is inoperable. **OR** The SRAT or SME nitric addition valve (FCV-0716 or FCV-3119) is inoperable.	----------**NOTE**---------- LCO 3.0.4 is not applicable, if Required Action F.1 has been met. ---------- F.1 Isolate the affected material from the affected Process Vessel(s).	IMMEDIATELY

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------**NOTE**---------- If Condition G is entered due to SMECT equipment the affected PROCESS AREAs are the SRAT and SME. ---------- G. Required Action(s) and/or associated Completion Time(s) of Condition F, Required Action A.2, or Required Action J.2 are not met.	G.1 Stop all transfers into the affected PROCESS AREA(s). **AND** ----------**NOTE**---------- Stopping the PRFT or SEFT agitator prior to stopping the transfer pump will cause entry into LCO 3.1.10 if transfers to the SRAT are in progress. ---------- G.2.1 Stop the affected PROCESS AREA(s) transfer pump, agitator, and sample pump for the SEFT, PRFT, RCT, or the MFT. **OR** (continued)	IMMEDIATELY IMMEDIATELY

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. (continued)	----------**NOTE**---------- The performance of Required Action G.2.2 for the SRAT should initiate the low steam flow interlock for the SRAT, as described in LCO 3.1.11. The interlock stops transfers from the SEFT and PRFT to the SRAT. ----------	
	G.2.2 Isolate the steam supply to the affected PROCESS AREA(s) for the SRAT, SME, or DWTT.	IMMEDIATELY
	AND	
	----------**NOTE**---------- If the affected PROCESS AREA(s) are in SHUTDOWN a transition to STANDBY is not required. ----------	
	G.3 Place the affected PROCESS AREA(s) in STANDBY.	Within 2 Hours after the affected process vessel's contents are ≤ 70°C for SRAT, SME, or DWTT **OR** Within 2 Hours for SEFT, PRFT, RCT, or MFT

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. Required Action B.2 and/or associated Completion Time is not met.	H.1 Stop all transfers into the SEFT, PRFT, SRAT, SME, RCT, DWTT, and MFT. **AND** ----------**NOTE**---------- Stopping the PRFT or SEFT agitator prior to stopping the transfer pump will cause entry into LCO 3.1.10 if transfers to the SRAT are in progress. ----------	IMMEDIATELY
	H.2 Stop the SEFT, PRFT, RCT, and MFT transfer pump, agitator, and sample pump. **AND** ----------**NOTE**---------- The performance of Required Action H.3 should initiate the low steam flow interlock for the SRAT, as described in LCO 3.1.11. The interlock stops transfers from the SEFT and PRFT to the SRAT. ----------	IMMEDIATELY
	H.3 Isolate the steam supply to the SRAT, SME, and DWTT. **AND** (continued)	IMMEDIATELY

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. (continued)	H.4 Restore inoperable equipment to OPERABLE status. **AND** ----------**NOTE**---------- If the affected process vessel(s) are in SHUTDOWN a transition to STANDBY is not required. ----------	IMMEDIATELY
	H.5 Place the SEFT, PRFT, SRAT, SME, RCT, DWTT, and MFT in STANDBY.	Within 2 Hours after the affected process vessel's contents are ≤ 70ºC for SRAT, SME, or DWTT **OR** Within 2 Hours for SEFT, PRFT, RCT, or MFT

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. All Purge Flow Monitoring instruments for the SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT or MFT are inoperable. **OR** Required Action(s) A.1, B.1 or J.1 and/or their associated Completion Time(s) are not met. **OR** Both pressure control valves for the SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, or MFT are inoperable.	----------**NOTE**---------- For the SMECT, enter LCO 3.1.3 or 3.1.4 based on the higher of the SRAT or SME MODES. ---------- I.1 Enter appropriate LCO Condition for Low Purge flow for the affected PROCESS AREA and given MODE (LCO 3.1.3, 3.1.4, 3.1.5, or 3.1.9)	IMMEDIATELY

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
J. One of two SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, or MFT purge flow indicators is inoperable.	J.1 Verify the required purge flow to the affected process vessel(s).	IMMEDIATELY and Continuously (For the SRAT, SME, or DWTT while in OPERATION)
OR		**OR**
One of two SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, or MFT pressure control valves is inoperable.		IMMEDIATELY and Every Recovery Time, as calculated from Table 3.1.4-1, 3.1.5-1, or 3.1.9-1, thereafter. (For the SEFT, PRFT, SMECT, RCT, or MFT while in all MODES, the SRAT and SME while in STANDBY or SHUTDOWN, and the DWTT while in LIMITED PROCESSING, STANDBY, or SHUTDOWN)
	AND	
	J.2 Restore inoperable equipment to OPERABLE status.	7 Days

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.6.1	DELETED	
SR 4.1.6.2	Verify that greater than or equal to 936 in. wc of nitrogen is present in the Safety Grade nitrogen storage tanks in Table 3.1.6-1.	12 Hours
SR 4.1.6.3	Perform an INSTRUMENT LOOP CALIBRATION on the SEFT purge flow instruments (FI-3219A and FI-3219B).	1 Year
SR 4.1.6.4	Perform an INSTRUMENT LOOP CALIBRATION on the SRAT purge flow instruments (FI-3034A/FSLL-3034A and FI-3034B/FSLL-3034B).	1 Year
SR 4.1.6.5	Perform an INSTRUMENT LOOP CALIBRATION on the SME purge flow instruments (FI-8856A/FSLL-8856A and FI-8856B/FSLL-8856B).	1 Year
SR 4.1.6.6	Perform an INSTRUMENT LOOP CALIBRATION on the MFT purge flow instruments (FI-0687A and FI-0687B).	1 Year
SR 4.1.6.7	DELETED	
SR 4.1.6.8	Perform an INSTRUMENT LOOP CHECK on the SRAT purge flow instruments (FI-3034A and FI-3034B). This SR is only applicable when both SRAT purge flow instruments are OPERABLE.	24 Hours

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.6.9	Perform an INSTRUMENT LOOP CHECK on the SME purge flow instruments (FI-8856A and FI-8856B). This SR is only applicable when both SME purge flow instruments are OPERABLE.	24 Hours
SR 4.1.6.10	Perform an INSTRUMENT LOOP CHECK on the MFT purge flow instruments (FI-0687A and FI-0687B). This SR is only applicable when both MFT purge flow instruments (are OPERABLE.	24 Hours
SR 4.1.6.11	DELETED	
SR 4.1.6.12	Perform an INSTRUMENT LOOP CALIBRATION on the Safety Grade nitrogen tank level indicators in Table 3.1.6-1.	1 Year
SR 4.1.6.13	Perform an INSTRUMENT LOOP TEST on SRAT hardwired automatic interlock functions detailed in Table 3.1.6-1.	1 Year
SR 4.1.6.14	Perform an INSTRUMENT LOOP TEST on SME hardwired automatic interlock functions detailed in Table 3.1.6-1.	1 Year
SR 4.1.6.15	DELETED	
SR 4.1.6.16	Verify that the Safety Grade nitrogen purge source is capable of simultaneously supplying the required STANDBY purge flows to the CPC/SPC vessel(s) and a total flow less than or equal to 504 scfm as measured by the vessels' local purge flow indicators.	1 Year

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.6.17	Verify the SRAT and SME steam valves (FCV-3000 and FCV-3080) close when directed by a simulated or actual interlock signal (see Table 3.1.6-1).	1 Year
SR 4.1.6.18	Verify the SRAT and SME nitric addition valves (FCV-0716 and FCV-3119) close when directed by a simulated or actual interlock signal (see Table 3.1.6-1).	1 Year
SR 4.1.6.19	Verify the SRAT and SME formic addition valves (FCV-2045 and FCV-2044) close when directed by a simulated or actual interlock signal (see Table 3.1.6-1).	1 Year
SR 4.1.6.20	DELETED	
SR 4.1.6.21	DELETED	
SR 4.1.6.22	Perform an INSTRUMENT LOOP CALIBRATION on the SMECT purge flow instruments (FI-3144A and FI-3144B).	1 Year
SR 4.1.6.23	DELETED	
SR 4.1.6.24	DELETED	
SR 4.1.6.25	DELETED	
SR 4.1.6.26	Perform Leak Test on Safety Grade Nitrogen Purge Isolation Check Valves (see Table 3.1.6-1).	2 Years

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.6.27	Perform an INSTRUMENT LOOP CALIBRATION on the PRFT purge flow instruments (FI-1016A and FI-1016B).	1 Year
SR 4.1.6.28	Perform an INSTRUMENT LOOP CHECK on the SEFT purge flow instruments (FI-3219A and FI-3219B). This SR is only applicable when both SEFT purge flow instruments are OPERABLE.	24 Hours
SR 4.1.6.29	Perform an INSTRUMENT LOOP CHECK on the PRFT purge flow instruments (FI-1016A and FI-1016B). This SR is only applicable when both PRFT purge flow instruments are OPERABLE.	24 Hours
SR 4.1.6.30	Perform an INSTRUMENT LOOP CHECK on the SMECT purge flow instruments (FI-3144A and FI-3144B). This SR is only applicable when both SMECT purge flow instruments are OPERABLE.	24 Hours
SR 4.1.6.31	Verify that each SEFT purge pressure control valve (PCV-3219A and PCV-3219B) is capable of controlling Primary and Safety Grade Purge pressure to the SEFT flow meters greater than or equal to 15 psig and less than or equal to 24 psig.	1 Year
SR 4.1.6.32	Verify that each PRFT purge pressure control valve (PCV-1016A and PCV-1016B) is capable of controlling Primary and Safety Grade Purge pressure to the PRFT flow meters greater than or equal to 15 psig and less than or equal to 24 psig.	1 Year

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.6.33	Verify that each Safety Grade Nitrogen pressure control valve (PCV-1233 and PCV-1234) is capable of actuating Safety Grade Nitrogen purge at a pressure greater than or equal to 64 psig and less than or equal to 68 psig.	1 Year
SR 4.1.6.34	Verify that each RCT purge pressure control valve (PCV-6149A and PCV-6149B) is capable of controlling Primary and Safety Grade Purge pressure to the RCT flow meters greater than or equal to 28 psig and less than or equal to 44 psig.	1 Year
SR 4.1.6.35	Verify that each DWTT purge pressure control valve (PCV-6167A and PCV-6167B) is capable of controlling Primary and Safety Grade Purge pressure to the DWTT flow meters greater than or equal to 28 psig and less than or equal to 44 psig.	1 Year
SR 4.1.6.36	Perform an INSTRUMENT LOOP CALIBRATION on the RCT purge flow instruments (FI-6149A and FI-6149B).	1 Year
SR 4.1.6.37	Perform an INSTRUMENT LOOP CALIBRATION on the DWTT purge flow instruments (FI-6167A and FI-6167B).	1 Year
SR 4.1.6.38	Perform an INSTRUMENT LOOP CHECK on the RCT purge flow instruments (FI-6149A and FI-6149B). This SR is only applicable when both RCT purge flow instruments are OPERABLE.	24 Hours
SR 4.1.6.39	Perform an INSTRUMENT LOOP CHECK on the DWTT purge flow instruments (FI-6167A and FI-6167B). This SR is only applicable when both DWTT purge flow instruments are OPERABLE.	24 Hours

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.6.40	Verify that each SRAT purge pressure control valve (PCV-3034A and PCV-3034B) is capable of controlling Primary and Safety Grade Purge pressure to the SRAT flow meters greater than or equal to 38 psig and less than or equal to 64 psig.	1 Year
SR 4.1.6.41	Verify that each SME purge pressure control valve (PCV-8856A and PCV-8856B) is capable of controlling Primary and Safety Grade Purge pressure to the SME flow meters greater than or equal to 21 psig and less than or equal to 35 psig.	1 Year
SR 4.1.6.42	Verify that each MFT purge pressure control valve (PCV-0687A and PCV-0687B) is capable of controlling Primary and Safety Grade Purge pressure to the MFT flow meters greater than or equal to 22 psig and less than or equal to 36 psig.	1 Year
SR 4.1.6.43	Verify that each SMECT purge pressure control valve (PCV-3144A and PCV-3144B) is capable of controlling Primary and Safety Grade Purge pressure to the SMECT flow meters greater than or equal to 29 psig and less than or equal to 43 psig.	1 Year
SR 4.1.6.44	With the temperature of the appropriate vessel being less than 70 ºC, verify that leakage past the SRAT and SME steam valves (FCV-3000 and FCV-3080) when closed is low enough to allow the temperature of the associated tanks to decrease at least 1 ºC within 6 hours with cooling water isolated.	----------NOTE---------- SR 4.0.4 is not applicable. ---------- 1 Year

Table 3.1.6-1 CPC Instrumentation, Components, and Automatic Interlocks

Process Area	Required Instrumentation	Setpoint/ Limit	Mode	LCO Condition
SRAT	A. Purge Flow Instrumentation i. Vessel Purge Flow Indicators (FI-3034A and FI-3034B)	N/A	OPERATION, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J
	ii. Vessel Purge Low Flow Interlock (FSLL-3034A or FSLL-3034B) (1)	$\geq$ 222 scfm	OPERATION	LCO 3.1.6 Condition D
	B. Interlocked Valves i. Steam Valve (FCV-3000)	N/A	OPERATION	LCO 3.1.6 Condition F
	ii. Nitric Addition Valve (FCV-0716)	N/A	OPERATION	LCO 3.1.6 Condition F
	iii. Formic Addition Valve (FCV-2045)	N/A	OPERATION	LCO 3.1.6 Condition F
	C. Pressure Control Valves (PCV-3034A and PCV-3034B)	$38 \leq x \leq 64$ psig	OPERATION STANDBY & SHUTDOWN	LCO 3.1.6 Condition I or J

Footnotes:

(1) The SRAT Low Purge Flow Hardwired Interlock will:
- Close FCV-3000 (steam), FCV-0716 (nitric), and FCV-2045 (formic)

(continued)

Table 3.1.6-1 CPC Instrumentation, Components, and Automatic Interlocks (continued)

Process Area	Required Instrumentation	Setpoint/ Limit	Mode	LCO Condition
SME	A. Purge Flow Instrumentation			
	i. Vessel Purge Flow Indicators (FI-8856A and FI-8856B)	N/A	OPERATION, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J
	ii. Vessel Purge Low Flow Interlock (FSLL-8856A or FSLL-8856B) (1)	≥ 86 scfm	OPERATION	LCO 3.1.6 Condition D
	B Interlocked Valves			
	i. Steam Valve (FCV-3080)	N/A	OPERATION	LCO 3.1.6 Condition F
	ii. Nitric Addition Valve (FCV-3119)	N/A	OPERATION	LCO 3.1.6 Condition F
	iii. Formic Addition Valve (FCV-2044)	N/A	OPERATION	LCO 3.1.6 Condition F
	C. Pressure Control Valves (PCV-8856A and PCV-8856B)	$21 \leq x \leq 35$ psig	OPERATION STANDBY & SHUTDOWN	LCO 3.1.6 Condition I or J

Footnotes:

(1) The SME Low Purge Flow Hardwired Interlock will:
- Close FCV-3080 (steam), FCV-3119 (nitric), and FCV-2044 (formic)
- Stop the PFSFT transfer pump.

(continued)

Table 3.1.6-1 CPC Instrumentation, Components, and Automatic Interlocks (continued)

Process Area	Required Instrumentation	Setpoint/ Limit	Mode	LCO Condition
MFT	A. Vessel Purge Flow Instruments (FI-0687A and FI-0687B)	N/A	OPERATION, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J
	B. Pressure Control Valves (PCV-0687A and PCV-0687B)	22 ≤ x ≤ 36 psig	OPERATION, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J
SRAT SME MFT SEFT PRFT RCT DWTT	Safety Grade Nitrogen Tanks and associated Level Indicators: Tank S422-150-078-00-T (LI-1240X and LI-1241X) Tank S422-150-080-00-T (LI-1247X and LI-1248X) Tank S422-150-082-00-T (LI-3610X and LI-3611X) Tank S422-150-084-00-T (LI-3617X and LI-3618X) Tank S422-150-086-00-T (LI-3630X and LI-3631X) Tank S422-150-088-00-T (LI-3650X and LI-3651X) Note: Only instrumentation on nitrogen storage tanks required to meet minimum safety grade nitrogen inventory requirements is required to be OPERABLE.	N/A	OPERATION, LIMITED PROCESSING, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition B or E
SRAT SME	A. SMECT Purge flow instruments (FI-3144A and FI-3144B)	N/A	OPERATION, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J
	B. SMECT Pressure Control Valves (PCV-3144A and PCV-3144B)	29 ≤ x ≤ 43 psig	OPERATION, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J

(continued)

Table 3.1.6-1 CPC Instrumentation, Components, and Automatic Interlocks (continued)

Process Area	Required Instrumentation	Setpoint/ Limit	Mode	LCO Condition
SEFT	A. SEFT Purge flow instruments (FI-3219A and FI-3219B)	N/A	OPERATION, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J
	B. SEFT Pressure Control Valves (PCV-3219A and PCV-3219B)	15 ≤ x ≤ 24	OPERATION, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J
SRAT SME MFT SEFT PRFT RCT DWTT	A. Safety Grade Nitrogen Purge Isolation Check Valves (CLI #s: S221000-SFP-V-750001385 and S221000-SFP-V-750001386)	≤ 4 scfm	OPERATION, LIMITED PROCESSING, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition B
PRFT	A. PRFT Purge flow instruments (FI-1016A and FI-1016B)	N/A	OPERATION, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J
	A. PRFT Pressure Control Valves (PCV-1016A and PCV-1016B)	15 ≤ x ≤ 24 psig	OPERATION, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J
SRAT SME MFT SEFT PRFT RCT DWTT	A. Safety Grade Nitrogen Pressure Control Valves (PCV-1233 and PCV-1234)	64≤ x ≤68 psig	OPERATION, LIMITED PROCESSING, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition B
RCT	A. RCT Purge flow instruments (FI-6149A and FI-6149B)	N/A	OPERATION, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J
	B. RCT Pressure Control Valves (PCV-6149A and PCV-6149B)	28 ≤ x ≤ 44 psig	OPERATION, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J

(continued)

Table 3.1.6-1 CPC Instrumentation, Components, and Automatic Interlocks (continued)

Process Area	Required Instrumentation	Setpoint/ Limit	Mode	LCO Condition
DWTT	A. DWTT Purge flow instruments (FI-6167A and FI-6167B)	N/A	OPERATION, LIMITED PROCESSING, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J
	B. DWTT Pressure Control Valves (PCV-6167A and PCV-6167B)	$28 \leq x \leq 44$ psig	OPERATION, LIMITED PROCESSING, STANDBY, & SHUTDOWN	LCO 3.1.6 Condition I or J

CROSS-REFERENCES:

TITLE	NUMBER
1. CPC Flammability Monitoring	3.1.1
2. SRAT, SME, SMECT, and DWTT Flammability Control – Operation	3.1.3
3. SRAT, SME, SMECT, and DWTT Flammability Control - Limited Processing, Standby, and Shutdown	3.1.4
4. MFT and RCT Flammability Control	3.1.5
5. SEFT and PRFT Flammability Control	3.1.9
6. SEFT and PRFT Agitator Power Monitoring	3.1.10
7. SRAT Temperature and Steam Flow Monitoring	3.1.11

3/4.1 CPC/SPC FLAMMABILITY CONTROL

3.1.7 Steam Heating of CPC Vessels

LCO 3.1.7 This LCO has been deleted.

3/4.1 CPC/SPC FLAMMABILITY CONTROL

3.1.8 Melter Feed Contents

LCO 3.1.8 This LCO has been deleted.

3/4.1 CPC/SPC FLAMMABILITY CONTROL

3.1.9 SEFT and PRFT Flammability Control

LCO 3.1.9

The purge flow to the SEFT shall be greater than or equal to 6 scfm.

AND

The liquid temperature in the SEFT shall be less than or equal to 38.4°C.

AND

The purge flow to the PRFT shall be greater than or equal to 5 scfm.

AND

The liquid temperature in the PRFT shall be less than or equal to 38.2°C.

AND

The SEFT temperature instrumentation loops, the PRFT temperature instrumentation loops, and associated high temperature interlocks in Table 3.1.9-3 shall be OPERABLE.

----------**NOTE**----------

Purge can be supplied by either of the two CPC Purge Systems (Primary Purge or the Safety Grade Nitrogen Purge system).

MODE APPLICABILITY: As specified in Table 3.1.9-3.

PROCESS AREA APPLICABILITY: SEFT and PRFT

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------**NOTE-1**---------- This Condition is not entered due to one inoperable flow instrument on a process vessel. ---------- ----------**NOTE-2**---------- This Condition is not to be exited until the Required Action A.1 has been completed and the purge flow maintained until the minimum amount of vessel purge volume per Table 3.1.9-2 has been supplied for the affected vessel(s). ----------		----------**NOTE**---------- If the purge is less than the LCO requirement prior to supplying the minimum amount of vessel purge volume per Table 3.1.9-2, then the subsequent Completion Time for the Required Action A.1 is reduced by the amount of time used to re-establish purge flow for the prior losses for the affected vessel(s). ----------
A. The purge flow to the SEFT is less than 6 scfm. **OR** The purge flow to the PRFT is less than 5 scfm.	A.1 Establish a purge flow greater than or equal to the specified limits to the affected process vessel(s) using any available source.	Within the recovery time of Table 3.1.9-1

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. The liquid temperature in the SEFT is greater than 38.4°C. **OR** The liquid temperature in the PRFT is greater than 38.2°C.	----------**NOTE-1**---------- Required Action B.1 should be performed by interlock functions. ---------- ----------**NOTE-2**---------- Stopping the affected vessel's agitator prior to stopping the transfer pump will cause entry into LCO 3.1.10 if transfers to the SRAT are in progress. ---------- B.1 Stop the affected vessel(s) transfer pump, agitator, and sample pump. **AND** B.2 Stop transfers into the affected process vessel(s).	 IMMEDIATELY IMMEDIATELY

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or both SEFT liquid temperature indicator(s) (TIT-3211A and/or TIT-3211B) or high temperature interlock(s) (TSHH-3211AA and/or TSHH-3211BA) are inoperable.	----------**NOTE**---------- Stopping the affected vessel's agitator prior to stopping the transfer pump will cause entry into LCO 3.1.10 if transfers to the SRAT are in progress. ----------	
OR	C.1 Stop the affected process vessel(s) transfer pump, agitator, and sample pump.	IMMEDIATELY
One or both PRFT liquid temperature indicator(s) (TIT-1141A and/or TIT-1141B) or high temperature interlock(s) (TSHH-1141AA and/or TSHH-1141BA) are inoperable.	**AND**	
	C.2 Stop transfers into the affected process vessel(s).	IMMEDIATELY

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.9.1	Verify that the purge flow to the SEFT is greater than or equal to 6 scfm locally.	12 Hours
SR 4.1.9.2	Verify that the purge flow to the PRFT is greater than or equal to 5 scfm locally.	12 Hours
SR 4.1.9.3	Verify that the liquid temperature in the SEFT is less than or equal to 38.4°C locally.	12 Hours

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.9.4	Verify that the liquid temperature in the PRFT is less than or equal to 38.2°C locally.	12 Hours
SR 4.1.9.5	Perform an INSTRUMENT LOOP CHECK on the SEFT local temperature instruments (TIT-3211A and TIT-3211B).	24 Hours
SR 4.1.9.6	Perform an INSTRUMENT LOOP CHECK on the PRFT local temperature instruments (TIT-1141A and TIT-1141B).	24 Hours
SR 4.1.9.7	Perform an INSTRUMENT LOOP CALIBRATION on the SEFT temperature instrumentation loops as detailed in Table 3.1.9-3.	1 Year
SR 4.1.9.8	Perform an INSTRUMENT LOOP TEST on the SEFT high temperature interlocks as detailed in Table 3.1.9-3.	1 Year
SR 4.1.9.9	Perform an INSTRUMENT LOOP CALIBRATION on the PRFT temperature instrumentation loops as detailed in Table 3.1.9-3.	1 Year
SR 4.1.9.10	Perform an INSTRUMENT LOOP TEST on the PRFT high temperature interlocks as detailed in Table 3.1.9-3.	1 Year

Table 3.1.9-1
SEFT Recovery Time (Time to CLFL)

		CONSERVATIVE ←													
		38.4° C		35° C		30° C		25° C		20° C		15° C		10° C	
	Liquid Volume gal	Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min	
CONSERVATIVE ↑	10657	2	02	2	34	3	14	3	45	4	11	4	30	4	46
	10500	2	19	2	56	3	40	4	16	4	45	5	07	5	25
	10000	3	18	4	09	5	11	6	02	6	42	7	13	7	37
	9500	4	24	5	31	6	53	7	59	8	53	9	33	10	06
	9000	5	38	7	03	8	48	10	12	11	19	12	10	12	52
	8500	7	03	8	48	10	57	12	41	14	05	15	08	15	59
	8000	8	41	10	48	13	25	15	31	17	13	18	29	19	32
	7500	10	32	13	05	16	14	18	46	20	47	22	20	23	35
	7000	12	42	15	44	19	29	22	30	24	55	26	45	28	14
	6500	15	13	18	50	23	15	26	50	29	42	31	53	33	39
	6000	18	12	22	28	27	42	31	56	35	20	37	54	40	00
	5500	21	46	26	48	33	00	38	00	42	01	45	04	47	33
	5000	26	05	32	03	39	24	45	20	50	05	53	43	56	40
	4500	31	24	38	31	47	16	54	20	60	00	64	20	67	51
	4000	38	07	46	39	57	09	65	39	72	28	77	39	81	53
	3500	46	48	57	10	69	56	80	15	88	32	94	51	99	59
	3000	58	27	71	16	87	03	99	48	110	03	117	51	124	13
	2500	74	50	91	06	111	05	127	16	140	15	150	09	158	14
	2000	99	32	120	56	147	15	168	33	185	40	198	43	209	22

NOTE-1: The values used for the recovery time determination are the liquid temperature and volume that existed prior to entry into this Condition. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (higher temperature is conservative) and volume (higher volume is conservative) shall be used. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach flammable conditions. Recovery times are not re-calculated for conditions that decrease the liquid temperature or volume during purge recovery.

NOTE-2: For volumes below the SEFT RTDs (less than or equal to 1800 gallons), the recovery time is based on a temperature of 105°C since the temperature monitoring capability isn't present. The recovery time for 1800 gallons is 84 hrs and 15 min and at 1400 gallons is 113 hrs and 39 min in the SEFT.

(continued)

Table 3.1.9-1 (continued)
PRFT Recovery Time (Time to CLFL)

		← CONSERVATIVE ←													
		38.2° C		35° C		30° C		25° C		20° C		15° C		10° C	
	Liquid Volume gal	Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min	
↑ CONSERVATIVE ↑	8310	1	20	1	40	2	07	2	28	2	45	2	57	3	08
	8000	2	03	2	33	3	12	3	44	4	09	4	29	4	44
	7500	3	20	4	08	5	11	6	02	6	43	7	14	7	39
	7000	4	50	5	59	7	29	8	42	9	40	10	25	11	00
	6500	6	37	8	10	10	11	11	49	13	08	14	08	14	56
	6000	8	44	10	45	13	23	15	31	17	13	18	31	19	34
	5500	11	18	13	51	17	13	19	56	22	06	23	45	25	06
	5000	14	25	17	39	21	52	25	17	28	01	30	06	31	47
	4500	18	18	22	20	27	37	31	53	35	19	37	55	40	02
	4000	23	13	28	15	34	52	40	13	44	30	47	46	50	25
	3500	29	37	35	57	44	16	51	00	56	24	60	31	63	51
	3000	38	15	46	19	56	55	65	28	72	22	77	36	81	52
	2500	50	25	60	56	74	43	85	51	94	50	101	39	107	12
	2000	68	50	82	59	101	33	116	34	128	40	137	52	145	22
	1500	99	42	119	55	146	28	167	57	185	15	198	25	209	09
	1000	161	42	194	05	236	36	271	00	298	43	319	49	337	03
	750	223	50	268	22	326	52	374	12	412	19	441	23	465	05

NOTE-1: The values used for the recovery time determination are the liquid temperature and volume that existed prior to entry into this Condition. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (higher temperature is conservative) and volume (higher volume is conservative) shall be used. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach flammable conditions. Recovery times are not re-calculated for conditions that decrease the liquid temperature or volume during purge recovery.

NOTE-2: For volumes below the PRFT RTDs (less than or equal to 600 gallons), the recovery time is based on a temperature of 105°C since the temperature monitoring capability isn't present. The recovery time for 600 gallons is 347 hrs and 43 min and at 100 gallons is 2230 hrs and 43 min in the PRFT.

Table 3.1.9-2
SEFT Purge Volume vs. Liquid Volume and Temperature

		CONSERVATIVE →						
		T=38.4 C	T=35 C	T=30 C	T= 25 C	T=20 C	T=15 C	T=10 C
	Liquid Volume (gallons)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)
CONSERVATIVE ↓	10657	737	756	775	787	795	801	805
	10500	827	847	869	883	892	898	902
	10000	1118	1146	1174	1192	1204	1213	1218
	9500	1418	1452	1488	1510	1525	1535	1542
	9000	1728	1768	1810	1837	1855	1867	1876
	8500	2047	2094	2143	2174	2195	2209	2219
	8000	2378	2430	2486	2521	2545	2561	2572
	7500	2720	2779	2841	2880	2907	2925	2937
	7000	3075	3140	3208	3252	3281	3301	3315
	6500	3445	3515	3590	3638	3670	3692	3706
	6000	3831	3907	3988	4040	4074	4098	4114
	5500	4235	4317	4404	4460	4497	4522	4540
	5000	4660	4748	4841	4900	4940	4967	4986
	4500	5109	5203	5302	5365	5408	5437	5456
	4000	5588	5687	5792	5859	5904	5935	5956
	3500	6103	6207	6317	6389	6436	6469	6491
	3000	6662	6771	6888	6963	7013	7047	7070
	2500	7280	7395	7517	7595	7648	7684	7708
	2000	7981	8101	8228	8310	8365	8403	8429
	1800	8293	8415	8544	8628	8684	8722	8748

NOTE-1: This note is applicable only when the purge is less than the LCO requirement for five minutes or less. If the purge is restored within 5 minutes, then maintaining the minimum required purge flow continuously for a minimum of 20 minutes satisfies the required purge volume. If purge flow is subsequently less than the LCO requirement after the initial 5 minutes and during this 20-minute required purge, then the purge volumes per this table apply.

NOTE-2: The values used for the purge volume determination are the liquid temperature and volume that existed at the time of re-establishing the required purge flow. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (lower temperature is conservative) and volume (lower volume is conservative) shall be used. The purge volume must be re-determined if the liquid temperature or volume decreases, as these conditions increase the required purge volume.

NOTE-3: The purge time can be calculated by dividing the purge volume by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

NOTE-4: For volumes below the SEFT RTDs (less than 1800 gallons), the purge volume is based on a temperature of 105°C since the temperature monitoring capability isn't present. The purge volume for 1400 gallons is 8324 cubic ft in the SEFT.

(continued)

Table 3.1.9-2 (continued)
PRFT Purge Volume vs. Liquid Volume and Temperature

		→ CONSERVATIVE →						
		T=38.2 C	T=35 C	T=30 C	T= 25 C	T=20 C	T=15 C	T=10 C
	Liquid Volume (gallons)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)
↓ CONSERVATIVE ↓	8310	380	389	398	405	409	412	414
	8000	557	569	583	592	598	603	605
	7500	851	869	890	904	913	919	923
	7000	1156	1181	1209	1226	1238	1246	1251
	6500	1474	1505	1539	1561	1575	1585	1592
	6000	1807	1843	1883	1909	1927	1939	1947
	5500	2155	2196	2243	2273	2293	2307	2317
	5000	2520	2567	2621	2655	2678	2693	2704
	4500	2907	2959	3019	3057	3082	3100	3112
	4000	3318	3375	3441	3483	3511	3530	3543
	3500	3758	3821	3892	3938	3969	3990	4004
	3000	4235	4303	4380	4430	4463	4486	4501
	2500	4760	4833	4916	4969	5004	5029	5045
	2000	5350	5428	5516	5573	5611	5637	5655
	1500	6039	6121	6216	6276	6316	6344	6363
	1000	6898	6986	7085	7149	7192	7221	7241
	750	7446	7535	7638	7703	7747	7778	7798

NOTE-1: This note is applicable only when the purge is less than the LCO requirement for five minutes or less. If the purge is restored within 5 minutes, then maintaining the minimum required purge flow continuously for a minimum of 20 minutes satisfies the required purge volume. If purge flow is subsequently less than the LCO requirement after the initial 5 minutes and during this 20 minutes required purge, then the purge volumes per this table apply.

NOTE-2: The values used for the purge volume determination are the liquid temperature and volume that existed at the time of re-establishing the required purge flow. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (lower temperature is conservative) and volume (lower volume is conservative) shall be used. The purge volume must be re-determined if the liquid temperature or volume decreases, as these conditions increase the required purge volume.

NOTE-3: The purge time can be calculated by dividing the purge volume by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

NOTE-4: For volumes below the PRFT RTDs (less than 600 gallons), the purge volume is based on a temperature of 105°C since the temperature monitoring capability isn't present. The purge volume for 100 gallons is 10,539 cubic ft in the PRFT.

Table 3.1.9-3
SEFT and PRFT Instrumentation and Automatic Interlocks

Process Area	Required Instrumentation	Setpoint/ Limit	Mode	LCO Condition
SEFT	A. Temperature Instrumentation Loops i. Vessel Temperature Indication (TIT-3211A and TIT-3211B)	N/A	OPERATION STANDBY & SHUTDOWN	LCO 3.1.9 Condition C
	ii. High Temperature Interlock (TSHH-3211AA and TSHH-3211BA)	≤ 38.4°C	when the SEFT level is greater than 1,800 gallons	LCO 3.1.9 Condition C
	B. Purge Flow	≥ 6 scfm	OPERATION STANDBY & SHUTDOWN	LCO 3.1.9 Condition A
PRFT	A. Temperature Instrumentation Loops i. Vessel Temperature Indication (TIT-1141A and TIT-1141B)	N/A	OPERATION STANDBY & SHUTDOWN	LCO 3.1.9 Condition C
	ii. High Temperature Interlock (TSHH-1141AA and TSHH-1141BA)	≤ 38.2°C	when the PRFT level is greater than 600 gallons	LCO 3.1.9 Condition C
	B. Purge Flow	≥ 5 scfm	OPERATION STANDBY & SHUTDOWN	LCO 3.1.9 Condition A

Footnotes:

(1) The SEFT High Temperature Hardwired Interlock will:
- Stop the SEFT agitator
- Stop the SEFT sample pump
- Stop the SEFT transfer pump

(2) The PRFT High Temperature Hardwired Interlock will:
- Stop the PRFT agitator
- Stop the PRFT sample pump
- Stop the PRFT transfer pump

CROSS-REFERENCES:

TITLE	NUMBER
1. CPC Purge Source	3.1.6
2. SEFT and PRFT Agitator Power Monitoring	3.1.10

3/4.1 CPC/SPC FLAMMABILITY CONTROL

3.1.10 SEFT and PRFT Agitator Power Monitoring

LCO 3.1.10

The SEFT agitator power shall be greater than or equal to 14.6% for two hours prior to and during SEFT transfer to the SRAT.

AND

The PRFT agitator power shall be greater than or equal to 14.6% for two hours prior to and during PRFT transfer to the SRAT.

AND

The SEFT agitator power instrumentation loops, the PRFT agitator power instrumentation loops, and associated low power interlocks in Table 3.1.10-1 shall be OPERABLE.

MODE APPLICABILITY: OPERATION

PROCESS AREA APPLICABILITY: SRAT

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. The SEFT agitator power is less than 14.6% during SE addition. **OR** The PRFT agitator power is less than 14.6% during MST Sludge Solids addition. **OR** One or both SEFT agitator power transmitter(s) (JT-3210A and/or JT-3210B), power indicator(s) (JIT-3210A and/or JIT-3210B), or low power interlock(s) (JSLL-3210AA and/or JSLL-3210BA) are inoperable. **OR** One or both PRFT agitator power transmitter(s) (JT-1140A and/or JT-1140B), power indicator(s) (JIT-1140A and/or JIT-1140B), or low power interlock(s) (JSLL-1140AA and/or JSLL-1140BA) are inoperable.	----------**NOTE-1**---------- LCO 3.0.4 is not applicable. ---------- ----------**NOTE-2**---------- Required Action A.1 should be performed by interlock functions. ---------- A.1 Stop transfers from the affected process vessel(s) to the SRAT.	IMMEDIATELY

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.10.1	Verify that the SEFT agitator power is greater than or equal to 14.6% locally.	At least 2 Hours prior to SEFT transfer to the SRAT **AND** Every 12 Hours thereafter during SEFT transfer to the SRAT
SR 4.1.10.2	Verify that the PRFT agitator power is greater than or equal to 14.6% locally.	At least 2 Hours prior to PRFT transfer to the SRAT **AND** Every 12 Hours thereafter during PRFT transfer to the SRAT
SR 4.1.10.3	Perform an INSTRUMENT LOOP CHECK on the SEFT agitator local power monitoring instruments (JIT-3210A and JIT-3210B).	At least 2 Hours prior to SEFT transfer to the SRAT **AND** Every 12 Hours thereafter during SEFT transfer to the SRAT
SR 4.1.10.4	Perform an INSTRUMENT LOOP CHECK on the PRFT agitator local power monitoring instruments (JIT-1140A and JIT-1140B).	At least 2 Hours prior to PRFT transfer to the SRAT **AND** Every 12 Hours thereafter during PRFT transfer to the SRAT

(continued)

SURVEILLANCE REQUIREMENTS: (continued)

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.10.5	Perform an INSTRUMENT LOOP CALIBRATION on the SEFT agitator power instrumentation loops detailed in Table 3.1.10-1.	1 Year
SR 4.1.10.6	Perform an INSTRUMENT LOOP TEST on the SEFT low agitator power interlocks as detailed in Table 3.1.10-1.	1 Year
SR 4.1.10.7	Perform an INSTRUMENT LOOP CALIBRATION on the PRFT agitator power instrumentation loops detailed in Table 3.1.10-1.	1 Year
SR 4.1.10.8	Perform an INSTRUMENT LOOP TEST on the PRFT low agitator power interlocks as detailed in Table 3.1.10-1.	1 Year

Table 3.1.10-1 SEFT and PRFT Agitator Power Instrumentation and Automatic Interlocks

Process Area	Required Instrumentation	Setpoint/ Limit	Mode	LCO Condition
SEFT	A. Agitator Power Instrumentation Loops			
	i. Vessel Agitator Power Watt Transducer (JT-3210A and JT-3210B)	N/A	OPERATION	LCO 3.1.10 Condition A
	ii. Vessel Agitator Power Indication (JIT-3210A and JIT-3210B)	N/A	OPERATION	LCO 3.1.10 Condition A
	iii. Low Power Interlock (JSLL-3210AA and JSLL-3210BA)	≥ 14.6%	OPERATION	LCO 3.1.10 Condition A
PRFT	A. Agitator Power Instrumentation Loops			
	i. Vessel Agitator Power Watt Transducer (JT-1140A and JT-1140B)	N/A	OPERATION	LCO 3.1.10 Condition A
	ii. Vessel Agitator Power Indication (JIT-1140A and JIT-1140B)	N/A	OPERATION	LCO 3.1.10 Condition A
	iii. Low Power Interlock (JSLL-1140AA and JSLL-1140BA)	≥ 14.6%	OPERATION	LCO 3.1.10 Condition A

Footnotes:

(1) The SEFT Low Agitator Power Hardwired Interlock will:
- Stop transfers from the SEFT to the SRAT

(2) The PRFT Low Agitator Power Hardwired Interlock will:
- Stop transfers from the PRFT to the SRAT

CROSS-REFERENCES:

TITLE	NUMBER
1. None	

3/4.1 CPC/SPC FLAMMABILITY CONTROL

3.1.11 SRAT Temperature and Steam Flow Monitoring

LCO 3.1.11

The SRAT contents shall be boiling prior to and during SEFT or PRFT transfers to the SRAT.

AND

The steam flow to the SRAT shall be greater than or equal to 47.3% during SEFT or PRFT transfers to the SRAT.

AND

The SRAT temperature instrumentation loops and associated low temperature interlocks in Table 3.1.11-1 shall be OPERABLE.

AND

The SRAT steam flow instrumentation loops and associated low steam flow interlocks in Table 3.1.11-1 shall be OPERABLE.

AND

Both Critical Plant Air Isolation check valves as listed in Table 3.1.11-1 shall be OPERABLE.

MODE APPLICABILITY: OPERATION

PROCESS AREA APPLICABILITY: SRAT

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. The steam flow to the SRAT is less than 47.3% during transfers from the SEFT or PRFT to the SRAT. **OR** One or both SRAT temperature indicator(s) (TIT-3008A and/or TIT-3008B) or low temperature interlock(s) (TSLL-3008AA and/or TSLL-3008BA) are inoperable. **OR** One or both SRAT steam flow transmitter(s) (FIT-3000AA and/or FIT-3000BA), steam flow indicator(s) (FIT-3000AB and/or FIT-3000BB), or low steam flow interlock(s) (FSLL-3000AA and/or FSLL-3000BA) are inoperable. **OR** One or more Critical Plant Air Isolation Check Valves are inoperable.	----------**NOTE-1**---------- LCO 3.0.4 is not applicable. ---------- ----------**NOTE-2**---------- Required Action A.1 should be performed by interlock functions if low steam flow is detected. ---------- A.1 Stop transfers to the SRAT from the SEFT and PRFT.	IMMEDIATELY

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------**NOTE-1**---------- This condition is not to be exited until Required Actions B.3 and B.4 are completed to ensure any accumulated Isopar L is safely removed. ---------- ----------**NOTE-2**---------- This Condition is not required to be entered if feed is stopped due to actuation of the low steam flow interlock. ----------	----------**NOTE-3**---------- LCO 3.0.4 is not applicable. ---------- ----------**NOTE-4**---------- Required Action B.1 should be performed by interlock functions for transfers from the SEFT and PRFT into the SRAT if low temperature is detected. ----------	
B. The SRAT is not boiling during transfers from the SEFT or PRFT to the SRAT.	B.1 Stop transfers into and out of the SRAT.	IMMEDIATELY
	AND	
	B.2 Isolate the steam supply to the SRAT.	IMMEDIATELY
	AND	
	B.3 Perform an engineering evaluation to determine if compensatory measures are required for the accumulation of Isopar L.	Prior to restoring steam flow to the SRAT
	AND	
	B.4 If compensatory measures are determined to be required, then implement the required compensatory measures.	N/A

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.11.1	Verify that the SRAT contents are boiling.	Prior to SEFT or PRFT transfer to the SRAT
SR 4.1.11.2	Verify that the steam flow to the SRAT is greater than or equal to 47.3% locally.	Prior to SEFT or PRFT transfer to the SRAT **AND** Every 12 Hours thereafter during SEFT or PRFT transfer to the SRAT
SR 4.1.11.3	Perform an INSTRUMENT LOOP CHECK on the SRAT local temperature instruments (TIT-3008A and TIT-3008B).	Prior to SEFT or PRFT transfer to the SRAT **AND** Every 12 Hours thereafter during SEFT or PRFT transfer to the SRAT
SR 4.1.11.4	Perform an INSTRUMENT LOOP CHECK on the SRAT steam flow instruments (FIT-3000AB and FIT-3000BB).	Prior to SEFT or PRFT transfer to the SRAT **AND** Every 12 Hours thereafter during SEFT or PRFT transfer to the SRAT
SR 4.1.11.5	Perform an INSTRUMENT LOOP CALIBRATION on the SRAT temperature instrumentation loops detailed in Table 3.1.11-1.	1 Year
SR 4.1.11.6	Perform an INSTRUMENT LOOP TEST on the SRAT low temperature interlocks as detailed in Table 3.1.11-1.	1 Year

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.1.11.7	Perform an INSTRUMENT LOOP CALIBRATION on the SRAT steam flow instrumentation loops detailed in Table 3.1.11-1.	1 Year
SR 4.1.11.8	Perform an INSTRUMENT LOOP TEST on the SRAT low steam flow interlocks as detailed in Table 3.1.11-1.	1 Year
SR 4.1.11.9	Perform Leak Test on Critical Plant Air Isolation Check Valves.	5 years

Table 3.1.11-1 SRAT Temperature and Steam Flow Instrumentation, and Automatic Interlocks

Process Area	Required Instrumentation	Setpoint/ Limit	Mode	LCO Condition
SRAT	A. Temperature Instrumentation Loops			
	i. Vessel Temperature Indication (TIT-3008A and TIT-3008B)	N/A	OPERATION	LCO 3.1.11 Condition A
	ii. Low Temperature Interlock (TSLL-3008AA and TSLL-3008BA) (1)	≥ 98°C	OPERATION	LCO 3.1.11 Condition A
	B. Steam Flow Instrumentation Loops			
	i. Vessel Steam Flow Transmitter (FIT-3000AA and FIT-3000BA)	N/A	OPERATION	LCO 3.1.11 Condition A
	ii. Vessel Steam Flow Indication (FIT-3000AB and FIT-3000BB)	N/A	OPERATION	LCO 3.1.11 Condition A
	iii. Low Steam Flow Interlock (FSLL-3000AA and FSLL-3000BA) (2)	≥ 47.3 %	OPERATION	LCO 3.1.11 Condition A
	C. Critical Plant Air Isolation Check Valves			
	i. PLA-3001-11 ii. PLA-3001-12	≤ 27 pph (leakage)	OPERATION	LCO 3.1.11 Condition A

Footnotes:

(1) The SRAT Low Temperature Hardwired Interlock will:
- Stop Transfers to the SRAT from the SEFT and PRFT

(2) The SRAT Low Steam Flow Hardwired Interlock will:
- Stop Transfers to the SRAT from the SEFT and PRFT

CROSS-REFERENCES:

TITLE	NUMBER
1. CPC Flammability Monitoring	3.1.1
2. SRAT, SME, SMECT, and DWTT Flammability Control – Operation	3.1.3
3. CPC Purge Source	3.1.6
4. SEFT and PRFT Agitator Power Monitoring	3.1.10

3/4.2 SPC FLAMMABILITY CONTROL

The following LCOs have been deleted:

3.2.1 SPC Flammability Monitoring

3.2.2 PVVH Flammability Monitoring

3.2.3 SPC Flammability Control - Operation

3.2.4 SPC Flammability Control – Standby

3.2.5 SPC Flammability Control - Shutdown

3.2.6 SPC Purge Sources

3.2.7 SPC Sump Level

3.2.8 PHA Composition

3/4.3 MELTER FLAMMABILITY

3.3.1 Melter Off-Gas Flammability Control

LCO 3.3.1 This LCO has been deleted.

3/4.4 LPPP FLAMMABILITY CONTROL

3.4.1 LPPP-PPT Temperature Control

LCO 3.4.1 The liquid temperature in the LPPP-PPT shall be less than or equal to 38.1°C.

AND

The LPPP-PPT temperature instrumentation loops and associated high temperature interlocks in Table 3.4.1-1 shall be OPERABLE.

MODE APPLICABILITY: As specified in Table 3.4.1-1.

PROCESS AREA APPLICABILITY: LPPP-PPT

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. The liquid temperature in the LPPP-PPT is greater than 38.1°C. **OR** One or both LPPP-PPT liquid temperature indicator(s) (TIT-7170A or TIT-7170B) is inoperable. **OR** One or both LPPP-PPT high temperature interlock(s) (TSHH-7170AA or TSHH-7170BA) is inoperable.	----------**NOTE-1**---------- Required Actions A.1 and A.2 should be performed by interlock functions if Condition A is entered due to high temperature condition. ---------- ----------**NOTE-2**---------- Stopping the LPPP-PPT agitator prior to stopping the transfer pump will cause entry into LCO 3.4.2 if transfers to the PRFT are in progress. ---------- A.1 Stop the LPPP-PPT transfer pump. **AND** A.2 Stop the LPPP-PPT agitator. **AND** A.3 Stop transfers into the LPPP-PPT.	 IMMEDIATELY IMMEDIATELY IMMEDIATELY

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.4.1.1	Verify that the liquid temperature in the LPPP-PPT is less than or equal to 38.1°C locally.	12 Hours
SR 4.4.1.2	Perform an INSTRUMENT LOOP CHECK on the LPPP-PPT local temperature instruments (TIT-7170A and TIT-7170B).	24 Hours
SR 4.4.1.3	Perform an INSTRUMENT LOOP CALIBRATION on the LPPP-PPT temperature instrumentation loops as detailed in Table 3.4.1-1.	1 Year
SR 4.4.1.4	Perform an INSTRUMENT LOOP TEST on the LPPP-PPT high temperature interlocks as detailed in Table 3.4.1-1.	1 Year

Table 3.4.1-1
LPPP-PPT Temperature Instrumentation and Automatic Interlocks

Process Area	Required Instrumentation	Setpoint/ Limit	Mode	LCO Condition
LPPP-PPT	A. Temperature Instrumentation Loops i. Vessel Temperature Indication (TIT-7170A and TIT-7170B)	N/A	OPERATION STANDBY & SHUTDOWN when the LPPP-PPT level is greater than 208 gallons	LCO 3.4.1 Condition A
	ii. High Temperature Interlock (TSHH-7170AA and TSHH-7170BA)	≤ 38.1°C	OPERATION STANDBY & SHUTDOWN when the LPPP-PPT level is greater than 208 gallons	LCO 3.4.1 Condition A

Footnotes:

The LPPP-PPT High Temperature Hardwired Interlock will:

- Stop the LPPP-PPT agitator
- Stop the LPPP-PPT transfer pump

CROSS-REFERENCES:

TITLE	NUMBER
1. LPPP-PPT Agitator Power Monitoring	3.4.2

3/4.4 LPPP FLAMMABILITY CONTROL

3.4.2 LPPP-PPT Agitator Power Monitoring

LCO 3.4.2 The LPPP-PPT agitator power shall be greater than or equal to 12.6% for two hours prior to and during LPPP-PPT transfer to the PRFT.

AND

The LPPP-PPT agitator power instrumentation loops and associated low power interlocks in Table 3.4.2-1 shall be OPERABLE.

MODE APPLICABILITY: OPERATION and STANDBY

PROCESS AREA APPLICABILITY: LPPP-PPT

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. The LPPP-PPT agitator power is less than 12.6% during transfer to the PRFT. **OR** One or both LPPP-PPT agitator power transducer(s) (JT-7171A or JT-7171B) is inoperable. **OR** One or both power indicator(s) (JIT-7171A or JIT-7171B) is inoperable. **OR** One or both low power interlock(s) (JSLL-7171AA or JSLL-7171BA) is inoperable.	----------**NOTE-1**---------- LCO 3.0.4 is not applicable. ---------- ----------**NOTE-2**---------- Required Action A.1 should be performed by interlock functions on agitator low power condition. ---------- A.1 Stop transfers from the LPPP-PPT to the PRFT.	IMMEDIATELY

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.4.2.1	Verify that the LPPP-PPT agitator power is greater than or equal to 12.6% locally.	At least 2 Hours prior to LPPP-PPT transfer to the PRFT

(continued)

SURVEILLANCE REQUIREMENTS: (continued)

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.4.2.2	Perform an INSTRUMENT LOOP CHECK on the LPPP-PPT agitator local power monitoring instruments (JIT-7171A and JIT-7171B).	At least 2 Hours prior to LPPP-PPT transfer to the PRFT
SR 4.4.2.3	Perform an INSTRUMENT LOOP CALIBRATION on the LPPP-PPT agitator power instrumentation loops detailed in Table 3.4.2-1.	1 Year
SR 4.4.2.4	Perform an INSTRUMENT LOOP TEST on the LPPP-PPT low agitator power interlocks as detailed in Table 3.4.2-1.	1 Year

Table 3.4.2-1 LPPP-PPT Agitator Power Instrumentation and Automatic Interlocks

Process Area	Required Instrumentation	Setpoint/ Limit	Mode	LCO Condition
LPPP-PPT	A. Agitator Power Instrumentation Loops			
	i. Vessel Agitator Power Watt Transducer (JT-7171A and JT-7171B)	N/A	OPERATION STANDBY	LCO 3.4.2 Condition A
	ii. Vessel Agitator Power Indication (JIT-7171A and JIT-7171B)	N/A	OPERATION STANDBY	LCO 3.4.2 Condition A
	iii. Low Power Interlock (JSLL-7171AA and JSLL-7171BA)	≥ 12.6%	OPERATION STANDBY	LCO 3.4.2 Condition A

Footnotes:

The LPPP-PPT Low Agitator Power Hardwired Interlock will:

- Stop transfer from the LPPP-PPT to the PRFT

CROSS-REFERENCES:

TITLE	NUMBER
1. None	

3/4.4 LPPP FLAMMABILITY CONTROL

3.4.3 LPPP Flammability Control

LCO 3.4.3

The Primary Nitrogen purge system shall be supplying a purge flow to the PPT greater than or equal to 1.3 scfm as indicated at FI-7470A or FI-7470B.

AND

The Primary Nitrogen purge system shall be supplying a purge flow to the SPT greater than or equal to 1.5 scfm as indicated at FI-6944A or FI-6944B.

AND

The Primary Nitrogen purge system shall be supplying a purge flow to the RPT greater than or equal to 3.8 scfm as indicated at FI-6962A or FI-6962B.

AND

The LPPP vessels' purge flow indication instrumentation in Table 3.4.3-3 shall be OPERABLE.

MODE APPLICABILITY: OPERATION, STANDBY, and SHUTDOWN

PROCESS AREA APPLICABILITY: LPPP – PPT, SPT, and RPT

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------**NOTE 1**--------- This Condition is not entered solely due to an inoperable Pressure Indicator (PI-5183) unless entering due to Required Actions and/or associated Completion Times of Condition F are not met. ---------- ----------**NOTE 2**---------- This Condition is not to be exited until the Primary Nitrogen purge system has been restored. ---------- ----------**NOTE 3**---------- If purge flow (from either Primary or Safety Grade Purge) to the applicable vessel drops below the LCO requirement, the vessel purge volume per Table 3.4.3-2 must be supplied to the affected vessel(s) before exiting this LCO Condition. ----------		----------**NOTE**---------- If the purge is less than the LCO requirement prior to supplying the minimum amount of vessel purge volume per Table 3.4.3-2, then the subsequent Completion Time for the Required Action A.2 is reduced by the amount of time used to re-establish purge flow for the prior losses for the affected vessel(s). ----------
A. The Primary Nitrogen purge to the PPT is less than 1.3 scfm. **OR** The Primary Nitrogen purge to the SPT is less than 1.5 scfm. **OR** (continued)	A.1 Stop all transfers into the affected vessel(s). **AND** A.2 Restore a purge flow greater than or equal to the minimum purge requirement for the affected process vessel(s) using any available source.	IMMEDIATELY Within the Recovery Time of Table 3.4.3-1 for the affected process vessel(s)

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued) The Primary Nitrogen purge to the RPT is less than 3.8 scfm. **OR** The Safety Grade Nitrogen System Actuation Pressure Indicator (PI-5183) is reading less than 52 psig. **OR** Required Action(s) and/or associated Completion Time(s) for Condition F are not met. **OR** Both PPT purge flow indicating loops (FI-7470A and FI-7470B) are inoperable. **OR** Both SPT purge flow indicating loops (FI-6944A and FI-6944B) are inoperable. **OR** Both RPT purge flow indicating loops (FI-6962A and FI-6962B) are inoperable.		

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Deleted		
C. Deleted		
D. Deleted		
E. Deleted		
F. The Safety Grade Nitrogen System Actuation Pressure Indicator (PI-5183) is inoperable.	----------**NOTE**---------- LCO 3.0.4 is not applicable. ---------- F.1 Verify the Safety Grade nitrogen system is not supplying the purge flow. **AND** F.2 Restore PI-5183 to OPERABLE status.	1 Hour **AND** Every 4 Hours thereafter 72 Hours
G. Deleted		

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.4.3.1	Verify that the Primary Nitrogen purge to the PPT is greater than or equal to 1.3 scfm locally at FI-7470A or FI-7470B.	12 Hours
SR 4.4.3.2	Verify that the Primary Nitrogen purge to the SPT is greater than or equal to 1.5 scfm locally at FI-6944A or FI-6944B.	12 Hours
SR 4.4.3.3	Perform an INSTRUMENT LOOP CHECK on the PPT purge flow meters (FI-7470A and FI-7470B). This SR is only applicable when both PPT purge flow instruments are OPERABLE.	7 Days
SR 4.4.3.4	Perform an INSTRUMENT LOOP CHECK on the SPT purge flow meters (FI-6944A and FI-6944B). This SR is only applicable when both SPT purge flow instruments are OPERABLE.	7 Days
SR 4.4.3.5	Deleted	
SR 4.4.3.6	Verify that the Safety Grade Purge System Actuation Pressure Indicator (PI-5183) is reading greater than or equal to 52 psig.	12 Hours
SR 4.4.3.7	Perform an INSTRUMENT LOOP CALIBRATION on the Safety Grade Purge System Actuation Pressure Indicator (PI-5183).	6 Months
SR 4.4.3.8	Perform an INSTRUMENT LOOP CALIBRATION on PPT purge flow meters (FI-7470A and FI-7470B).	1 Year
SR 4.4.3.9	Perform an INSTRUMENT LOOP CALIBRATION on SPT purge flow meters (FI-6944A and FI-6944B).	1 Year

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.4.3.10	Verify that the Primary Nitrogen purge to the RPT is greater than or equal to 3.8 scfm locally at FI-6962A or FI-6962B.	12 Hours
SR 4.4.3.11	Perform an INSTRUMENT LOOP CHECK on the RPT purge flow meters (FI-6962A and FI-6962B). This SR is only applicable when both RPT purge flow instruments are OPERABLE.	7 Days
SR 4.4.3.12	Perform an INSTRUMENT LOOP CALIBRATION on RPT purge flow meters (FI-6962A and FI-6962B).	1 Year

Table 3.4.3-1
LPPP- Precipitate Pump Tank (PPT) Recovery Times

		← CONSERVATIVE ←													
		38.1° C		35° C		30° C		25° C		20° C		15° C		10° C	
	Liquid Volume gal	Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min	
↑ CONSERVATIVE ↑	6466	3	29	4	13	5	12	5	59	6	37	7	05	7	29
	6000	6	59	8	23	10	18	11	50	13	03	13	59	14	44
	5500	11	38	13	54	16	59	19	29	21	26	22	56	24	10
	5000	17	30	20	48	25	18	28	56	31	47	33	59	35	47
	4500	24	58	29	33	35	46	40	48	44	46	47	49	50	19
	4000	34	39	40	49	49	12	56	00	61	21	65	29	68	52
	3500	47	30	55	43	66	54	75	57	83	06	88	37	93	08
	3000	65	05	76	03	90	57	103	02	112	35	119	58	126	01
	2500	90	16	105	04	125	12	141	32	154	28	164	27	172	39
	2000	128	43	149	18	177	17	200	00	218	00	231	55	243	22
	1500	193	44	223	56	265	02	298	25	324	52	345	22	362	14
	1000	325	09	374	37	441	58	496	41	540	06	573	46	601	30
	700	495	04	569	20	670	26	752	36	817	50	868	27	910	10

NOTE-1: The values used for the recovery time determination are the liquid temperature and volume that existed prior to entry into this Condition. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (higher temperature is conservative) and volume (higher volume is conservative) shall be used. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach flammable conditions. Recovery times are not re-calculated for conditions that decrease the liquid temperature or volume during purge recovery.

NOTE-2: For volumes below the PPT RTDs (less than 208 gallons), the recovery time is based on a temperature of 105°C since the temperature monitoring capability isn't present. The recovery time for 100 gallons is 4,755 hrs and 32 min in the PPT.

(continued)

Table 3.4.3-1 (continued)
LPPP- Sludge Pump Tank (SPT) Recovery Times

		← CONSERVATIVE ←																	
		50° C		45° C		40° C		35° C		30° C		25° C		20° C		15° C		10° C	
	Liquid Volume gal	Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min	
↑ CONSERVATIVE ↑	6217	5	13	5	21	5	28	5	36	5	44	5	52	6	01	6	07	6	13
	6000	6	54	7	04	7	14	7	24	7	35	7	45	7	57	8	05	8	13
	5500	11	25	11	40	11	57	12	14	12	31	12	49	13	07	13	21	13	35
	5000	17	02	17	25	17	49	18	14	18	40	19	06	19	34	19	54	20	15
	4500	24	08	24	41	25	15	25	50	26	26	27	03	27	41	28	10	28	39
	4000	33	16	34	01	34	47	35	35	36	24	37	15	38	08	38	47	39	28
	3500	45	19	46	19	47	22	48	27	49	33	50	42	51	54	52	47	53	42
	3000	61	43	63	05	64	30	65	57	67	27	69	01	70	37	71	49	73	04
	2500	85	06	86	59	88	55	90	54	92	58	95	06	97	18	98	57	100	40
	2000	120	42	123	21	126	04	128	53	131	47	134	47	137	53	140	14	142	40
	1500	180	45	184	40	188	44	192	55	197	14	201	42	206	18	209	49	213	28
	1000	301	52	308	23	315	07	322	04	329	14	336	38	344	18	350	10	356	15
	650	498	29	509	13	520	17	531	42	543	30	555	41	568	16	577	58	587	59

Note: The values used for the recovery time determination are the liquid temperature and volume that existed prior to entry into this Condition. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (higher temperature is conservative) and volume (higher volume is conservative) shall be used. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach flammable conditions. Recovery times are not re-calculated for conditions that decrease the liquid temperature or volume during purge recovery.

(continued)

Table 3.4.3-1 (continued)
LPPP- Recycle Pump Tank (RPT) Recovery Times

		← CONSERVATIVE ←																			
		55° C		50° C		45° C		40° C		35° C		30° C		25° C		20° C		15° C		10° C	
	Liquid Volume gal	Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min		Recovery Time hr/min	
↑ CONSERVATIVE ↑	6179	2	02	2	13	2	26	2	41	2	58	3	19	3	43	4	13	4	46	5	28
	6000	2	36	2	51	3	07	3	26	3	48	4	14	4	45	5	22	6	05	6	58
	5500	4	38	5	03	5	31	6	03	6	41	7	25	8	17	9	19	10	31	12	00
	5000	7	09	7	47	8	29	9	18	10	15	11	21	12	39	14	12	16	00	18	14
	4500	10	19	11	13	12	13	13	23	14	44	16	17	18	08	20	21	22	53	26	02
	4000	14	23	15	37	17	01	18	37	20	28	22	37	25	09	28	12	31	42	36	02
	3500	19	42	21	23	23	18	25	28	27	59	30	55	34	22	38	29	43	15	49	08
	3000	26	57	29	14	31	50	34	47	38	12	42	11	46	52	52	28	58	56	66	55
	2500	37	14	40	23	43	57	48	02	52	44	58	12	64	38	72	19	81	13	92	10
	2000	52	52	57	20	62	23	68	08	74	47	82	31	91	37	102	28	115	02	130	31
	1500	79	11	85	51	93	23	101	59	111	54	123	26	137	00	153	12	171	56	195	02
	1000	132	14	143	19	155	52	170	11	186	41	205	52	228	26	255	22	286	34	325	00
	650	218	16	236	32	257	13	280	49	307	59	339	34	376	45	421	06	472	30	535	47

Note: The values used for the recovery time determination are the liquid temperature and volume that existed prior to entry into this Condition. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (higher temperature is conservative) and volume (higher volume is conservative) shall be used. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach flammable conditions. Recovery times are not re-calculated for conditions that decrease the liquid temperature or volume during purge recovery.

Table 3.4.3-2
LPPP- Precipitate Pump Tank (PPT) Purge Volume vs. Liquid Volume and Temperature

		CONSERVATIVE →						
		T=38.1 C	T=35 C	T=30 C	T=25 C	T=20 C	T=15 C	T<10 C
	Liquid Volume (gallons)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)
CONSERVATIVE ↓	6466	270	278	287	293	297	300	302
	6000	499	514	530	541	548	552	556
	5500	761	782	805	821	831	838	842
	5000	1040	1067	1098	1118	1131	1140	1146
	4500	1340	1372	1409	1434	1450	1460	1468
	4000	1662	1699	1743	1772	1790	1803	1812
	3500	2011	2053	2103	2136	2157	2172	2182
	3000	2392	2440	2496	2532	2556	2573	2584
	2500	2816	2868	2930	2970	2996	3015	3027
	2000	3295	3352	3419	3463	3492	3512	3525
	1500	3857	3918	3991	4038	4070	4091	4106
	1000	4560	4625	4702	4753	4787	4810	4826
	700	5108	5176	5256	5309	5344	5368	5384

Note-1: This note is applicable only when the purge is less than the LCO requirement for five minutes or less. If the purge is restored within 5 minutes, then maintaining the minimum required purge flow continuously for a minimum of 20 minutes satisfies the required purge volume. If purge flow is subsequently less than the LCO requirement during this 20 minutes required purge, then the purge volumes per this table apply.

Note-2: The values used for the purge volume determination are the liquid temperature and volume that existed at the time of re-establishing the required purge flow. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (lower temperature is conservative) and volume (lower volume is conservative) shall be used. The purge volume must be re-determined if the liquid temperature or volume decreases, as these conditions increase the required purge volume.

Note-3: The purge time can be calculated by dividing the purge volume by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

Note-4: For volumes below the PPT RTDs (less than 208 gallons), the purge volume is based on a temperature of 105°C since the temperature monitoring capability isn't present. The purge volume for 100 gallons is 7,698 cubic ft in the PPT.

(continued)

Table 3.4.3-2 (continued)
LPPP- Sludge Pump Tank (SPT) Purge Volume vs. Liquid Volume and Temperature

		→ CONSERVATIVE →						
		T=50 C	T=45 C	T=40 C	T=35 C	T=30 C	T=25 C	T<25 C
	Liquid Volume (gallons)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)
↓ CONSERVATIVE ↓	6217	390	391	392	393	394	394	394
	6000	499	500	501	502	503	503	503
	5500	760	761	763	764	766	766	766
	5000	1039	1041	1043	1045	1047	1047	1047
	4500	1338	1340	1342	1345	1347	1347	1347
	4000	1659	1662	1665	1667	1670	1670	1670
	3500	2008	2011	2014	2017	2020	2020	2020
	3000	2389	2392	2396	2399	2403	2403	2403
	2500	2812	2815	2819	2823	2827	2827	2827
	2000	3291	3295	3299	3303	3307	3307	3307
	1500	3852	3857	3861	3866	3870	3870	3870
	1000	4554	4559	4564	4569	4573	4573	4573
	650	5210	5215	5220	5225	5230	5230	5230

Note-1: This note is applicable only when the purge is less than the LCO requirement for five minutes or less. If the purge is restored within 5 minutes, then maintaining the minimum required purge flow continuously for a minimum of 20 minutes satisfies the required purge volume. If purge flow is subsequently less than the LCO requirement during this 20 minutes required purge, then the purge volumes per this table apply.

Note-2: The values used for the purge volume determination are the liquid temperature and volume that existed at the time of re-establishing the required purge flow. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (lower temperature is conservative) and volume (lower volume is conservative) shall be used. The purge volume must be re-determined if the liquid temperature or volume decreases, as these conditions increase the required purge volume.

Note-3: The purge time can be calculated by dividing the purge volume by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

(continued)

Table 3.4.3-2 (continued)
LPPP- Recycle Pump Tank (RPT) Purge Volume vs. Liquid Volume and Temperature

		CONSERVATIVE →									
		T=55 C	T=50 C	T=45 C	T=40 C	T=35 C	T=30 C	T=25 C	T=20 C	T=15 C	T=10 C
	Liquid Volume (gallons)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)	Purge Volume (cubic ft)
CONSERVATIVE ↓	6179	527	543	559	577	596	616	638	665	699	756
	6000	645	664	684	705	728	752	779	811	853	923
	5500	998	1025	1053	1083	1115	1150	1188	1234	1294	1395
	5000	1372	1405	1441	1479	1520	1565	1614	1673	1750	1880
	4500	1768	1808	1851	1897	1947	2001	2061	2131	2224	2379
	4000	2191	2238	2288	2341	2399	2462	2531	2613	2719	2896
	3500	2647	2700	2756	2816	2881	2953	3031	3123	3241	3435
	3000	3143	3201	3264	3330	3402	3482	3567	3668	3796	4003
	2500	3689	3753	3821	3894	3973	4059	4152	4261	4397	4612
	2000	4304	4374	4447	4526	4611	4704	4803	4918	5061	5279
	1500	5022	5096	5175	5259	5350	5449	5554	5675	5821	6037
	1000	5914	5993	6076	6165	6261	6366	6476	6601	6750	6956
	650	6744	6825	6912	7004	7104	7211	7325	7452	7601	7796

Note-1: This note is applicable only when the purge is less than the LCO requirement for five minutes or less. If the purge is restored within 5 minutes, then maintaining the minimum required purge flow continuously for a minimum of 20 minutes satisfies the required purge volume. If purge flow is subsequently less than the LCO requirement during this 20 minutes required purge, then the purge volumes per this table apply.

Note-2: The values used for the purge volume determination are the liquid temperature and volume that existed at the time of re-establishing the required purge flow. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (lower temperature is conservative) and volume (lower volume is conservative) shall be used. The purge volume must be re-determined if the liquid temperature or volume decreases, as these conditions increase the required purge volume.

Note-3: The purge time can be calculated by dividing the purge volume by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

(continued)

Table 3.4.3-3 LPPP Purge Flow Instrumentation

PROCESS AREA	REQUIRED INSTRUMENTATION	SETPOINT	MODE	LCO CONDITION
LPPP-PPT	A. PPT Purge Flow Instruments i. Flow Indicators (FI-7470A or FI-7470B)	N/A	OPERATION STANDBY & SHUTDOWN	LCO 3.4.3 Condition A
LPPP-SPT	B. SPT Purge Flow Instruments i. Flow Indicators (FI-6944A or FI-6944B)	N/A	OPERATION STANDBY & SHUTDOWN	LCO 3.4.3 Condition A
LPPP-PPT LPPP-SPT LPPP-RPT	C. Safety Grade Purge System Actuation Pressure Indicator (PI-5183).	N/A	OPERATION STANDBY & SHUTDOWN	LCO 3.4.3 Condition F
LPPP-RPT	D. RPT Purge Flow Instruments i. Flow Indicators (FI-6962A or FI-6962B)	N/A	OPERATION STANDBY & SHUTDOWN	LCO 3.4.3 Condition A

CROSS-REFERENCES:

TITLE	NUMBER
1. LPPP Purge Sources	3.4.5

3/4.4 LPPP FLAMMABILITY CONTROL

3.4.4 PPT Flammability Control - Standby & Shutdown

LCO 3.4.4 This LCO has been deleted.

3/4.4 LPPP FLAMMABILITY CONTROL

3.4.5 LPPP Purge Sources

LCO 3.4.5 The Safety Grade Nitrogen purge source to the PPT, SPT, and RPT and associated instruments in Table 3.4.5-1 shall be OPERABLE.

MODE APPLICABILITY: OPERATION, STANDBY, and SHUTDOWN

PROCESS AREA APPLICABILITY: LPPP – SPT, PPT, and RPT

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. The Safety Grade Nitrogen purge source is inoperable. **OR** Both Safety Grade Nitrogen Purge Isolation Check Valves are inoperable. **OR** Both Safety Grade Nitrogen tank level gauges (LI-5181X and LI-5182X) are inoperable. **OR** The Safety Grade Nitrogen tank inventory is less than 90 in.wc. **OR** Both Safety Grade Nitrogen pressure control valves (PCV-5181A and PCV-5181B) are inoperable. **OR** The Safety Grade Nitrogen purge source is not capable of supplying the required purge flow to a process vessel(s) (SPT, PPT, or RPT).	A.1 Verify the LPPP Primary Nitrogen purge system is providing the necessary purge to satisfy LCO 3.4.3. **AND** A.2 Restore the supply/ affected component to OPERABLE status.	1 Hour **AND** Every 4 Hours thereafter 72 Hours

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Both LPPP Purge pressure control valves (PCV-7436A and PCV-7436B) are inoperable. **OR** Required Action A.1 is not met and/or its associated Completion Time is not met.	B.1 Enter LCO 3.4.3 Condition A for Low Purge flow to the affected Process Area.	IMMEDIATELY
C. Required Action A.2 is not met and/or its associated Completion Time is not met.	C.1 Stop all transfers to the affected Process Vessel(s). **AND** C.2 Place the affected Process Vessel(s) in STANDBY. **AND** C.3 Restore the supply/ affected component to OPERABLE status.	IMMEDIATELY IMMEDIATELY IMMEDIATELY

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.4.5.1	Verify that the Safety Grade Nitrogen storage tank local indicator LI-5181X or LI-5182X indicates greater than or equal to 90 in. wc.	12 Hours
SR 4.4.5.2	Deleted	
SR 4.4.5.3	Perform an INSTRUMENT LOOP CALIBRATION on the Safety Grade Nitrogen storage tank level gauge (LI-5181X or LI-5182X). See Table 3.4.5-1.	1 Year
SR 4.4.5.4	Deleted	
SR 4.4.5.5	Deleted	
SR 4.4.5.6	Deleted	
SR 4.4.5.7	Verify that the LPPP safety grade Nitrogen purge source is capable of supplying the required purge flow of LCO 3.4.3 to the PPT, SPT, and RPT and a total flow less than 12.8 scfm as measured by the vessels' local purge flow indicators.	1 Year
SR 4.4.5.8	Perform Leak Test on Safety Grade Nitrogen Isolation Check Valves. See Table 3.4.5-1.	2 Years
SR 4.4.5.9	Deleted	
SR 4.4.5.10	Verify that each Safety Grade Nitrogen pressure control valve (PCV-5181A and PCV-5181B) is capable of actuating Safety Grade Nitrogen Purge at a pressure greater than or equal to 38 psig and less than or equal to 46 psig.	1 Year

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.4.5.11	Verify that each LPPP Purge pressure control valve (PCV-7436A and PCV-7436B) is capable of controlling Primary and Safety Grade Purge pressure to the SPT, PPT, and RPT flow meters greater than or equal to 21 psig and less than or equal to 36 psig.	1 Year

Table 3.4.5-1 LPPP Purge Instrumentation/Components

Process Area	Required Instrumentation	Setpoint/ Limit	Mode	LCO Condition
LPPP-SPT, LPPP-PPT, LPPP-RPT	A. Safety Grade Nitrogen Storage Tank			
	i. One Level Gauge (LI-5181X or LI-5182X)	N/A	OPERATION STANDBY & SHUTDOWN	LCO 3.4.5 Condition A
LPPP-SPT, LPPP-PPT, LPPP-RPT	B. Safety Grade Nitrogen Isolation Check Valve (S511000-NNG-CV-750001707 or S511000-NNG-CV-750001708)	≤ 10 scfm	OPERATION STANDBY & SHUTDOWN	LCO 3.4.5 Condition A
LPPP-SPT, LPPP-PPT, LPPP-RPT	C. Pressure Control Valves			
	i. One Safety Grade Nitrogen (PCV-5181A or PCV-5181B)	$38 \leq x \leq 46$ psig	OPERATION STANDBY & SHUTDOWN	LCO 3.4.5 Condition A
	ii. One LPPP Purge (PCV-7436A or PCV-7436B)	$21 \leq x \leq 36$ psig	OPERATION STANDBY & SHUTDOWN	LCO 3.4.5 Condition B

CROSS-REFERENCES:

TITLE	NUMBER
1. LPPP Flammability Control	3.4.3

3/4.5 LWF FLAMMABILITY CONTROL

The following LCOs have been deleted:

3.5.1 LWF Flammability Monitoring

3.5.2 LWF PVV Flammability Monitoring

3.5.3 LWF Flammability Control

3.5.4 LWF Flammability Control - Standby & Shutdown

3.5.5 LWF Purge Sources

3/4.6 OWST FLAMMABILITY

The following LCOs have been deleted:

3.6.1 OWST Inventory Control

3.6.2 OWST Flammability Control

3.6.3 OWST Purge Sources

3/4.7 CONFINEMENT

3/4.7 CONFINEMENT

3.7.1 Zone 1 Ventilation

LCO 3.7.1

Three of the four Zone 1 Exhaust Fans shall be OPERABLE, and the associated equipment, instrumentation, interlocks, and dampers listed in Table 3.7.1-1 shall be OPERABLE.

AND

The Sand Filter Inlet Plenum Pressure shall be more negative than or equal to -1.36 in. wc.

AND

The Sand Filter shall be OPERABLE.

MODE APPLICABILITY: OPERATION, LIMITED PROCESSING, STANDBY, and SHUTDOWN

PROCESS AREA APPLICABILITY: SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------**NOTE**---------- This Condition is not required to be entered solely due to the inoperability of a DG (per LCO 3.0.6). DG inoperability is covered by LCO 3.9.1. ---------- A. Two Zone 1 Exhaust Fans are inoperable.	----------**NOTE**---------- LCO 3.0.4 is not applicable if Actions A.1 and A.2 are met ---------- A.1 Verify the Sand Filter inlet plenum pressure is more negative than or equal to -1.36 in. wc. **AND** A.2 Verify at least one of the OPERABLE Zone 1 Exhaust Fans is on an OPERABLE DG bus. **AND** A.3 Restore at least one of the inoperable Zone 1 Exhaust Fans to OPERABLE status (i.e., total of at least three OPERABLE Fans.)	IMMEDIATELY **AND** Every 6 Hours thereafter 2 Hours 14 Days
B. One Sand Filter Inlet Plenum Pressure Transmitter (PT-5755 or PT-5756) is inoperable. **OR** One High High Sand Filter inlet plenum pressure interlock loop listed in Table 3.7.1-1 is inoperable.	----------**NOTE**---------- LCO 3.0.4 is not applicable ---------- B.1 Restore the inoperable equipment to OPERABLE status.	7 Days

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. The Sand Filter inlet plenum pressure is more positive than -1.36 in. wc.	C.1 Start Zone 1 Exhaust Fan(s).	IMMEDIATELY
	AND	
	---------- **NOTE** ---------- Required Action C.2 should be completed by hardwired interlocks. ----------	
	C.2 Stop all Zone 1 Supply, Zone 2 Exhaust, and Weld Test Cell Fans.	IMMEDIATELY
	AND	
	C.3 Isolate the steam supply to the SRAT, SME, and DWTT.	IMMEDIATELY
	AND	
	C.4 Stop all transfers in the affected PROCESS AREAS.	IMMEDIATELY
	AND	
	C.5 Verify that the purge flows to the CPC/SPC vessels are in compliance with LCO requirements.	IMMEDIATELY
	AND	
	(continued)	

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	---------- **NOTE** ---------- If the affected process vessel(s) are in SHUTDOWN a transition to STANDBY is not required. ---------- C.6 Place the SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter in STANDBY.	24 Hours
D. Both Sand Filter Inlet Plenum Pressure Transmitters are inoperable **OR** Both High High Sand Filter inlet plenum pressure interlock loops listed in Table 3.7.1-1 are inoperable.	D.1 Stop all Zone 1 Supply, Zone 2 Exhaust, and Weld Test Cell Fans. **AND** D.2 Verify at least one Zone 1 Exhaust Fan is running. **AND** D.3 Restore at least one of the inoperable equipment trains (pressure transmitter and associated interlock) to OPERABLE status.	IMMEDIATELY IMMEDIATELY **AND** Every 4 Hours thereafter 72 Hours

(continued)

ACTIONS (continued):

E. Zone 1 Exhaust Local Control Station (LCS-272) is inoperable.	---------- **NOTE** ---------- LCO 3.0.4 is not applicable if Action E.1 is met. ---------- E.1 Position an Operator in the Fan House. **AND** E.2 Restore the inoperable equipment to OPERABLE status.	 IMMEDIATELY 14 Days

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action(s) and/or associated Completion Time(s) of Conditions A, B, or E are not met.	F.1 Stop all transfers into and out of the affected PROCESS AREAS.	IMMEDIATELY
	AND	
	F.2 Isolate the steam supply to the SRAT, SME, and DWTT.	IMMEDIATELY
	AND	
	----------**NOTE**---------- If the affected process vessel(s) are in SHUTDOWN a transition to STANDBY is not required. ----------	
	F.3 Place the SEFT, PRFT, SME, SRAT, MFT, RCT, DWTT, and Melter in STANDBY.	24 Hours
G. Three Zone 1 Exhaust Fans are inoperable.	G.1 Stop all transfers in the affected PROCESS AREAS.	IMMEDIATELY
OR	**AND**	
Required Action(s) and/or its associated Completion Time(s) of Condition D is not met.	G.2 Isolate the steam supply to the SRAT, SME, and DWTT.	IMMEDIATELY
	AND	
	G.3 Verify that the purge flows to the CPC/SPC vessels are in compliance with LCO requirements.	IMMEDIATELY
	AND	
	(continued)	

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. (continued)	G.4 Verify at least one OPERABLE Zone 1 Exhaust Fan is on an OPERABLE DG bus. **AND** ---------- **NOTE** ---------- If the affected process vessel(s) are in SHUTDOWN a transition to STANDBY is not required. ---------- G.5 Place the SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter in STANDBY.	IMMEDIATELY 24 Hours

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------**NOTE**---------- This Condition is not required to be entered solely due to the inoperability of both DGs (per LCO 3.0.6). Inoperability of both DGs is covered by LCO 3.9.1. ---------- H. All Zone 1 Exhaust Fans are inoperable. **OR** The Sand Filter is inoperable. **OR** Required Action(s) and/or its associated Completion Time of Condition C or G is not met.	H.1 Stop all transfers in the affected PROCESS AREAS. **AND** H.2 Isolate the steam supply to the SRAT, SME, and DWTT. **AND** H.3 Verify that the purge flow to the CPC/SPC vessels are in compliance with LCO requirements. **AND** H.4 Restore inoperable equipment to OPERABLE status. **AND** ---------- **NOTE** ---------- If the affected process vessel(s) are in SHUTDOWN a transition to STANDBY is not required. ---------- H.5 Place the SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter in STANDBY.	IMMEDIATELY IMMEDIATELY IMMEDIATELY IMMEDIATELY 24 Hours

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.7.1.1	Verify that the Sand Filter Inlet Plenum pressure is more negative than or equal to -1.36 in. wc at PIC-5755A.	12 Hours
SR 4.7.1.2	Perform an INSTRUMENT LOOP CALIBRATION on the Sand Filter Inlet Plenum Pressure Transmitter.	1 Year
SR 4.7.1.3	Perform an INSTRUMENT LOOP TEST of the High High Sand Filter Inlet Plenum Pressure Interlock, listed in Table 3.7.1-1.	1 Year
SR 4.7.1.4	Verify that the following Zone 1 Ventilation System dampers will open and close as designed (refer to Table 3.7.1-1): • Zone 1 Exhaust Fans Discharge Dampers • Zone 1 Exhaust Fans Inlet Vane Dampers	1 Year
SR 4.7.1.5	Start each Zone 1 Exhaust Fan from the local START/STOP switch at the load centers.	1 Year
SR 4.7.1.6	Verify that the sand filter efficiency is greater than 99.5% with the design air flow through the filter.	18 Months
SR 4.7.1.7	Verify that LCS-272 will start either Zone 1 Exhaust Fan following a loss of power to the individual load center within 30 seconds following restoration of power to the load center.	2 Years
SR 4.7.1.8	Verify that each Zone 1 Exhaust Fan's switch on the load center is set to remote.	12 Hours

(continued)

SURVEILLANCE REQUIREMENTS (Continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.7.1.9	Verify the Zone 1 Exhaust Fans perform to meet their design requirements by comparison of baseline data.	6 Months

Table 3.7.1-1 Required Ventilation Equipment, Instrumentation, and Interlocks

Process Area	Required Instrumentation	Setpoint/ Limit	Mode	LCO Condition
SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter	A. Sand Filter Inlet Plenum High High Pressure Interlocks including associated Pressure Transmitters (PT-5755 and PT-5756) (1)	≤ -1.36 in. wc	See LCO	LCO 3.7.1 Condition B, C, or D
	B. Zone 1 Dampers			
	i. Zone 1 Exhaust Fan(s) Discharge Damper	N/A	See LCO	LCO 3.7.1 Condition A, G or H
	ii. Zone 1 Exhaust Fans Inlet Vane Damper(s)	N/A	See LCO	LCO 3.7.1 Condition A, G or H
	C. Zone 1 Exhaust Fans Manual Start/Stop Switch	N/A	See LCO	LCO 3.7.1 Condition A, E, G or H
	D. Zone 1 Local Control Station (LCS-272)	N/A	See LCO	LCO 3.7.1 Condition E
	E. Sand Filter	N/A	See LCO	LCO 3.7.1 Condition H

Footnotes:

1. The Sand Filter High High Inlet Plenum Pressure interlocks stop Zone 1 Supply Fans, Zone 2 Exhaust Fans, and Weld Test Cell Fans.

CROSS-REFERECES:

TITLE	NUMBER
1. SRAT, SME, SMECT, and DWTT Flammability Control – Operation	LCO 3.1.3
2. SRAT, SME, SMECT, and DWTT Flammability Control – Limited Processing, Standby, and Shutdown	LCO 3.1.4
3. MFT and RCT Flammability Control	LCO 3.1.5
4. SEFT and PRFT Flammability Control	LCO 3.1.9
5. Deleted	
6. Standby Electrical Power	LCO 3.9.1

3/4.8 EFFLUENT MONITORING

The following LCOs have been deleted:

3.8.1 Zone 1 Exhaust System Radiation Monitoring

3.8.2 LPPP Exhaust System Radiation Monitoring

3.8.3 LWF Exhaust System Radiation Monitoring

3/4.9 ELECTRICAL POWER

3.9.1 Standby Electrical Power

LCO 3.9.1 Two Standby Diesel Generator (DG) Systems, associated electrical distribution systems, and support systems defined in Table 3.9.1-2 shall be OPERABLE.

MODE APPLICABILITY: OPERATION, LIMITED PROCESSING, STANDBY, SHUTDOWN

PROCESS AREA APPLICABILITY: SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------**NOTE**---------- Required Action A.2 shall be completed if this Condition is entered. ---------- ----------**NOTE**---------- If Diesel Generator #2 (DG200) is inoperable, then DG Fuel Oil Transfer System controls (LCS-210) are also inoperable and Condition E shall also be entered. ---------- A. One DG system is inoperable.	----------**NOTE**---------- LCO 3.0.4 is not applicable if Required Actions A.1, A.2, and A.3 are met. ---------- A.1 Verify that at least one of the Zone 1 Exhaust Fans is OPERABLE and on the OPERABLE DG bus. **<u>AND</u>** ----------**NOTE**---------- Required Action A.2.1 can be considered completed if SR 4.9.1.11 or 4.9.1.13 has been performed on the OPERABLE DG within the previous 24 Hours. ---------- A.2.1 Perform SR 4.9.1.11 or 4.9.1.13 on the OPERABLE DG system. (continued)	IMMEDIATELY 24 Hours

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	**OR**	
	A.2.2 Determine OPERABLE DG is not inoperable due to common cause failure potential.	24 Hours
	AND	
	A.3 Verify fuel oil in the underground storage tank which is supplied power by the OPERABLE DG is greater than or equal to 9,787 gallons.	24 Hours
	AND	
	A.4 Restore the inoperable equipment and/or fuel oil inventory to OPERABLE status.	14 Days
B. The new diesel fuel oil (in the fuel oil storage tanks or day tanks) properties are not within specifications listed in SR 4.9.1.24 or SR 4.9.1.25.	---------- **NOTE** ---------- LCO 3.0.4 is not applicable. ---------- B.1 Verify and/or restore fuel oil in the fuel oil storage tank and/or day tank to within specification (s).	1 Month
	OR	
	B.2 Enter Condition A or G.	1 Month

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Fuel oil in one or both DG fuel oil storage tank(s) is less than 9,787 gallons but greater than or equal to 7,327 gallons. **OR** Either DG Lube Oil storage (makeup) tank is less than 25% full but visible in the sight glass.	---------- **NOTE** ---------- LCO 3.0.4 is not applicable. ---------- C.1 Restore the parameter to within limits.	48 Hours

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Battery D41 or D51 has one or more battery cell parameters out of limits listed in Table 3.9.1-1.	---------- **NOTE** ---------- LCO 3.0.4 is not applicable if Required Actions D.1 and D.2 are met. ----------	
	D.1 Verify pilot cell(s) electrolyte level and float voltage meet Table 3.9.1-1 Category C values.	1 Hour
	AND	---------- **NOTE** ---------- The 25% extension allowed by LCO 3.0.2 is not applicable to the Completion Time of Required Action D.2. ----------
	D.2 Verify battery cell parameters meet Table 3.9.1-1 Category C values.	24 Hours **AND** Every 7 Days thereafter
	AND	
	D.3 Restore battery cell out of limits parameters to meet Table 3.9.1-1 Category B values.	3 Months
	AND	
	D.4 Restore terminal voltage and float current.	3 Months

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. The DG Fuel Oil Transfer System controls (LCS-210) are inoperable.	---------- **NOTE** ---------- LCO 3.0.4 is not applicable. ---------- E.1 Station a qualified operator in the Fan House, continuously when a DG is running. **AND** E.2 Restore inoperable equipment to OPERABLE status.	 IMMEDIATELY 3 Months
F. One air receiver pressure indicator (PI-8580X or PI-8581X) on DG#1 is inoperable. **OR** One air receiver pressure indicator (PI-8600X or PI-8601X) on DG#2 is inoperable.	---------- **NOTE** ---------- LCO 3.0.4 is not applicable. ---------- F.1 Restore the inoperable equipment to OPERABLE status.	 14 Days
G. Both DG systems are inoperable. **OR** Required Action(s) A.1, A.2, or A.3 and/or associated Completion Time(s) are not met.	G.1 Stop transfers from the SEFT and PRFT into the SRAT. **AND** G.2 Isolate the steam supply to the SRAT, SME, and DWTT. **AND** G.3 Restore inoperable equipment (at least one DG system), and/or associated DG fuel oil inventory to OPERABLE status.	IMMEDIATELY IMMEDIATELY 2 Hours

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. Required Action(s) and/or associated Completion Time(s) of Conditions C, D, or F are not met. **OR** Battery D41 or D51 is inoperable for reason(s) other than Condition D. **OR** Fuel oil in one or both DG fuel oil storage tank(s) is less than 7,327 gallons. **OR** Lube oil in one or both DG lube oil storage (makeup) tank(s) is not visible in the sight glass.	H.1 Declare affected DG inoperable and enter Condition A or G.	IMMEDIATELY

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. Required Action A.4 or E.2 and/or associated Completion Time(s) is not met.	I.1 Stop all transfers into and out of the affected PROCESS AREAS.	IMMEDIATELY
	AND	
	I.2 Isolate the steam supply to the SRAT, SME and DWTT.	IMMEDIATELY
	AND	
	----------**NOTE**---------- If the Affected Process Vessel(s) is in SHUTDOWN a transition to STANDBY is not required. ----------	
	I.3 Place the SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter in STANDBY.	24 Hours

(continued)

ACTIONS (continued):

CONDITION	REQUIRED ACTION	COMPLETION TIME
J. Required Action(s) and/or associated Completion Times of Condition G are not met.	J.1 Stop all transfers into and out of the affected PROCESS AREAS.	IMMEDIATELY
	AND	
	J.2 Isolate the steam supply to the SRAT, SME, and DWTT.	IMMEDIATELY
	AND	
	J.3 Verify that the purge flows to the CPC/SPC vessels are in compliance with LCO requirements.	IMMEDIATELY
	AND	
	J.4 Restore inoperable equipment (at least one DG system and associated DG fuel oil inventory) to OPERABLE status.	IMMEDIATELY
	AND	
	----------**NOTE**---------- If the Affected Process Vessel(s) is in SHUTDOWN a transition to STANDBY is not required. ----------	
	J.5 Place the SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter in STANDBY.	24 Hours

SURVEILLANCE REQUIREMENTS:

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.9.1.1	Verify the DG is supported by air start receivers charged to greater than or equal to 177 psig.	24 Hours **AND** Within 24 Hours after each DG shutdown
SR 4.9.1.2	Verify the DG day tank fuel oil level is greater than or equal to a sight-glass level of 5/8.	7 Days **AND** Within 24 Hours after each DG shutdown
SR 4.9.1.3	Verify the lubricating oil inventory in the DG sump is greater than or equal to the standby full dipstick indication.	7 Days **AND** Within 24 Hours after each DG shutdown
SR 4.9.1.4	Verify the fuel oil in the DG fuel oil storage tank is greater than or equal to 9,787 gallons.	7 Days **AND** Within 24 Hours after each DG shutdown
SR 4.9.1.5	Verify the battery terminal voltage is ≥ 130 VDC.	1 Month
SR 4.9.1.6	---------- **NOTE** ---------- Performance of SR 4.9.1.7 satisfies this SR. ---------- Verify the battery pilot cell voltage is ≥ 2.13 VDC.	1 Month

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.9.1.7	Verify battery cell voltage meets Table 3.9.1-1 Category B values.	3 Months **AND** 24 Hours after a Battery Discharge < 110 VDC **AND** 24 Hours after a Battery Overcharge > 150 VDC
SR 4.9.1.8	---------- **NOTE** ---------- Credit may be taken for unplanned events that satisfy this SR. ---------- Verify battery capacity is adequate to supply and maintain in an operable status the required emergency loads for the design duty cycle when subjected to a battery service test.	18 Months
SR 4.9.1.9	Deleted.	
SR 4.9.1.10	Verify that the fuel oil transfer system including LCS-210 operates to automatically transfer fuel oil from the fuel oil storage tank to the day tank.	6 Months

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.9.1.11	---------- NOTES ---------- 1. All DG starts may be preceded by an engine pre-lube period and followed by a warm-up period prior to loading. 2. A modified DG start involving idling and gradual acceleration to rated speed may be used for this SR as recommended by the manufacturer. 3. Performance of SR 4.9.1.13 satisfies this SR. ---------- Verify the DG starts from standby conditions and achieves the following steady-state conditions: Voltage ≥ 432 VAC and ≤ 528 VAC, and Frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	1 Month

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.9.1.12	---------- **NOTES** ---------- 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This SR shall be conducted on only one DG at a time. ---------- Verify the DG synchronizes, loads, and operates at a load ≥ 1000 kW and ≤ 2000 kW for greater than or equal to 60 minutes.	1 Month
SR 4.9.1.13	---------- **NOTE** ---------- All DG starts may be preceded by an engine pre-lube period. ---------- Verify the DG starts from standby conditions in ≤ 30 seconds and achieves the following steady state conditions: Voltage ≥ 432 VAC and ≤ 528 VAC, and Frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	6 Months
SR 4.9.1.14	---------- **NOTES** ---------- 1. Momentary transients outside the load range do not invalidate this test. 2. Credit may be taken for unplanned events that satisfy this SR. ---------- Verify the diesel generator operates for ≥ 8 hours. For ≥ 2 hours of this test, the diesel generator load shall be maintained between ≥ 2100 kW and ≤ 2200 kW, and during the remaining hours of this test, the diesel generator load shall be maintained between ≥ 1800 kW and ≤ 2000 kW while maintaining voltage and frequency specified in SR 4.9.1.13.	2 Years

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.9.1.15	---------- **NOTE** ---------- Credit may be taken for unplanned events that satisfy this SR. ---------- Verify the DG capability to reject a load of ≥ 1800 kW and ≤ 2000 kW without tripping on overspeed, and voltage is maintained ≤ 576 VAC (using plant loads).	2 Years
SR 4.9.1.16	Deleted.	
SR 4.9.1.17	---------- **NOTEs** ---------- 1. Credit may be taken for unplanned events that satisfy this SR. 2. All DG starts may be preceded by an engine pre-lube period. ---------- Demonstrate on an actual or simulated loss of offsite power: A. Deenergization of emergency bus; B. Load shedding from emergency bus; C. DG auto starts from standby conditions and: 1. Energizes the associated DG supplied bus in ≤ 30 seconds, 2. Energizes required safety loads, 3. Maintains steady-state voltage ≥ 432 VAC and ≤ 528 VAC, 4. Maintains steady-state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. Supplies loads for ≥ 5 minutes.	2 Years

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.9.1.18	---------- **NOTE** ---------- Credit may be taken for unplanned events that satisfy this SR. ---------- Verify the DG's capability to reject a load greater than or equal to the largest single operating plant load and: 1. Following load rejection, the frequency is ≤ 66.7 Hz, 2. Within 3 seconds following load rejection, the voltage is ≥ 432 VAC and ≤ 528 VAC, 3. Within 3 seconds following load rejection, the frequency is ≥ 58.8 Hz and ≤ 61.2 Hz.	2 Years
SR 4.9.1.19	---------- **NOTES** ---------- 1. Credit may be taken for unplanned events that satisfy this SR. 2. All DG start may be preceded by an engine pre-lube period. ---------- Verify the DG's capability to: 1. Synchronize with the offsite power source while the generator is loaded with its emergency loads upon a simulated or actual restoration of offsite power. 2. Transfer its loads to the offsite power source. 3. Be restored to its ready-to-load status.	2 Years

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.9.1.20	---------- **NOTES** ---------- 1. Credit may be taken for unplanned events that satisfy this SR. 2. All DG starts may be preceded by an engine pre-lube period. ---------- Verify the DG's automatic trip is bypassed on actual or simulated loss of voltage signal on the emergency bus except for: 1. Engine overspeed, 2. Generator differential current, 3. Low lube oil pressure, 4. High crankcase pressure, 5. Negative sequence current, 6. Anti-motoring, 7. Voltage controlled overcurrent, and 8. Loss of excitation.	2 Years
SR 4.9.1.21	Deleted	
SR 4.9.1.22	Check for and remove accumulated water from the DG fuel oil storage and day tanks.	1 Month
SR 4.9.1.23	Verify the particulate contamination in the DG fuel oil storage and day tanks is ≤ 20 mg/l.	3 Months
SR 4.9.1.24	Sample the new fuel oil and verify the following: 1. API gravity is ≥ 30 and ≤ 42, 2. Kinematic viscosity at 40°C is ≥ 1.9 centistokes and ≤ 4.1 centistokes, 3. Sediment and water is ≤ 0.05% by volume, 4. Flash Point is ≥ 125°F, 5. Visual appearance is clear and bright.	Prior to adding new fuel oil to the storage tank(s)

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.9.1.25	Sample the new fuel oil and verify the following: 1. Cloud point is ≤ 30°F, 2. Cetane index is ≥ 40, 3. Particulate contamination is ≤ 10 mg/l.	Within 31 Days of adding new fuel oil to the storage tank(s)
SR 4.9.1.26	For the fuel oil storage tanks: 1. Drain fuel oil, 2. Remove the sediment, 3. Clean tank.	10 Years
SR 4.9.1.27	Perform an INSTRUMENT LOOP CALIBRATION on the Diesel Air Receiver Pressure Indicator.	1 Year
SR 4.9.1.28	Manually start the fuel oil transfer pump from the local start switches.	3 Months
SR 4.9.1.29	Deleted.	
SR 4.9.1.30	Deleted.	
SR 4.9.1.31	Deleted.	
SR 4.9.1.32	Verify the DG Lube Oil Storage (makeup) Tank inventory is greater than or equal to 25% indication.	7 Days **AND** Within 24 hours after each Lube Oil transfer from the Lube Oil Storage Tank to the DG Lube Oil Sump

(continued)

SURVEILLANCE REQUIREMENTS (continued):

SURVEILLANCE REQUIREMENT		FREQUENCY
SR 4.9.1.33	Verify the battery cell electrolyte levels meet Table 3.9.1-1 Category B values.	1 Month **AND** 24 Hours after a Battery Discharge < 110 VDC **AND** 24 Hours after a Battery Overcharge > 150 VDC
SR 4.9.1.34	---------- **NOTE** ---------- Not required to be met when battery terminal voltage is less than the minimum established voltage of SR 4.9.1.5. ---------- Verify the battery float current is ≤ 2 amps.	1 Month **AND** 24 Hours after a Battery Discharge < 110 VDC **AND** 24 Hours after a Battery Overcharge > 150 VDC

Table 3.9.1-1 Battery Cell Parameter Requirements

PARAMETER	Deleted	**CATEGORY B** (Limits for Each Connected Cell)	**CATEGORY C** (Allowable Value for Each Connected Cell)
Electrolyte Level		> Minimum level indication mark and not overflowing	Above top of plates and not overflowing.
Float Voltage		≥ 2.13 VDC	> 2.07 VDC

Table 3.9.1-2 DG Support Systems

Process Area	Required Support System	Setpoint/ Limit	Mode	LCO Condition
SEFT, PRFT SRAT, SME, MFT, RCT, DWTT, Melter	**Diesel Generator (DG) #1, DG100**			
	A. DG Fuel Oil			
	i. Day Tank #1 Inventory	≥5/8 full	SEE LCO	LCO 3.9.1 Condition A or G
	ii. Storage Tank #1 Inventory	≥9787 gallons	SEE LCO	LCO 3.9.1 Condition C or H
	iii. Transfer System from Storage Tank #1	N/A	SEE LCO	LCO 3.9.1 Condition A or G
	iv. Quality	N/A	SEE LCO	LCO 3.9.1 Condition A, B, or G
	v. LCS-210	N/A	SEE LCO	LCO 3.9.1 Condition E
	B. DG #1 Lube Oil Inventory		SEE LCO	
	i. DG Sump	≥ Standby Full		LCO 3.9.1 Condition A or G
	ii. DG Lube Oil Storage Tank	≥25%		LCO 3.9.1 Condition C or H
	C. Battery (D51)	N/A	SEE LCO	LCO 3.9.1 Condition D or H
	D. Air Receiver Pressure	≥177 psig		
	i. Pressure Indicators (PI-8580X and PI-8581X)	N/A	SEE LCO	LCO 3.9.1 Condition A, G, or F
	E. Breakers			
	i. Feeder Breaker to MCC B901	N/A	SEE LCO	LCO 3.9.1 Condition A or G
	ii. DG Output Breaker	N/A	SEE LCO	LCO 3.9.1 Condition A or G

(continued)

Table 3.9.1-2 DG Support Systems (continued)

Process Area	Required Support System	Setpoint/ Limit	Mode	LCO Condition
SEFT, PRFT SRAT, SME, MFT, RCT, DWTT, Melter	**Diesel Generator (DG) #2, DG200**			
	A. DG Fuel Oil			
	i. Day Tank #2 Inventory	≥5/8 full	SEE LCO	LCO 3.9.1 Condition A or G
	ii. Storage Tank #2 Inventory	≥9787 gallons	SEE LCO	LCO 3.9.1 Condition C or H
	iii. Transfer System from Storage Tank #2	N/A	SEE LCO	LCO 3.9.1 Condition A or G
	iv. Quality	N/A	SEE LCO	LCO 3.9.1 Condition A, B, or G
	v. LCS-210	N/A	SEE LCO	LCO 3.9.1 Condition E
	B. DG #2 Lube Oil Inventory		SEE LCO	
	i. DG Sump	≥ Standby Full		LCO 3.9.1 Condition A or G
	ii. DG Lube Oil Storage Tank	≥25%		LCO 3.9.1 Condition C or H
	C. Battery (D41)	N/A	SEE LCO	LCO 3.9.1 Condition D or H
	D. Air Receiver Pressure	≥177 psig		
	i. Pressure Indicators (PI-8600X and PI-8601X)	N/A	SEE LCO	LCO 3.9.1 Condition A, G, or F
	E. Breakers			
	i. Feeder Breaker to MCC B111	N/A	SEE LCO	LCO 3.9.1 Condition A or G
	ii. DG Output Breaker	N/A	SEE LCO	LCO 3.9.1 Condition A or G

CROSS-REFERENCES:

TITLE	NUMBER
1. Zone 1 Ventilation	LCO 3.7.1
2. SRAT, SME, SMECT, and DWTT Flammability Control - Operation	LCO 3.1.3
3. SRAT, SME, SMECT, and DWTT Flammability Control - Limited Processing, Standby, and Shutdown	LCO 3.1.4
4. MFT and RCT Flammability Control	LCO 3.1.5
5. SEFT and PRFT Flammability Control	LCO 3.1.9

3/4.10 INTERAREA TRANSFER LINES

The following LCO has been deleted:

3.10.1 Interarea Transfer Lines

Section 5

Administrative Controls

5.0 ADMINISTRATIVE CONTROLS

5.1 Responsibility

5.1.1 The FACILITY Manager shall be responsible for overall safe operation of the FACILITY and shall have control over those activities necessary for safe operation of the FACILITY. The FACILITY Manager shall delegate, in writing, the succession to this responsibility during any absences.

5.1.2 The Control Room Manager (CRM) shall be responsible for the FACILITY command function. As part of this command function, the CRM shall ensure operation of the FACILITY is in accordance with approved TSRs.

5.2 Organization

5.2.1 Organization

a. Lines of authority, responsibility, and communication shall be defined and established for the highest management levels, through intermediate levels, down to and including all operating organization positions. These relationships shall be documented and updated, as appropriate, in the form of organization charts, functional descriptions of departmental responsibilities and relationships, and job descriptions for key personnel positions, or in equivalent forms of documentation.

b. The individuals who train the operating staff, carry out radiological control, or perform Quality Assurance (QA) functions may report to the FACILITY Manager; however, they shall have sufficient organizational freedom to ensure their independence from operating pressures.

5.2.2 FACILITY Staff

The FACILITY staff organization shall be as follows:

a. A current list of FACILITY support personnel including work and home telephone numbers shall be maintained in the Defense Waste Processing Facility (DWPF) control room. This list should include management, radiation safety, and technical support personnel.

b. Each on-duty shift shall be composed of at least one Control Room Manager, one Control Room Operator qualified on all stations, one Balance of Plant (BOP) Operator, and one Vitrification Building Operator. Minimum staffing requires a second CPC qualified operator to monitor CPC operations during SEFT or PRFT transfers to the SRAT to allow for continuous monitoring/trending of the transfer. The Control Room Operator(s), BOP Operator, and Vitrification Building Operator shall remain in the vicinity of the S-Area facilities.

Minimum staffing requires an additional operator when the Saltstone Facility is destaffed. One DWPF operator qualified to secure Salt Solution Receipt Tank (SSRT) agitator(s) operation is required for daily rounds on SSRT equipment/alarm status to ensure SSRT agitator(s) operation is secured.

The minimum FACILITY shift crew composition may be one less than specified above for a period up to 2 Hours due to unexpected absences/incapacitation. Shift crew composition is not permitted to be less than minimum required staffing due to shift turnover. In the event the minimum FACILITY shift crew composition cannot be met when any PROCESS AREA is in OPERATION, then action shall be taken IMMEDIATELY to place those PROCESS AREAS in STANDBY.

(continued)

5.2 Organization (continued)

c. Administrative procedures shall be implemented to limit the working hours of staff who perform safety-related functions (e.g., personnel required to meet the minimum shift crew composition). Adequate shift coverage shall be maintained without routine heavy use of overtime. The FACILITY shall follow site and FACILITY procedures governing overtime.

5.3 Staff Qualifications and Training

5.3.1 Qualification

A program shall be established to ensure that FACILITY staff, who perform safety-related functions, meet established qualification requirements for their positions. This program shall adhere to qualification requirements established in accordance with applicable Department of Energy (DOE) regulations.

5.3.2 Training

An initial training and retraining program for the FACILITY staff shall be established and maintained. This program shall adhere to training requirements established in accordance with applicable DOE regulations.

5.4 Response Plans

The purpose of the RESPONSE PLAN is to ensure that additional analysis or administrative and management controls are in place when abnormal situations arise and the FACILITY is outside of normal operating limits defined by the TSR. The RESPONSE PLAN function is to restore the PROCESS AREA and/or FACILITY to LCO compliance. RESPONSE PLANS are intended to provide personnel with the direction needed to safely achieve a stated endpoint. These plans, however, do not prohibit reliance upon operator training and experience in the correction of the condition for immediate mitigation of an unsafe or worsening condition.

The RESPONSE PLAN addresses the situation where an LCO cannot be met (due to equipment inoperability, etc.) and the FACILITY must operate in continual LCO noncompliance because the corresponding Required Actions place the FACILITY in a MODE in which the LCO is still applicable. During the time that the LCO requirements are being restored, the PROCESS AREA and/or FACILITY operations shall be bounded by an approved RESPONSE PLAN.

The RESPONSE PLAN shall evaluate PROCESS AREA(S) or FACILITY conditions to determine the risk to the FACILITY and the public from the limited operations allowed in the applicable MODE. These plans will typically implement compensatory actions or surveillances to reduce risk.

The RESPONSE PLANS shall be approved by the FACILITY Manager (or designee), DWPF FOSC and the Department of Energy (DOE).

5.5 Deinventory Plans

The purpose of the DEINVENTORY PLANS is to authorize and control the removal of jumpers or other equipment, including vessels, that cannot be performed within the framework required by the TSR for OPERATION, STANDBY, and SHUTDOWN. Examples of conditions that would warrant development of a DEINVENTORY PLAN include: removal of the air or nitrogen purge from the CPC vessels, or removal of the nitrogen purge from the LPPP vessels. However, other scenarios that necessitate removal of equipment that is required in OPERATION, STANDBY, and SHUTDOWN would also require a DEINVENTORY PLAN. It should be noted however that some equipment removal is already accommodated by the ACTIONS contained in LCOs. It is for those activities that cannot be performed by entering the ACTIONS of a LCO. A DEINVENTORY PLAN differs from a RESPONSE PLAN in that a RESPONSE PLAN is utilized to restore compliance with a TSR control, while a DEINVENTORY PLAN is utilized to authorize and control complex operations that are not routinely anticipated (i.e., jumper removals under certain circumstances, vessel removal, or other major evolution).

Each DEINVENTORY PLAN shall be written such that flammable conditions are prevented in the affected vessel(s) and associated ventilation headers, and outside the affected vessel(s) and process piping, where applicable. The guidance contained in NFPA 69, Standard on Explosion Prevention Systems, 1992 (or a later edition) shall be incorporated into each DEINVENTORY PLAN as applicable. Controls shall include as a minimum: control of flammable concentrations or oxygen concentrations, instrumentation necessary to assure compliance with the plan (i.e., concentration of benzene in liquid, dilution flow, differential pressure, oxygen concentration monitoring, or flammable vapor concentration monitoring, as appropriate), and surveillances to periodically monitor compliance with the plan. These surveillances shall include controls for the instruments used to monitor compliance with the plan, as well as surveys of the instrument readings at a predetermined frequency. Compensatory measures, for conditions outside the DEINVENTORY PLAN, shall be identified and proceduralized prior to implementation of the DEINVENTORY PLAN.

Each DEINVENTORY PLAN shall be evaluated using the USQ process prior to performance. Each DEINVENTORY PLAN shall be approved by the DWPF FACILITY Manager (or designee), Engineering Manager (or designee), and DWPF FOSC.

5.6 Reviews and Assessments

5.6.1 Facility Operations Safety Committee

5.6.1.1 Responsibilities

The Facility Operations Safety Committee (FOSC) advises the FACILITY Manager on matters affecting the operation of the FACILITY and associated activities that affect safety. During the performance of reviews, a cross-disciplinary determination/evaluation may be necessary. If deemed necessary, such reviews shall be performed by personnel of the appropriate discipline. Individual reviewers shall not review their own work or work for which they have direct responsibility. FOSC functions and responsibilities will be established according to approved procedure and shall contain as a minimum:

a. Review of proposed changes to TSRs and bases.

b. Review of discovery and positive Unreviewed Safety Question Evaluations (USQE).

c. Review of proposed RESPONSE PLANS and DEINVENTORY PLANS.

5.6.1.2 Composition

The committee members must possess sufficient education, experience, and diversified expertise, along with safety analysis and technical training to undertake the reviews that the committee is intended to perform.

(continued)

5.6 Reviews and Assessments (continued)

5.6.2 LW Contractor Independent Assessment

An Independent Assessment of facility activities and programs affecting nuclear safety shall be performed independent of the facility staff. This independent assessment should provide for the integration of the reviews and audits into a cohesive program to provide senior level management with an assessment of facility operation and recommended actions to improve nuclear safety. The assessment should sample all applicable functional areas to assess level of performance, assure adherence to applicable DOE directives and regulatory requirements, and evaluate the adequacy of the ongoing self-assessment program.

5.6.3 DWPF Self Assessments

DWPF Self Assessments must be conducted by various levels of line organization who have responsibility for the functional area, process or activity being assessed. These assessments must be conducted in accordance with approved procedures/guidelines and must insure adherence to regulatory, operational, and administrative requirements.

5.6.4 Unreviewed Safety Question (USQ) Process

USQ process shall:

1. Be performed on proposed activities (including temporary modifications), reviewed, approved and documented in accordance with an approved procedure.

2. Require DOE approval of the proposed activity prior to implementation when a positive USQ is involved.

5.7 TSR Control

5.7.1 Changes to the TSR shall:

a. Be performed under appropriate administrative controls.

b. Be reviewed according to TSR Section 5.6.

c. Be reviewed and approved by the DOE prior to implementation.

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5.8 Procedures, Programs, and Manuals

5.8.1 Procedures

5.8.1.1 Scope

Written procedures shall be established, implemented, and maintained covering the following activities:

a. Operational activities
b. Maintenance activities (including corrective and preventive maintenance)
c. The emergency and abnormal operating procedures
d. Security plan implementation
e. Emergency plan implementation
f. Procedures for all surveillances required by TSRs
g. Procedures governing the administrative aspects of FACILITY operation
h. Programs specified in section 5.8.2
i. MODE changes

5.8.1.2 Review, Revision, and Approval

Procedures (for activities listed in 5.8.1.1) and revisions thereto, shall be reviewed and approved in accordance with approved administrative procedures prior to implementation, and reviewed periodically as set forth in administrative procedures. Refer to Chapter 10 of the FSAR for further details.

5.8.1.3 Temporary Changes

Temporary changes to procedures may be made provided the change is documented and reviewed in accordance with approved administrative procedures. Refer to Chapter 10 of the FSAR for further details.

(continued)

5.8 Procedures, Programs, and Manuals (continued)

5.8.2 Programs and Manuals

The following programs shall be established, implemented, and maintained. Additional details related to SACs (e.g., requirement criteria, methodologies) are identified in the FSAR subsection listed next to each SAC.

5.8.2.1 Radiological Protection Program (FSAR Section 11.5.11.2.1)

The radiological protection program shall ensure that the radiation exposure of onsite and offsite individuals is maintained within applicable DOE limits and is As Low As Reasonably Achievable (ALARA). The program shall ensure that individual and collective radiation exposures are minimized. The FACILITY shall follow site and FACILITY procedures for all operations involving personnel radiation exposure, including control of high radiation areas and monitoring during SCT loading/unloading.

5.8.2.2 Environmental Compliance Program (FSAR Section 11.5.11.2.2)

The site environmental compliance program shall comply with federal and state environmental regulations. The FACILITY shall follow site and FACILITY procedures governing the applicable environmental regulations.

5.8.2.3 Industrial Hygiene Program (FSAR Section 11.5.11.2.3)

The Industrial Hygiene Program shall serve to maintain employee exposures to chemical, physical and/or biological hazards within safe levels. The FACILITY shall follow site and FACILITY procedures governing the applicable Industrial Hygiene regulations.

5.8.2.4 FACILITY Fire Protection Program (FSAR Section 11.5.11.2.4)

1. A FACILITY fire protection program shall be established to minimize the following:

   a. The likelihood of occurrence of a fire-related event
   b. The consequence of a fire-related event affecting the public, workers, environment, property, and missions

2. The fire protection program shall include the following:
   a. Fire Prevention
      1) Fire-resistive construction
      2) Control of combustibles
      3) Control of ignition sources

(continued)

5.8 Procedures, Programs, and Manuals (continued)

5.8.2.4 FACILITY Fire Protection Program (FSAR Section 11.5.11.2.4) (continued)

4) FACILITY inspections
5) Storage, handling, and use of flammable and combustible liquids and gases
6) Identification and tracking of fire protection impairments and deficiencies

b. Fire Control

1) Automatic detection/suppression and alarm systems
2) Fire Watches/Patrols (as necessary)
3) Proper availability and maintenance of FACILITY fire fighting equipment
4) Identification of fire fighting personnel, responsibilities, and training
5) 24-hour fire fighting coverage

5.8.2.5 Emergency Response Program (FSAR Section 11.5.11.2.5)

An area emergency plan shall define specific measures, policies, and actions to prevent or minimize injuries, damage to property, and impact on the environment caused by accidents, natural disasters, or deliberate damage within the area of responsibility.

The FACILITY Manager shall ensure that an area emergency plan is established in accordance with applicable DOE requirements, based on formal hazards assessment and requirements. The area emergency plan should contain the following elements at a minimum:

a. Emergency response organization
b. Operational emergency event classes
c. Notification
d. Consequence assessment
e. Protective actions
f. Medical support
g. Recovery and reentry
h. Emergency FACILITY and equipment
i. Training
j. Drills and exercises
k. Program administration

(continued)

5.8 Procedures, Programs, and Manuals (continued)

5.8.2.6 Installed Process Instrumentation and Measuring and Test Equipment (FSAR Section 11.5.11.2.6)

1. Installed Process Instrumentation (IPI) and Measuring and Test Equipment (M&TE) shall be identified and programmatically controlled when utilized to monitor process variables (such as level or temperature) used to comply with the requirements of the TSR.

2. Controls shall include the following:

   a. Traceability of TSR-related instruments
   b. Calibration frequencies for TSR-related calibratable instruments
   c. Evaluation of TSR-related items found outside of calibration tolerances

5.8.2.7 Configuration Control Program (FSAR Section 11.5.11.2.7)

A Configuration Control Program shall be implemented that:

a. Identifies and documents the technical baseline of structures, systems, components, and computer software;
b. Ensures that changes to the technical baseline are properly developed, assessed, approved, issued, and implemented; and
c. Maintains a system for recording, controlling, and indicating the status of technical baseline documentation on a current basis.
d. Determine and implement testing/inspection requirements to ensure temporary modifications used as credited SC or SS SSCs meet the FSAR Chapter 4 requirements.
e. Ensures that changes to the technical baseline are properly assessed to ensure confined hydrogen locations, if created, are evaluated to determine if they can impact safety related equipment, and if so, are evaluated to confirm their ability to withstand a confined hydrogen explosion.

5.8.2.8 Nuclear Maintenance Management Program (FSAR Section 11.5.11.2.8)

A Nuclear Maintenance Management Program (NMMP) shall be established and implemented to ensure that effective measures are taken so that SSCs that are part of the safety basis are capable of performing their intended function.

(continued)

5.8 Procedures, Programs, and Manuals (continued)

5.8.2.9 Nuclear Criticality Safety Program (FSAR Section 11.5.11.2.9)

The Nuclear Criticality Safety Program shall establish the following requirements:

a. Nuclear Criticality Safety Evaluations (NCSEs) shall be the base documents for nuclear criticality safety control. Processes shall be shown to be subcritical under all normal and credible abnormal operating conditions.
b. NCSEs shall be used to analyze new processes or significant process changes that may adversely impact the characteristics of nuclear criticality safety.
c. NCSEs shall document the calculations and judgments used in determining that nuclear criticality safety is ensured.
d. Nuclear Criticality Safety Assessments (NCSAs) may be used to assess a facility process or operation for criticality safety and to demonstrate compliance to be within the requirements and/or limits specified in an existing applicable and approved NCSE. An NCSA shall not establish new barriers, controls, or limits.

5.8.2.10 Quality Assurance Program (FSAR Section 11.5.11.2.10)

The FACILITY QA program, through the site QA program, shall:

a. Require that sufficient records be maintained for activities affecting Safety Class and Safety Significant Structures, Systems, and Components
b. Support independent assessment/verification requirements to ensure compliance with the QA program
c. Provide for a graded approach to the application of QA requirements throughout the life of the FACILITY

5.8.2.11 Waste Acceptance Criteria (SAC) (FSAR Section 11.5.11.2.11)

The WAC Program shall ensure that the compositions of waste streams to be received into the FACILITY are within the analyzed DSA limits prior to transfer. These limits consist of:

a. Flammability Assumptions
b. Inhalation Dose Potential
c. Nuclear Criticality Safety
d. Corrosion Control

(continued)

5.8 Procedures, Programs, and Manuals (continued)

5.8.2.11 Waste Acceptance Criteria (SAC) (FSAR Section 11.5.11.2.11) (continued)

Waste streams not bounded by the analyzed isotopic and chemical inventory assumptions shall not be accepted unless a USQ review has been performed and approved.

5.8.2.12 Deleted

5.8.2.13 Deleted

5.8.2.14 Waste Tank Contents (SAC) (FSAR Section 11.5.11.2.14)

Waste streams to be transferred to or processed in the RCT and RPT shall be characterized to ensure that the amount of Isopar L that will be present in each tank is less than or equal to 13.5 grams. This limit is equivalent to 41 gallons of Strip Effluent with an Isopar L concentration in the Strip Effluent of 87 mg/L.

5.8.2.15 Deleted

5.8.2.16 Deleted

5.8.2.17 Structural Integrity Program (FSAR Section 11.5.11.2.17)

A Structural Integrity program shall provide for conducting of inservice inspections of Safety Related SSCs and their supports, as well as Non-Safety Related SSCs – Interaction Sources. This program shall provide reasonable assurance that the evidence of structural or functional degradation during service is detected to permit corrective action before the function of this SSC is compromised. This program shall be applicable to the Safety Class and Safety Significant SSCs identified in the FSAR, as well as Non-Safety Related SSCs – Interaction Sources as discussed in Chapter 9 of the FSAR. The program shall determine those inspection/measurements that need to be performed on the SSCs to ensure that the SSCs will perform their intended design function under operational and accident conditions.

5.8.2.18 Load Lift Program (FSAR Section 11.5.11.2.18)

A load lift program for movement of loads over safety class or safety significant SSCs shall be implemented. This program shall ensure movement of loads over these locations is conducted in a manner that will minimize the potential of damaging safety related SSCs due to load drops (e.g., minimization of lifting heights, verification of load charts, lift stability, and verification of rigging).

(continued)

5.8 Procedures, Programs, and Manuals (continued)

5.8.2.19 Hanford Connectors Torque Program (SAC) (FSAR Section 11.5.11.2.19)

Required torque for Safety Class and Safety Significant process (non-electrical) Hanford connectors/jumpers that are required to maintain purge flow and for transfer line Hanford connectors/jumpers that are required to contain their contents following a seismic event will be applied by impacting the Hanford connector with the crane-operated impact wrench for a minimum of 9 seconds.

These requirements shall be met whenever applicable jumpers are reinstalled or loosened for any reason.

5.8.2.20 Transfer Control Program (SAC) (FSAR Section 11.5.11.2.20)

The following controls are not SAC items unless specifically noted.

A transfer control program shall be established governing radioactive waste transfers between CSTF and DWPF, between SWPF and DWPF, and between buildings within DWPF (i.e., 511-S and 221-S). The program shall at a minimum include the following attributes:

a. Provide means to monitor transfers and stop transfers when material is unaccounted for.

b. Establish and maintain continuous communication within the sending and receiving facilities during transfers (this aspect of the attribute is only applicable to transfers between DWPF and CSTF/SWPF). Maintain continuous communication with the sending and receiving facilities during RSS transfers from CSTF to SWPF. Transfers shall be terminated upon loss of communication in both cases.

c. Prior to transfers, identify in-progress excavation work with the potential to breach the transfer line core pipe and discontinue excavation work during the transfer. (SAC)

d. Ensure during a tornado/high wind warning, following a tornado/high wind event, or following an earthquake, that transfers are terminated (this attribute is only applicable to transfers between DWPF and CSTF/SWPF).

e. Ensure during a tornado/high wind warning, following a tornado/high wind event, or following an earthquake, that transfers through excavated lines are terminated. (SAC)

(continued)

5.8 Procedures, Programs, and Manuals (continued)

5.8.2.20 Transfer Control Program (SAC) (FSAR Section 11.5.11.2.20) (continued)

f. For batch transfers into the LPPP or SEFT, prior to initiating transfers, verify that the receiving tank has adequate freeboard (difference between tank overflow level and current tank level) to receive the planned transfer amount. (SAC)

g. For continuous transfers from the RCT to HDB-8 via the LPPP RPT, verify that the intermediate tank (RPT) transfer pump is pumping prior to starting the transfer from the sending tank (RCT). (SAC)

h. Prohibit transfers from the RCT to the RPT concurrent with transfers from Tank 40 to the SPT. (SAC)

Additional controls for transfers from DWPF to CSTF are identified in the Waste Compliance Plan (TSR 5.8.2.25). Additional attributes of the Transfer Control Program performed only by CSTF or SWPF are identified in the interface section of the DWPF FSAR (Section 11.7).

5.8.2.21 Traffic Control Program (FSAR Section 11.5.11.2.21)

Programmatic controls shall be implemented to ensure that all vehicle movements are controlled near safety class or safety significant SSCs. These controls shall (as necessary) include the following:

a. Posted motor vehicle speed limits.
b. Locations of vehicle barriers to protect SSCs.

5.8.2.22 Deleted

5.8.2.23 Chemical Controls (FSAR Section 11.5.11.2.23)

Programmatic Controls shall be implemented to preclude chemical additions to vessels and tanks from generating flammable vapors (above the rate assumed in the safety analysis) and inadvertent/incompatible chemical transfers. These controls (as applicable) include the following:

(continued)

5.8 Procedures, Programs, and Manuals (continued)

5.8.2.23 Chemical Controls (FSAR Section 11.5.11.2.23) (continued)

a. Controls, including supervisory approval, shall be established to control chemical additions to CPC/SPC vessels, which impact flammable vapor generation.

b. Controls, including supervisory approval, shall be established for chemical transfers where the potential for mixing of incompatible chemicals exists.

c. Sampling and/or process knowledge shall be used to ensure the compatibility of chemical transfers.

d. New applications of chemicals or use of new process chemicals may be required and are subjected to the USQ process. The Proposed Activity shall address items such as storage, potential accidents, leaks, overflows, drain and waste paths, as applicable.

e. Chemical inventories are within the assumptions of the analyses.

Programmatic controls shall be implemented to preclude antifoam additions to the SRAT and SME that causes the vessels to become flammable. These controls include the following:

a. Antifoam addition timing and frequency shall be controlled
b. Discreet antifoam addition volumes shall be controlled
c. Receiving vessel (SRAT or SME) liquid temperature during antifoam additions shall be controlled
d. Antifoam shall be added undiluted
e. SEFT and PRFT additions to the SRAT shall not coincide with peak ADP off-gassing.

5.8.2.24 Deleted

5.8.2.25 Waste Compliance Plan (SAC) (FSAR Section 11.5.11.2.25)

Controls shall be implemented to ensure the WAC limits as identified by the receiving facility are not exceeded.

The following administrative and SAC controls are designated for transfer controls between DWPF and Concentration, Storage, and Transfer Facilities (CSTF). The following controls are not SAC items unless specifically noted.

a. Notification shall be provided to (and concurrence received from) the CSTF Shift Manager/First Line Manager/Control Room Manager prior to intended transfers to the CSTF.

(continued)

5.8 Procedures, Programs, and Manuals (continued)

5.8.2.25 Waste Compliance Plan (SAC) (FSAR Section 11.5.11.2.25) (continued)

b. The equipment needed to stop transfers and liquid additions to the CSTF shall be available to respond to indications of a primary containment waste release. (SAC)
c. Transfers into the CSTF shall be secured as a result of a tornado warning, tornado watch, or high wind warning for the CSTF as issued by the SRS Operations Center. (SAC)
d. Transfers into the CSTF shall be secured following a seismic event. (SAC)
e. Transfers into the CSTF shall be secured following notification of a CSTF wildland fire event. (SAC)
f. Transfers into the CSTF shall be secured following notification of a CSTF control room abandonment event. (SAC)

5.8.2.26 Deleted

5.8.2.27 Deleted

5.8.2.28 Diesel Low Power Operations (FSAR Section 11.5.11.2.28)

Any light load operation (more than 4.5 hours of running at load less than 20% rated capacity) of the diesels will be followed by the manufacturer's recommended diesel operations.

5.8.2.29 Deleted

5.8.2.30 Seismic Event Response (SAC) (FSAR Section 11.5.11.2.30)

Following a seismic event, transfers from the SEFT and PRFT into the SRAT shall be terminated.

Following a seismic event, melter feed shall be terminated immediately.

5.8.2.31 Deleted

5.8.2.32 Deleted

5.8.2.33 Deleted

(continued)

5.8 Procedures, Programs, and Manuals (continued)

5.8.2.34 Conduct of Operations (FSAR Section 11.5.11.2.34)

Conduct of operations shall be established to address the applicable topical areas from DOE requirements. The FACILITY shall follow site and FACILITY procedures for implementing conduct of operations.

5.8.2.35 Glass Waste Storage Building (GWSB) #1 Canister Handling Administrative Control (FSAR Section 11.5.11.2.35)

The GWSB #1 Canister Handling Administrative Control shall be established to protect the more stringent canister heat generation limits that GWSB #1 requires when in a double stack configuration.

5.8.2.36 Retained Hydrogen Program (SAC) (FSAR Section 11.5.11.2.36)

The Retained Hydrogen Program (SAC) shall determine a Q-time applicable to each vessel in which agitation must be restored to maintain the vessel vapor space less than or equal to 95% CLFL. Purge flow rates are required to be at pre-loss of agitation TSR required flow rates upon re-agitation, i.e., if agitation is lost with the SRAT in OPERATION, TSR required OPERATION flow rates must be verified prior to resuming agitation. Verification can be either by reading flow instrumentation or by verification of Mode and no LCO entry related to flow rate. If agitation cannot be restored, the agitator, or components creating an equivalent or larger opening, shall be removed from the vessel. Component removal must be completed within the Q-time.

5.8.2.37 Melter Off-Gas Flammability Control Program (FSAR Section 11.5.11.2.37)

Flammable gas concentration in the melter off-gas shall be maintained less than or equal to 60% CLFL during normal operations and 95% CLFL during a design-basis melter off-gas surge event. This is accomplished by ensuring the following remain within specified limits:

a. total carbon concentration in the melter feed
b. melter feed rate
c. melter feed density
d. total melter air flow rate
e. Off-Gas Condensate Tank vapor space temperature

These factors combine to control melter off-gas flammability and are evaluated using the model as discussed in the DWPF FSAR Chapter 11.

(continued)

5.8 Procedures, Programs, and Manuals (continued)

5.8.2.38 Material Tracking Program (SAC) (FSAR Section 11.5.11.2.38)

The Material Tracking Program shall ensure that the composition of the combined waste stream in the SRAT remains within the following analyzed DSA limits.

a. Flammability Assumptions (SAC)
b. Inhalation Dose Potential (SAC)
c. Canister Heat Generation (SAC)
d. Salt Solubility in Glass (SAC)

5.8.2.39 Excavation Actions (SAC) (FSAR Section 11.5.11.2.39)

Prohibit excavating activities near the affected transfer line when sound isolation is not achievable at SWPF.

5.9 Reporting Requirements

5.9.1 General Requirements

Written reports and oral notifications shall be submitted to DOE in accordance with DOE regulations regarding reporting requirements. These reports and notifications shall be prepared, reviewed and approved in accordance with approved procedures.

5.9.2 TSR Violations

TSR violations must be reported to DOE in accordance with applicable DOE reporting requirements.

A violation of the TSR occurs as a result of any of the following circumstances:

a. Exceeding an SL. (There is no SL at DWPF, thus this circumstance is not applicable to DWPF.)

b. Failure to complete a Required Action statement within the Completion Time following the exceeding of an LCS or failing to comply with an LCO. (There is no LCS at DWPF)

c. Failing to perform a Surveillance Requirement (SR) within the required time limit.

d. Failing to comply with a Specific Administrative Control (SAC) statement. For SACs which have an associated recovery action, a TSR violation would exist only upon failure to meet both the requirement and the recovery action.

e. Failing to comply with an Administrative Control (AC) requirement.

   Failure to comply with an AC statement is a TSR violation when either the AC is directly violated, as would be the case with not meeting minimum staffing requirements for example, or the intent of a referenced program is not fulfilled. To qualify as a TSR violation, the failure to meet the intent of the referenced program would need to be significant enough to render the summary of the referenced program in the DSA invalid.

f. Failure to comply with a PROCESS AREA MODE requirement (defined in Section 1.6) is a TSR violation when either the requirement is directly violated or the intent of a requirement is not fulfilled. A TSR violation does not occur if the PROCESS AREA MODE requirement non-compliance is due to equipment failure of an SSC.

(continued)

5.9 Reporting Requirements (continued)

A TSR violation does not occur if there is a planned or purposeful entry into LCO 3.0.3 and a DOE approved RESPONSE PLAN is initiated prior to the expiration of the LCO Completion Time since the FACILITY stays within the TSR (as amended by the RESPONSE PLAN).

5.9.3 Conditions Outside TSR

In an emergency, if a situation develops that is not addressed by the TSR, site personnel are expected to use their training and expertise to take actions to correct or mitigate the situation. Also, site personnel may take actions that depart from a requirement in the TSRs provided that (1) an emergency situation exists; (2) these actions are needed immediately to protect workers, the public or the environment from imminent and significant harm; and (3) no action consistent with the TSR can provide adequate or equivalent protection. Such action must be approved as a minimum by the Control Room Manager. If emergency action is taken, both a verbal notification shall be made to the responsible Head of the Field Element, and a written report shall be made to the Program Secretarial Officer within 24 hours.

5.10 Record Retention

The records supporting the implementation of the TSR shall be retained for the period specified by the SRS Record Retention Schedule.

Section 6

Design Features

6.0 DESIGN FEATURES

6.1 Design Features Description, Vital Passive Components List, and Site Characteristics

6.1.1 This section identifies and describes the passive design features and passive structures, systems and components (SSCs) not specifically required to have Safety Limits (SLs), Limiting Control Settings (LCSs), or Limiting Conditions for Operation (LCOs) as required by 10 CFR 830.

Accordingly, the following description consists of a general overview as well as a table that provides a specific listing of applicable SSCs and other design features. The table also provides a cross-reference to the FSAR section that gives additional detailed description of the component/design feature.

6.1.2 Components such as piping, valves, vessels, supports, and confinement structures are passive components that, if altered, could have an effect on safety. The Defense Waste Processing Facility has been classified as a Hazard Category 2 Facility. Passive components identified in Table 6.1.2-1 are credited in the safety analysis as performing a passive preventive or mitigative function. TSR Administrative Controls provide programmatic controls for Configuration Control (Section 5.8.2.7), Nuclear Maintenance Management Program (Section 5.8.2.8), and Structural Integrity (Section 5.8.2.17). Table 6.1.2-1 also references FSAR Chapter 4 sections that provide more information on these design features.

Criticality concerns are addressed in the Nuclear Criticality Safety Evaluations (NCSEs) referenced in the DSA and are controlled through a TSR Administrative Control for a Nuclear Criticality Safety Program (5.8.2.9).

6.1.3 The location of the Facility, with respect to the site boundary and nearby facilities, is a design feature that is utilized in the analysis of the accident consequences to the public and workers. Changes in the site boundary or the assumed distances to workers in other facilities would have an effect on the calculated accident consequences.

(continued)

6.0 DESIGN FEATURES (continued)

6.1.4 References

Nuclear Safety Management, Title 10, Code of Federal Regulations, Part 830, Final Rule, January 10, 2001

Implementation Guide for Use in Developing Technical Safety Requirements, DOE Guide DOE G 423.1-1A, November 3, 2010

Final Safety Analysis Report, Savannah River Site, Defense Waste Processing Facility, WSRC-SA-6

Table 6.1.2-1 Design Features

Structures System or Component	FSAR Ch. 4 Sect.	Description
Vitrification Building and RPC Walls	4.3.1	Maintain its confinement throughout the DBT, DBE, and post vessel explosion in order to support Zone 1 Ventilation air flow configuration and prevent damage to Safety Class process vessels and purge systems, and support the MPC Crane. Safety Significant: Providing shielding for the workers within the Vitrification Building.
221-S Shielded Viewing Windows	4.4.5	Provide sufficient shielding to protect the worker.
CPC/SPC Vessels SRAT, SME, SEFT, PRFT, SMECT, MFT, RCT, DWTT	4.3.7	The CPC/SPC Vessels must maintain their structural integrity to support the purging of their contents. Safety Significant Function: The CPC/SPC Vessels must maintain their integrity to contain their contents.
PRFT Dip Leg Siphon Break	4.3.9	Prevents siphons from the PRFT to the LPPP.
SEFT Transfer Orifice	4.3.46	To limit the flow of material transferred to the SRAT.
PRFT Transfer Orifice	4.3.46	To limit the flow of material transferred to the SRAT.
SRAT Steam Supply Jumper	4.3.46	Provide a pathway for the steam to the SRAT coil to provide heat necessary for steam distillation of Isopar L.
CPC Primary Purge System	4.4.1	
Liquid Nitrogen Storage Tanks	4.4.1	To supply sufficient purge flow to the purge system to maintain the CPC vessels non-flammable.
Piping and Valves	4.4.1	To provide a pathway for the purge to the CPC Vessels
CPC Safety Grade N2 Purge System	4.3.8	
Liquid Nitrogen Storage Tanks	4.3.8	To supply sufficient purge flow to the purge system to maintain the vessels' vapor space non-combustible for 4 days.
Piping and Valves	4.3.8	Provide pathway for N2 to CPC Vessels
Tornado missile shield	4.3.8	To protect the CPC Safety Grade Nitrogen Purge System from tornado missiles.
Purge Hanford Connector and Jumper	4.3.8	Provide a pathway for the purge to the CPC Vessels and ensure the flow path remains intact following a DBE.
Diesel Generator System	4.4.47	
Lube Oil Makeup Tank and piping/valves for each diesel generator	4.4.47	To provide containment and a pathway for lube oil.

(continued)

Table 6.1.2-1 Design Features (continued)

Structures System or Component	FSAR Ch. 4 Sect.	Description
Piping and Valve	4.4.47	To provide pathway for medium (jacket water, lube oil, air)
2-hr Fire Resistant Cable Enclosure	4.4.47	To provide 2-hr fire protection for the DG200 support systems cable tray.
Diesel Fuel Oil System	4.4.48	
Piping and Valves	4.4.48	To provide pathway for the fuel oil to be fed to the DG
Fuel oil header redundant heat activated isolation valves	4.4.48	To prevent an active single failure from inadvertent activation of the heat activated isolation valve from isolating the day tanks from the fuel storage tanks.
Zone 1 Ventilation	4.4.46	
Zone 1 Tunnel	4.4.46	Supports the operation of the Zone 1 Ventilation System by providing an air flow path through the canyon to the Sand Filter
Zone 1 Exhaust Stack Zone 1 Exhaust Duct	4.4.46	Supports the operation of the Zone 1 Ventilation System by providing an air flow path for the Zone 1 exhaust and an elevated release path through the exhaust stack.
Zone 1 Exhaust Balancing Dampers Zone 1 Exhaust Fans Suction Dampers	4.4.46	To support the operation of the Zone 1 by remaining open following a DBE or DBT.
LPPP Vessels (SPT, PPT, RPT)	4.4.53	To provide the initial barrier to prevent the release of the contents into the cell and contain the contents to allow the purge system to function
LPPP Safety Grade Purge Systems	4.4.45	
Piping and valves	4.4.45	To provide a pathway for the purge to the LPPP vessels.
SPT/PPT/RPT Purge Hanford Connector and Jumper	4.4.45	Provide a pathway for the purge to the LPPP vessels and ensure the flow path remains intact following a DBE.

(continued)

Table 6.1.2-1 Design Features (continued)

Structures System or Component	FSAR Ch. 4 Sect.	Description
LPPP Cell and Cell Covers	4.4.54	To provide a barrier to prevent a significant release of materials from within the cells as well as providing shielding from the process. To support the operation of the safety significant SSCs within the cell by preventing a collapse from causing SSC failure.
LPPP Process Cell Crane Structural Support/Superstructure	4.4.55	Support the operation of the Safety Significant Systems within the LPPP by preventing its collapse from causing their failure.
LPPP Primary Purge Systems	4.4.9	
Liquid nitrogen storage tank (located at 422-S)	4.4.9	To supply sufficient purge flow to the purge system to maintain the vessel's vapor space non-combustible.
Piping and valves	4.4.9	To provide indication of the purge flow to the vessels.
Emergency Nitrogen Connection	4.4.9	To provide an alternate method for supplying nitrogen gas at a connection in the nitrogen distribution piping.
LPPP Crane Operator Station	4.4.12	To provide sufficient shielding to protect the worker
Melter	4.4.6	Maintains integrity to contain contents
Glass Waste Storage Building (GWSB) Vaults	4.4.56	To protect the integrity of the filled canisters. The GWSB Vault precludes damage to the stored canisters by remaining structurally intact. To provide sufficient shielding to protect the worker.
GWSB Canister Supports	4.4.57	To protect the integrity of the filled canisters. The GWSB canister supports prevent the canisters from falling to the vault floor.
Organic Acid Drain Catch Tank and Piping	4.4.33	Maintains their integrity to contain contents
Organic Acid Drain Catch Tank Dikes	4.4.34	Maintain integrity to contain any leaked formic acid
Nitric Acid Feed Tank and Piping	4.4.35	Maintains their integrity to contain contents
Nitric Acid Feed Tank Dikes	4.4.36	Maintain integrity to contain any leaked nitric acid
Failed Equipment Storage Vault Structure (FESV)	4.4.13	Provides a barrier of protection from the sources stored within it.
Acid Drain Catch Tank and Piping	4.4.11	Maintain integrity to contain contents
Acid Drain Catch Tank Dikes	4.4.7	Maintains integrity to contain any leaked Nitric acid
Formic Acid Feed Tank and Piping	4.4.29	To provide a barrier to prevent the release of formic acid
Inter-Area Transfer Lines	4.4.39	

(continued)

Table 6.1.2-1 Design Features (continued)

Structures System or Component	FSAR Ch. 4 Sect.	Description
Core Line	4.4.39	Maintain their integrity to contain their contents, including following a DBE or a detonation in the transfer line core pipe or jacket.
Secondary Containment	4.4.39	Maintain their integrity to contain their contents and provide gross containment following a DBE or a detonation in the transfer line core pipe or jacket.
LPPP Transfer Line Jumpers and Hanford Connectors (with the exception of the SE and RSS jumpers and sludge jumper between Tank 40 and the SPT)	4.4.39	Maintain their integrity to contain their contents, including following a DBE or a detonation in the jumper.
LPPP Sludge Transfer Line Jumper between Tank 40 and the SPT and Hanford Connectors	4.4.39	Maintain their integrity to contain their contents, including following a DBE and provide a minimal leak path following a detonation in the jumper.
LPPP SE and RSS Transfer Line Jumpers	4.4.39	Maintain their integrity to contain their contents, including following a DBE.
LPPP SE and RSS Double Drain Valves	4.4.39	Maintain their integrity, including following a DBE, and provide a minimal leak path following a detonation in the jumper.
Fan House 292-S	4.4.49	Maintain Integrity to protect the safety significant SSCs within the building.
Diesel Generator Room Heater Supports	4.4.52	Supports the operation of the Safety Significant systems beneath it by preventing its collapse from causing their failure
LPPP Jumpers above Safety Significant Jumpers	4.4.58	To support the operation of the Safety Significant Systems beneath it by preventing its collapse from causing their failure
Main Process Cell Crane Structure	4.3.10	To support the operation of the Safety Class Systems within the process cells by preventing its collapse from causing their failure
RPC Covers	4.3.11	To support the operation of the Safety Class Systems within the process cells by preventing its collapse from causing their failure
CMSD Structural Support	4.3.12	To support the operation of the Safety Class Systems within the process cells by preventing its collapse from causing their failure
422-S Superstructure	4.4.40	To support the operation of the safety significant SSCs within the 422-S Area
CPC Removable Wall	4.3.28	To support the operation of the Safety Class Systems within the process cells by preventing its collapse from causing their failure
Fan House Maintenance Cranes and Structural Support	4.4.50	Supports the operation of the Safety Significant systems beneath it by preventing its collapse from causing their failure

(continued)

Table 6.1.2-1 Design Features (continued)

Structures System or Component	FSAR Ch. 4 Sect.	Description
Fire Protection Piping above the Diesel Generator Systems	4.4.51	Supports the operation of the Safety Significant systems beneath it by preventing its collapse from causing their failure
CPC/SPC Jumpers above Safety Class jumpers	4.3.35	Supports the operation of the Safety Class systems beneath it by preventing its collapse from causing their failure
Sodium Nitrite Feed Tank Dike and Dike Drain Plug	4.4.59	Maintain integrity to contain sodium nitrite leakage and prevent inadvertent drainage to the Floor Drain Catch Tank via the Regulated Drain Header
Melt Cell Crane Structure	4.3.44	Maintain integrity to prevent collapse onto SS SSCs and causing their failure
LPPP Oil Drain Catch Tanks	4.4.60	Maintain their integrity to contain their contents, including following a DBE.

Appendix A

Bases

B 3/4.0 APPLICABILITY

B 3.0 Limiting Conditions For Operation

BASES

3.0.1 LCO 3.0.1 establishes the Applicability statement within each LCO as the requirement for conformance to the LCO for safe operation of the FACILITY or PROCESS AREA (i.e., when the FACILITY or PROCESS AREA is in the MODES or other specified conditions of the Applicability statement of each LCO). LCO 3.0.2 establishes the exception for requiring each LCO to be met.

3.0.2 LCO 3.0.2 establishes that upon discovery of a failure to meet an LCO, the associated ACTIONS shall be met. The Completion Time of each Required Action for an ACTION's Condition is applicable from the point in time that an ACTION's Condition is entered. The Required Actions establish those remedial measures that must be taken within specified Completion Times when the requirements of an LCO are not met. A TSR violation exists when the requirements of the LCO are not met and the associated ACTION(S) have not been satisfied within the specified Completion Times. The purpose of this LCO is to clarify the following:

1. Implementation of the ACTION(S) within the specified Completion Times constitutes compliance with an LCO, and
2. Completion of the remedial measures of the ACTION(S) is not required when compliance with an LCO is restored, unless otherwise specified.

Conditions in an LCO's ACTION Section may be concurrently applicable. For example, an LCO that requires two systems to be OPERABLE will typically have a Condition addressing the situation where one system is inoperable and another Condition addressing the situation where both systems are inoperable. When both systems are inoperable, both Conditions are applicable concurrently. The effect of this requirement is to ensure that the Completion Times associated with the Conditions are tracked correctly.

(continued)

3.0.2 (continued) When a change in MODE or other specified condition is required to comply with Required Actions, the PROCESS AREA may enter a MODE or other specified condition in which a new LCO becomes applicable. In this case, the Completion Times of the associated Required Actions would apply from the point in time that the new LCO becomes applicable, and the appropriate Condition in the LCO ACTION Section is entered.

The Completion Times for the Required Actions are also applicable when a system or component is removed from service intentionally. The reasons for intentionally relying on the ACTIONS include, but are not limited to, performance of SRs, preventive maintenance, corrective maintenance, or investigation of operational problems. Such intentional entries into the LCO shall be performed in accordance with an approved procedure. Approved procedures are controlled administratively by the Administrative Control Section.

Some Completion Times in Required Actions require periodic performance on a "once per … Days" or "every … Hours thereafter" basis. For these recurring Required Actions, a 25% extension may be applied to each performance after the initial performance, unless otherwise stated in individual LCOs.

This allowable extension time is based on engineering judgment, as well as operating experience that indicates the most probable result of any periodic check or activity is the verification of conformance to the required condition or preservation of a known safe condition. Good operating practice would dictate that this extension is used only on an as-needed basis and is not normally relied upon as operational convenience to extend periodic Completion Time intervals beyond those specified.

3.0.3 LCO 3.0.3 establishes the ACTIONS that must be implemented when an LCO is not met and when one of the following conditions occurs:

1. An associated Required Action is not met in the specified Completion Time, and no other Condition applies, or
2. The Condition is not specifically addressed by the associated Required Actions Section.

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3.0.3 (continued) This LCO requires that the affected PROCESS AREA(S) be placed in a MODE where the LCO does not apply if the limits for operation, as defined by the LCO and its ACTIONS Section, cannot be met or associated ACTIONS are not provided (It is not meant to place a PROCESS AREA(S) in DEINVENTORIED). This Required Action shall be initiated within 1 Hour and completed within the next 24 Hours. One Hour provides sufficient time for a safety-based review of the situation prior to initiating MODE change evolutions; 24 Hours is sufficient for the process vessels to cool to the required temperatures and completing the MODE change in a safe and orderly manner. (If Process Cooling Water is available, it may be used to cool the vessels.) In those cases where the MODE change is not achievable in 24 Hours, an approved RESPONSE PLAN shall be developed and initiated within 24 Hours after recognizing the inability to complete the MODE change within the required 24 Hours using the guidance in the Administrative Controls Section.

Some of the LCOs apply in OPERATION, STANDBY, and SHUTDOWN. When this condition exists and LCO 3.0.3 is required to be entered, steps shall be initiated within 1 Hour to stop all sampling activities and transfers into and out of the affected PROCESS AREA(s) and to place any affected PROCESS AREA(s) which is in OPERATION to STANDBY. This action shall isolate the affected PROCESS AREA(S) and place it in the safest condition possible. Also, within 24 Hours, an approved RESPONSE PLAN shall be developed and initiated in accordance with guidance provided in the Administrative Controls Section. Since the affected PROCESS AREA cannot enter OPERATION, STANDBY or SHUTDOWN to exit the requirements of the LCO, the RESPONSE PLAN shall bound the activities to be conducted in the PROCESS AREA. The RESPONSE PLAN shall address the need for more frequent SRs as necessary.

(continued)

3.0.3 (continued) Additionally, some LCOs do not address the associated Required Action(s) for a PROCESS AREA based on the PROCESS AREA MODE requirements defined in Section 1.6. Thus when a requirement for a PROCESS AREA MODE is not met, LCO 3.0.3 is required to be entered. When this condition exists, activities shall be initiated within 1 Hour and completed within 24 Hours to restore compliance with the affected PROCESS AREA MODE requirement(s) or transition the affected PROCESS AREA(S) to a MODE which satisfies the PROCESS AREA MODE requirements. One Hour provides sufficient time for a safety-based review of the situation prior to initiating MODE requirement restoration activities or MODE change evolutions. 24 Hours is normally sufficient for completing the MODE requirement restoration or MODE change in a safe and orderly manner for most PROCESS AREAS. In those cases where the MODE requirement restoration or MODE change is not achievable in 24 Hours, an approved RESPONSE PLAN shall be developed and initiated within 24 Hours after recognizing inability to complete the MODE requirement restoration or MODE change within the required 24 Hours using the guidance in the Administrative Controls Section of this TSR. Since the PROCESS AREA is not bound by the MODE requirements or applicability within the LCOs, the RESPONSE PLAN shall bound the activities to be conducted in the PROCESS AREA(S).

RESPONSE PLANS directed by LCO 3.0.3 shall control the activities to be conducted in the PROCESS AREA. The RESPONSE PLAN shall be approved by the appropriate FACILITY Manager (or designee), DWPF FOSC, and DOE. The Completion Time of 24 Hours is sufficient to evaluate the conditions, develop the plan, and obtain necessary approvals.

If the FACILITY or PROCESS AREA(S) is placed in a MODE where the LCO does not apply then LCO 3.0.3 may be exited. Furthermore, LCO 3.0.3 may be exited if any of the following occurs:

a. The LCO is now met.

b. A Condition exists for which the Required Actions have now been performed.

c. Required Actions exist that do not have expired Completion Times. These Completion Times are applicable from the point in time that the Condition is initially entered and not from the time LCO 3.0.3 is exited.

(continued)

3.0.3 (continued)

Additionally, if LCO 3.0.3 was entered due to non-compliance with a PROCESS AREA MODE requirement defined in Section 1.6, a MODE change directed by LCO 3.0.3 may be terminated and LCO 3.0.3 exited if restoration of the PROCESS AREA MODE requirement has been completed.

Exceptions to LCO 3.0.3 may be provided in instances where requiring the FACILITY or PROCESS AREA(S) to be placed in a MODE where the LCO does not apply or in STANDBY, in accordance with LCO 3.0.3, would not provide appropriate remedial measures for the associated condition of the FACILITY or PROCESS AREA(S). Also LCO 3.0.3 shall not be interpreted to require placing a FACILITY or PROCESS AREA in a higher MODE (e.g., requiring a move from SHUTDOWN to STANDBY) or to require placing a FACILITY or PROCESS AREA in DEINVENTORIED.

3.0.4

LCO 3.0.4 establishes limitations for MODE changes when an LCO is not met. It precludes placing the FACILITY or PROCESS AREA in a different MODE when the following exist:

a. The requirements of an LCO for that MODE have not been met (except where the LCO is applicable in the new MODE and the ACTIONS have been met); and

b. Continued noncompliance with these requirements would result in the FACILITY or PROCESS AREA being placed in a MODE or other specified condition in which the LCO does not apply to comply with the Required Actions.

This LCO ensures that the FACILITY or PROCESS AREA operational activities are not initiated when corrective action is being taken.

Compliance with ACTION(S) that permit continued operation of the FACILITY or PROCESS AREA or other specified Condition in the LCO Applicability for an unlimited period of time provides an acceptable level of safety for continued operation without regard to the status of the FACILITY or PROCESS AREA before or after a MODE change. Therefore, in this case, entry into a MODE or other condition may be made in accordance with the provisions of the applicable ACTION(S). The provisions of this LCO should not be interpreted as endorsing the failure to exercise good operating practice in restoring systems or components to OPERABLE status before beginning operations.

(continued)

BASES

3.0.4 (continued)

The provisions of LCO 3.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS. Furthermore, the provision of LCO 3.0.4 shall not prevent placing PROCESS AREAS in lower MODE(S) when the PROCESS AREA is in LCO Condition(s) which apply in both MODES, provided the ACTIONS of the LCO are met. In addition, the provisions of LCO 3.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that result from a normal shutdown. When a FACILITY or PROCESS AREA is to be removed from a MODE to comply with ACTION(S), LCO 3.0.4 does not apply if it would delay placing the FACILITY or PROCESS AREA in a lower MODE.

Exceptions to LCO 3.0.4 are stated in the individual LCO. Exceptions may apply to all the ACTIONS or to a specific Required Action. Where exceptions to LCO 3.0.4 are specified, they remove the capability to rely on ACTIONS or other specified condition in the LCO Applicability for an unlimited period of time before entry into a MODE and they require compliance with the LCO prior to entry into the MODE.

When changing MODES or other specified conditions while in an ACTION's Condition, in compliance with LCO 3.0.4, or where an exception to LCO 3.0.4 is stated, the ACTIONS define the remedial measures that apply. SRs do not have to be performed on the associated inoperable equipment (or on variables outside the specified limits), as permitted by SR 4.0.1. Therefore, a change in MODE or other specified condition in this situation does not violate SR 4.0.1 or SR 4.0.4 for those SRs that do not have to be performed due to the associated inoperable equipment. However, SRs must be met to demonstrate OPERABILITY prior to declaring the associated equipment OPERABLE (or variable within limits) and restoring compliance with the affected LCO.

(continued)

3.0.5 LCO 3.0.5 establishes criteria to allow testing of equipment removed from service or declared inoperable to comply with ACTION(S). This provides an exception to LCO 3.0.2 to allow testing to demonstrate one of the following:

1. OPERABILITY of the equipment being returned to service, or
2. OPERABILITY of other equipment.

It is reasonable to allow such testing to be conducted under administrative control to prove OPERABILITY and to return equipment to service. Typically the return of equipment to service places the FACILITY or PROCESS AREA in a more reliable and, therefore, safer condition. The return of equipment to service to test OPERABILITY shall be performed in accordance with approved procedures. Approved procedures are controlled administratively by the Administrative Controls Section.

The administrative controls are to ensure the time the equipment is returned to service in conflict with the requirements of the ACTIONS is limited to the time absolutely necessary to perform the allowed SRs. This LCO does not provide time to perform any other preventive or corrective maintenance.

An example of demonstrating the OPERABILITY of other equipment is taking an inoperable channel or trip system out of the tripped condition to prevent the trip function from occurring during the performance of an SR on another channel in the other trip system. A similar example of demonstrating the OPERABILITY of other equipment is taking an inoperable channel or trip system out of the tripped condition to permit the logic to function and indicate the appropriate response during the performance of an SR on another channel in the same trip system.

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3.0.6

LCO 3.0.6 establishes which LCOs are applicable when support systems are declared inoperable, depending upon whether the support system has an LCO specified in the TSR or not. When the support system has a separate LCO, the supported system is not required to be declared inoperable solely because of support system inoperability. This is an exception to the definition of OPERABLE. This exception is necessary to provide an appropriate interface between the support systems and the supported systems, to preclude cascading to the most restrictive supported system's ACTIONS, and to eliminate the confusion associated with entering multiple ACTIONS. This is justified because the ACTIONS that are required to ensure the FACILITY or PROCESS AREAs are maintained in a safe condition are specified in the support system LCO's ACTIONS. These ACTIONS may include entering the supported system's ACTIONS or may specify other Required Actions. An example of a support system having its own LCO is the Standby Diesel Generator. DG100 is the support system for Zone 1 Exhaust Fans 1 & 2. When DG100 is inoperable, Zone 1 Exhaust Fans 1 & 2 are not considered inoperable due to lack of emergency power. Thus, the LCO 3.7.1 Condition for two fans inoperable would not be entered. Subsequently, if Zone 1 Exhaust Fan #3 (supported by DG200) is not able to perform its intended function due to a mechanical failure, then Zone 1 Exhaust Fan #3 would be considered inoperable, but neither the LCO 3.7.1 Condition for two fans inoperable nor the LCO 3.7.1 Condition for three fans inoperable would be entered, since only one Zone 1 Exhaust Fan is considered TSR inoperable pursuant to LCO 3.0.6.

When a support system is inoperable and there is no LCO for that support system, the supported system shall be evaluated for inoperability or degradation. In this case, inoperability of a support system may or may not affect the OPERABILITY of the supported system. OPERABILITY of the supported system will depend on whether it can still perform its intended function taking into consideration the status of the support system. Until it is determined that the supported system is OPERABLE, the ACTIONS of the applicable supported system LCO shall apply.

B 3/4.0 APPLICABILITY

B 4.0 Surveillance Requirements

BASES

4.0.1 SR 4.0.1 establishes the requirement that surveillances must be met during the MODES or other conditions specified in the Applicability statement of the LCO, unless otherwise specified in an individual SR. SR 4.0.1 ensures that surveillances are performed to verify the OPERABILITY of systems and components and that parameters are within specified limits. This SR produces a high degree of confidence that operation of the FACILITY or PROCESS AREA will be as predicted in the accident analysis.

Surveillances do not have to be performed when the FACILITY or PROCESS AREA is in a MODE or other specified condition for which the requirements of the associated LCO are not applicable, unless otherwise specified.

SR(s) do not have to be performed on inoperable equipment because the applicable ACTIONS define the remedial measures that apply. However, applicable SRs may have to be met to demonstrate OPERABILITY prior to declaring the equipment OPERABLE. For example, if a tank ventilation system is declared inoperable due to a fan failure, a verification that the fan can draw a sufficient exhaust flow rate must be performed prior to declaring the system OPERABLE. However, it is not necessary to perform an efficiency test on the associated High-Efficiency Particulate Air (HEPA) filters if the maintenance activities did not involve the filters. SRs for the HEPA filters must be current in accordance with SR 4.0.1 to declare the system OPERABLE.

When surveillances are performed to demonstrate OPERABILITY prior to declaring equipment OPERABLE, the time and date of the successful performance may be used to reestablish the periodicity for the SR in accordance with the specified frequency.

Upon completion of maintenance, appropriate post-maintenance testing is required to declare equipment OPERABLE. This includes ensuring applicable SRs are not failed and their most recent performance is in accordance with SR 4.0.2. Post-maintenance testing may not be possible in the current MODE or other specified conditions in the Applicability due to the necessary equipment parameters not having been established.

(continued)

BASES

4.0.1 (continued) In situations where the necessary parameters have not been established, the equipment may be considered OPERABLE provided testing has been satisfactorily completed to the extent possible and the equipment is not otherwise believed to be incapable of performing its function. This will allow operation to proceed to a MODE or other specified condition where other necessary post-maintenance tests can be completed.

4.0.2 SR 4.0.2 establishes the conditions under which the specified frequency for SRs may be extended. This requirement permits an allowable extension (25%) of the normal surveillance frequency of periodic SRs. This extension is intended to facilitate surveillance scheduling in consideration of FACILITY or PROCESS AREA operating conditions that may not be suitable for conducting the surveillance (e.g., transient conditions or other ongoing maintenance activities). However, this allowance is not to be applied to non-periodic or conditional SRs (e.g., SRs whose frequency requires that the surveillance be performed at a particular point in time based on FACILITY or PROCESS AREA conditions, impending process evolutions, equipment conditions). The frequency for conditional SRs (e.g., "Prior to...", "IMMEDIATELY") has been specified to ensure that a given condition exists or that actions are taken to preclude challenging the safe operating envelope as defined by the SAR.

If the periodic frequency statement for an SR contains applicability restrictions (e.g., every 24 Hours during OPERATION), the frequency shall be considered periodic and the 25% extension allowance may be applied. Frequency statements such as “Within 12 Hours prior to OPERATION” or “Within 30 Days following…” are conditional, and therefore the 25% extension allowance is not applicable.

The allowable extension time is based on engineering judgment, as well as operating experience that indicates the most probable result of any particular surveillance is the verification of conformance to the acceptance criteria. Good operating practice would dictate that this extension is used only on an as-needed basis and is not normally relied upon as an operational convenience to extend surveillance intervals or periodic Completion Time intervals beyond those specified.

(continued)

BASES

4.0.3 SR 4.0.3 establishes the failure to perform an SR within the allowed frequency defined by the provisions of SR 4.0.2, as well as any failure to meet an SR, as a condition that constitutes a failure to meet the OPERABILITY requirements for an LCO. This requirement clarifies that the ACTIONS are applicable when SRs have not been completed or met within the allowed frequency. The Completion Times of the applicable Required Actions apply from the time it is identified that a surveillance has not been performed or is not met. Completion of the Required Actions within the allowed Completion Time either restores compliance with the LCO or provides adequate compensatory measures.

Failure to perform the surveillance within the frequency allowed requires the associated equipment to be declared inoperable and the applicable ACTIONS to be entered. When an LCO is not met as a result of failure to perform an SR within the specified interval of SR 4.0.2, a delay period of 24 Hours or up to the limit of the specified frequency, whichever is less, is provided prior to entering the ACTIONS to permit completion of the SR and thus allow recovery in accordance with LCO 3.0.2. This delay period provides adequate time to plan and perform most routine SRs that have been missed, recognizing that the most probable result is a verification of conformance to the acceptance criteria. This allowance avoids challenges to FACILITY systems from an unnecessary transient. However, this delay period is not to be applied to non-periodic or conditional SRs (i.e., SRs whose frequency requires that the surveillance be performed at a particular point in time based on FACILITY or PROCESS AREA conditions, impending process evolutions, equipment conditions) unless a specific exception is included in the frequency. The frequency for non-periodic and conditional SRs (e.g., "Prior to..., IMMEDIATELY") has been specified to ensure that a given condition exists or that actions are taken to preclude challenging the safe operating envelope as defined by the SAR.

The delay period commences at the time it is identified that a surveillance has not been performed. The Required Actions apply upon expiration of the delay period if the SR is not completed. When the surveillance is performed and the acceptance criteria are not met, the Completion Times of the Required Action(s) apply from the time that the results are known.

SR 4.0.3 is not to be used to allow a MODE change prohibited by SR 4.0.4.

(continued)

BASES

4.0.3 (continued)

SR 4.0.3 also provides a time limit for completion of surveillances that become applicable as a consequence of MODE changes imposed by Required Actions.

Failure to comply with specified frequencies for SRs is expected to be an infrequent occurrence. Use of the delay period established by SR 4.0.3 is a flexibility which is not intended to be used as an operational convenience to extend surveillance intervals. Use of this delay period is a TSR violation and must be reported to DOE.

If a surveillance is not completed within the allowed delay period, then the equipment is considered inoperable or the variable is considered outside the specified limits and the Completion Times of the Required Actions for the applicable LCO Conditions begin IMMEDIATELY upon expiration of the delay period. When the surveillance is performed and the acceptance criteria are not met within the delay period, then the equipment is inoperable, or the variable is outside the specified limits and the Completion Times of the Required Actions for the applicable LCO Conditions begin IMMEDIATELY upon the failure of the surveillance.

Completion of the surveillance within the delay period allowed by this SR, or within the Completion Time of the Required Actions, restores compliance with the LCO statement and SR 4.0.1. However, as stated above, entering the delay period remains a TSR violation and must be reported to DOE.

4.0.4

SR 4.0.4 establishes the requirement that all applicable SRs must be met or the associated ACTIONS permit continued operation of the affected PROCESS AREA in that MODE or other specified condition in the LCO Applicability for an unlimited period of time before entry into a MODE or other specified condition in the Applicability statement. The purpose of this requirement is to ensure that system and component OPERABILITY requirements, or parameter limits, are met before they apply. Unless otherwise stated, the required SRs must have been performed within their specified frequency prior to a change in MODE. The provisions of SR 4.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS.

(continued)

BASES

4.0.4 (continued)

The precise requirements for performance of SRs are specified such that exceptions to SR 4.0.4 should not be necessary. The specific time frames and conditions necessary for meeting the SRs are specified in the frequency, in the surveillance, or both. This allows performance of surveillances when the prerequisite condition(s) specified in a surveillance procedure require entry into the MODE or other specified condition in the Applicability of the associated LCO prior to the performance or completion of a surveillance. A surveillance that could not be performed until after entering the LCO Applicability, would have its frequency specified such that it is not "due" until the specific conditions needed are met. Alternately, the surveillance may be stated in the form of a Note as not required (to be met or performed) until a particular event, condition, or time has been reached. If exceptions are required they are stated in the individual SRs. The SRs are annotated consistent with the requirements of Section 1.5.

B 3/4.1 CPC/SPC FLAMMABILITY CONTROL

B 3.1.1 CPC Flammability Monitoring

BASES

BACKGROUND SUMMARY

Combustible concentrations of hydrogen and organics (e.g., Isopar L and ADPs) can be produced and/or accumulated in the SRAT. Hydrogen is generated by catalyzed decomposition of formic acid; to a lesser degree, hydrogen is produced by the radiolysis of water (organics contribute when present) in the slurry. Thermolytic decomposition of slurry constituents is also a recognized mechanism for hydrogen generation. Although thermolytic decomposition is possible at SRAT processing conditions, it is negligible compared to catalytic hydrogen generation. Organics are introduced by the Strip Effluent which is transferred to the SRAT. Two gas chromatographs (GCs) are provided to determine the hydrogen concentrations in the SRAT Offgas System and calculate a CLFL percentage including contributions from organics. The SRAT GCs measure for hydrogen, calculate the LFL percentage for hydrogen, and then add a constant for ADPs and Isopar L to determine the CLFL percentage. The terms LFL and CLFL are used interchangeably in this TSR. These instruments will stop the SRAT processing when elevated LFL percentages exist.

Combustible concentrations of hydrogen and organics (i.e., ADPs) can also be produced as a result of processing material in the SME. Two gas chromatographs are provided to determine the hydrogen concentration in the SME Offgas System and calculate a CLFL percentage including contributions from ADPs. The SME GCs measure for hydrogen, calculate the LFL percentage for hydrogen, and then add a constant for ADPs to determine the CLFL percentage. These instruments will stop the SME processing when elevated LFL percentages exist.

The operations performed in the SRAT and SME involve radioactive material which has the potential to produce flammable gas mixtures at normal operating temperatures. The SRAT and SME are process vessels which are located in the CPC.

(continued)

BASES

APPLICATION TO SAFETY ANALYSIS

The SRAT and SME are normally purged by the Primary Purge System for CPC system vessels. The purge flow prevents buildup of high concentrations of flammable gas. The SRAT low steam flow and low temperature interlocks ensure the organics entering the SRAT vapor space will volatilize within the SRAT and will be swept into the PVV system. The vessels are predicted to fail as a result of the calculated pressure generated by a hydrogen explosion (FSAR Section 9.4.2.1) (Ref. 1) in the vapor space of the process vessel or vent header. TSR controls on nitric and formic acid additions and ADP additions (TSR 5.8.2.23) prevent over addition of chemicals. Hydrogen verification test for each sludge macro batch (TSR 5.8.2.11) assures that the hydrogen generation rate is not above that assumed for the purge flow to the vessel. TSR 5.8.2.11 also assure that the organic concentration is within the limits assumed for the purge flow rate. The Retained Hydrogen Program (SAC) (TSR 5.8.2.36) prevents high concentrations of flammable gas buildup due to retained hydrogen. Additionally, as a defense in depth measure, the gas chromatographs (GCs) which measure the vapor space hydrogen concentration are used to monitor the flammable fuel concentrations.

The GCs (LFL percentage analyzers) and the hardwired interlocks provide monitoring and interlock functions to ensure that hydrogen concentrations in the SRAT and SME do not challenge the flammability limit of LCO 3.1.1. High concentrations of flammable gas cause an interlock to actuate which isolates steam to the affected process vessel and stops transfers which provide reactants to the process vessel. These actions decrease the flammable gas production in the vessel.

(continued)

BASES

LCO

During OPERATION, the FACILITY will rely upon the GCs on the SRAT and SME to provide LFL interlock actuation during elevated flammable fuel concentrations.

A total of four GCs (two GCs per process vessel) monitor the SRAT and SME via the CPC vessel vent exhaust. Two GCs draw samples from the SRAT condenser and two GCs draw samples from the SME condenser (only one is required to be OPERABLE per vessel). Associated with each vessels GC system are hardwired interlocks. The GCs and the Hi LFL hardwired interlocks provide LFL percentage monitoring and interlock functions which prevent the flammable gas mixture concentrations in the SRAT and SME from reaching flammable levels. The instrumentation and interlocks related to controlling the flammable concentrations in the SRAT and SME are detailed in Table 3.1.1-1. The LCO values of 60% of the LFL are based upon the requirements of NFPA 69. Accounting for the uncertainty of the LFL GCs reading (Ref. 2) and the response time for the associated interlocks, the 60% LFL setpoint will prevent a flammable mixture from forming. There is no margin of safety associated with the instrumented LFL values for the SRAT and SME as interlock actions at 60% LFL take actions that decrease flammable gas production and prevent reaching 100% LFL.

OPERABILITY of these interlocks is protected by this LCO.
The LFL value used for determining compliance with the LCO shall be based upon the LFL of hydrogen in air (LFL for hydrogen is 4.0 vol. %).

The interlock actuation will stop processing in the SRAT and/or SME. This is accomplished by isolating steam to the affected process vessel(s). For the interlock circuitry to be OPERABLE, the circuit must be capable of receiving all inputs and performing the interlock functions in Table 3.1.1-1.

(continued)

BASES

MODE APPLICABILITY

This LCO is applicable during OPERATION since during heating and processing of the material is the only time in which the flammable fuel generation rate could exceed the capabilities of the required purges. During STANDBY and SHUTDOWN the purge requirements are sufficiently bounding to dilute any generated flammable fuel to 25% of the LFL when the STANDBY and SHUTDOWN temperature limit are maintained or 95% of the LFL at the bounding temperature.

PROCESS AREA APPLICABILITY

This LCO applies to those areas in the FACILITY whose flammable fuel generation rate could overcome the dilution flow of the purge systems. These areas have been determined to be the SRAT and SME.

ACTIONS

A.1

Condition A is entered if the flammable gas mixtures concentration in the SRAT or SME is greater than or equal to 60% of the LFL. The affected process vessel has an LFL percentage value that has exceeded the LCO setpoint and is approaching the LFL. Therefore, to minimize further flammable fuels from being produced, and/or reduction of the vapor space of the vessel, all transfers into the process vessels shall be stopped IMMEDIATELY. Automatic interlock actions should stop the introduction of chemicals that add reactants to the process. These include nitric and formic acid and process frit. Operator actions are necessary to further isolate materials such as antifoam which are permitted to be added during the process.

The following are not considered transfers into the affected process vessel for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

(continued)

BASES

ACTIONS (continued)

A.2

NOTE-1 has been included to inform the operators that Required Action A.2 should have been performed by interlock function. NOTE-2 has been included to alert operators that the closure of the SRAT steam valve will result in an interlock, described in LCO 3.1.11, to stop the SEFT and PRFT transfer pumps. This Required Actions shall be initiated IMMEDIATELY to isolate the steam supply. This Required Action should have already occurred upon the LCO flammability setpoint being reached due to hardwired interlocks. However, if not, operator action shall be taken IMMEDIATELY to initiate the proper response of the LFL interlocks. This Required Action will decrease the production of flammable gases and lessen the need for large purge flow rates.

A.3

To reduce the vapor space flammable fuel concentration additional dilution flow is introduced to the vessel. This is accomplished by fully opening the manual purge flow control valve to provide additional dilution purge. To satisfy this requirement the manual purge flow control valve shall be 100% open. By performing this action, the CPC safety grade nitrogen system is made inoperable, since increasing the flow requirements to the vessels has jeopardized the inventory of the storage tanks.

A.4

IMMEDIATELY stopping all maintenance activities in the CPC eliminates potential ignition sources and reduces the probability of an explosion.

A.5

The affected process vessel(s) (SRAT and/or SME) shall be placed in STANDBY within 2 hours after reaching 70ºC. The 2-Hour Completion Time recognizes that a formal MODE change declaration may require completion of activities that cannot be completed IMMEDIATELY and is the usual time to reach STANDBY conditions. Required Actions A.1 and A.2 ensure that the activities necessary to place the affected process vessels in a stable condition are initiated IMMEDIATELY. This Completion Time allows adequate time to cool these vessels and to safely transition to STANDBY, and recognizes that actions to place the affected process vessel in STANDBY are underway.

(continued)

BASES

ACTIONS (continued)

B.1, B.2, B.3 and B.4

Condition B is entered if the flammable vapor concentration in the SRAT or the SME is greater than or equal to 80% of the LFL. Eighty percent is conservative to 100% LFL and the Required Actions of this Condition will eliminate possible ignition sources. Required Actions shall be initiated IMMEDIATELY to stop all transfers into the affected vessel, isolate the steam supply, maximize the purge flow to the vessels, and stop any maintenance activities in the CPC. These actions should have already occurred upon the LCO flammability setpoint being reached. However, if not, operator action shall be taken IMMEDIATELY to initiate the proper response of the LFL interlocks. These Required Actions will decrease the production of flammable gases and increase the dilution purge in the process vessels.

The following are not considered transfers into the affected process vessel for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

B.5

This Required Action ensures prior to reaching the LFL that possible spark sources are removed IMMEDIATELY. This is completed by stopping the process vessel(s) agitator, sample pumps and transfer pumps. This not only stops the associated mechanical devices but also de-energizes associated electrical components in the canyon.

(continued)

ACTIONS (continued)

B.6

The affected process vessel(s) (SRAT and/or SME) shall be placed in STANDBY within 2 hours after reaching 70 ºC. The 2-Hour Completion Time recognizes that a formal MODE change declaration may require completion of activities that cannot be completed IMMEDIATELY and is the usual time to reach STANDBY conditions. Required Actions B.1, B.2, B.3, B.4, and B.5 ensure that the activities necessary to place the affected process vessels in a stable condition are initiated IMMEDIATELY. This Completion Time allows adequate time to cool these vessels and to safely transition to STANDBY, and recognizes that actions to place the affected process vessel in STANDBY are underway.

C.1

Condition C is entered if the SRAT or SME does not have an OPERABLE gas chromatograph, local indication, or associated interlocks. The affected process vessel flammable fuel concentration may be approaching the LFL without being monitored. Therefore, to minimize further flammable fuels from being produced, and/or reduction of the vapor space of the vessel, all transfers into the process vessels shall be stopped. Operator actions are required to stop the introduction of chemicals, including nitric and formic acid, and process frit, if the interlock fails. Operator actions will also be required to IMMEDIATELY isolate material which interlocks do not stop such as antifoam, which is permitted to be added during the process.

The following are not considered transfers into the affected process vessel for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

(continued)

BASES

ACTIONS (continued)

C.2

NOTE-1 has been included to inform the operators that Required Action C.2 should have been performed by the Gas Chromatograph(s) associated interlock function. NOTE-2 has been included to alert operators that the closure of the SRAT steam valve will result in an interlock, described in LCO 3.1.11, to stop the SEFT and PRFT transfer pumps. Required Action shall be initiated IMMEDIATELY to isolate the steam supply. This Required Action will decrease the production of flammable gases and lessen the need for large purge flow rates.

C.3

IMMEDIATELY stopping all maintenance activities in the CPC eliminates potential ignition sources and reduces the probability of an explosion.

C.4

The affected process vessel(s) (SRAT and/or SME) shall be placed in STANDBY within 2 hours after reaching 70 ºC. The 2-Hour Completion Time recognizes that a formal MODE change declaration may require completion of activities that cannot be completed IMMEDIATELY and is the usual time to reach STANDBY conditions. Required Actions C.1, C.2, and C.3 ensure that the activities necessary to place the affected process vessels in a stable condition are initiated IMMEDIATELY. This Completion Time allows adequate time to cool these vessels and to safely transition to STANDBY, and recognizes that actions to place the affected process vessel in STANDBY are underway.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 4.1.1.1

The flammable vapor concentration of the SRAT contents shall be verified to be less than or equal to 60% of the LFL, every 12 hours based on the LFL of hydrogen and organics (ADPs and Isopar L). This value is determined by AIT-8795 or AIT-8796 which have their output at AX-8799. This verification ensures that the parameter responsible for the potential explosion in the process vessel is being monitored during OPERATION. The percentage of LFL indication can be obtained from the SRAT GCs. The instrument used for the indication must be INSTRUMENT LOOP CALIBRATED. The 12-Hour frequency is adequate to determine the actual value because hardwired interlocks will stop the process if LFL percentage setpoints are exceeded. The value shall be read at the controller. Failure to meet the requirements of this SR requires entering Condition A or B of this LCO.

SR 4.1.1.2

The flammable vapor concentration of the SME contents shall be verified to be less than or equal to 60% of the LFL every 12 hours based on the LFL of hydrogen and organics (ADPs). This value is determined by AIT-8797 or AIT-8798 which have their output at AX-8800. This verification ensures that the flammable vapor concentration responsible for the potential explosion in the process vessel is being monitored during OPERATION. The percentage of LFL indication can be obtained from the SME GCs. The instrument loop or components used for the indication must be INSTRUMENT LOOP CALIBRATED. The 12-Hour frequency is adequate to determine the actual value because hardwired interlocks will stop the process if LFL percentage setpoints are exceeded. The value shall be read at the controller. Failure to meet the requirements of this SR requires entering Condition A or B of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.1.3

The SRAT gas chromatographs LFL function shall be INSTRUMENT LOOP CALIBRATED at least every 7 days. Performance of this SR ensures that the gas chromatographs are properly calibrated on a regular basis to support processing of sludge material in the SRAT. The calibration involves response testing of the instrument with a known standard. Verification is made that the parameter indications are correct at the indicating controller (AX-8799). SRAT instrument loop 8795 calibration consists of measuring hydrogen concentration and calculating the CLFL percentage (loop 8795). SRAT instrument loop 8796 calibration consists of measuring hydrogen concentration and calculating the CLFL percentage (loop 8796). This SR ensures that the gas chromatographs are operating within as-designed accuracy levels. The required calibration interval will maintain a high level of accuracy for the instruments and is considered adequate to track and trend instrument performance. To ensure that the analyzers are calibrated during periods of infrequent transfers, the maximum permissible period between calibrations is 7 days. Failure to meet or perform this SR for both analyzers requires entering Condition C of this LCO.

SR 4.1.1.4

The SME gas chromatographs LFL function shall be INSTRUMENT LOOP CALIBRATED at least every 7 days. Performance of this SR ensures that the gas chromatographs are properly calibrated on a regular basis to support processing of sludge material in the SME. The calibration involves response testing of the instrument with a known standard. Verification is made that the parameter indications are correct at the indicating controller (AX-8800). SME instrument loop 8797 calibration consists of measuring hydrogen concentration and calculating CLFL percentage (loop 8797). SME instrument loop 8798 calibration consists of measuring hydrogen concentration and calculating the CLFL percentage (loop 8798). This SR ensures that the gas chromatographs are operating within as-designed accuracy levels. The required calibration interval will maintain a high level of accuracy for the instruments and is considered adequate to track and trend instrument performance. To ensure that the analyzers are calibrated during periods of infrequent transfers, the maximum permissible period between calibrations is 7 days. Failure to meet or perform this SR for both analyzers requires entering Condition C of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.1.5

An INSTRUMENT LOOP TEST of the SRAT gas chromatographs Hi LFL interlock shall be conducted on a yearly basis. This test shall verify, with actual or simulated input signal, that the required equipment receives the proper signal to direct the actions outlined in the footnotes of Table 3.1.1-1. A successful completion of this test will ensure the required equipment receives the signal directing the actions required by this interlock at a setpoint within the requirements of Table 3.1.1-1. A yearly frequency is based on the instrument loop accuracy and reliability. The equipment receiving the signal is tested in LCO 3.1.6. Credit can be taken for successful completion of this SR from a successful activation of the interlock if all functions detailed in Table 3.1.1-1 can be verified to have occurred. A failure to meet the requirements of this SR requires entry into Condition C of this LCO.

SR 4.1.1.6

An INSTRUMENT LOOP TEST of the SME gas chromatographs Hi LFL interlock shall be conducted on a yearly basis. This test shall verify, with actual or simulated input signal, that the required equipment receives the proper signal to direct the actions outlined in the footnotes of Table 3.1.1-1. A successful completion of this test will ensure the required equipment receives the signal directing the actions required by this interlock at a setpoint within the requirements of Table 3.1.1-1. The equipment receiving the signal is tested in LCO 3.1.6. Credit can be taken for successful completion of this SR from a successful activation of the interlock if all functions detailed in Table 3.1.1-1 can be verified to have occurred. A yearly frequency is based on the instrument loop accuracy and reliability. A failure to meet the requirements of this SR requires entry into Condition C of this LCO.

REFERENCES

1. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U), WSRC-SA-6.

2. Instrumentation Uncertainties Evaluation Loops: S378-AE-7716, 7717, 7736, and 7737 SRAT and SME Gas Chromatograph System, J-CLC-S-00024.

B 3/4.1 CPC/SPC FLAMMABILITY CONTROL

B 3.1.2 CPC Temperature Requirements

BASES

This LCO has been deleted.

B 3/4.1 CPC/SPC FLAMMABILITY CONTROL

B 3.1.3 SRAT, SME, SMECT, and DWTT Flammability Control - Operation

BASES

BACKGROUND SUMMARY

In performing the DWPF mission, several Chemical Process Cell (CPC) operations result in the production of flammable gas which, if ignited, could cause a significant release of radioactive material. The CPC process vessels identified in the accident analysis which possess the potential to explode and cause a release of radioactive material include the SRAT, SME, SMECT, and DWTT.

Hydrogen can be generated in the SRAT, SME, SMECT, and DWTT via the following mechanisms: catalytic, thermolytic, and radiolytic decomposition of the vessel contents. Additional flammability concerns are from a volatile organic (Isopar L) entering the SRAT from the SEFT and/or PRFT and from antifoam degrading into flammable degradation products and off-gassing in the SRAT, SME, and SMECT.

The above CPC process vessels have a purge supply that provides a motive force of either air or nitrogen gas that dilutes the flammable gas below the established LFL/CLFL safety value. Interlocks on the steam supply and nitric and formic acid additions are provided for the SRAT and SME. An interlock on the PFSFT transfer is additionally provided for the SME. Temperature and steam flow controls, and LCO requirements for verification of boiling are provided for SEFT and PRFT transfers to the SRAT to prevent the accumulation of organic in the SRAT and potential organic carryover to the downstream process vessels.

APPLICATION TO SAFETY ANALYSIS

The accident analyses indicate that an explosion in the SRAT, SME, SMECT, or DWTT can produce significant radiological consequences for the onsite worker. The SRAT, SME, SMECT, and DWTT are predicted to fail as a result of the calculated pressure generated by a hydrogen explosion (FSAR Section 9.4.2.1). The FSAR assumes that the progression of the event has the potential to damage other tanks within the CPC, either by the ejection of fragments or by the dislodging of cell covers.

(continued)

BASES

APPLICATION TO SAFETY ANALYSIS (continued)

The requirements of this LCO ensure that the flammable fuel concentration of the SRAT and SME are maintained less than or equal to 60% of the CLFL by ensuring a minimum purge through the vessels. Ensuring the minimum purge to the SMECT will maintain its vapor space less than or equal to 95% of the CLFL based on incredible conditions and 25% of the CLFL for the bounding set of conditions. Ensuring the minimum purge to the DWTT will maintain its vapor space less than or equal to 25% of the CLFL.

The contents of the SEFT and PRFT are only introduced to the SRAT when the SRAT contents are boiling to steam strip the organic of concern (Isopar L) for removal by the vessel purge system. LCO 3.1.11 provides the temperature and steam flow controls as well as the requirements for verification of boiling for SEFT and PRFT transfers to the SRAT. TSR controls on nitric and formic acid additions and ADP additions (TSR 5.8.2.23) prevent over addition of chemicals. The Retained Hydrogen Program (SAC) (TSR 5.8.2.36) prevents high concentrations of flammable gas buildup due to retained hydrogen.

LCO

This LCO has been established to ensure that the assumptions made in the FSAR, regarding the ability of the CPC purge flow sources to prevent an explosion in the SRAT, SME, SMECT, and DWTT are protected. The purge flow is supplied from the Primary purge system that includes the primary air and bulk nitrogen. The Primary purge source will continue to supply the purge until the pressure in the supply header falls below the pressure of the Safety Grade nitrogen supply source. At this point, the pressure control valve in the Safety Grade nitrogen supply line opens to allow the Safety Grade purge supply to the process vessels.

The LCO limit for the SRAT purge flow will limit the gaseous concentrations of flammables to less than or equal to 60% of the CLFL. This LCO ensures the Safety Analysis value of 186 scfm for SRAT purge is met by implementing a limit of 222 scfm (Ref. 5). SRAT purge flow is monitored at FI-3034A and at FI-3034B (Ref. 2). The LCO limit for the SME purge flow will limit the gaseous concentrations of flammables to less than or equal to 60% of the CLFL. This LCO ensures the Safety Analysis value of 72 scfm for SME purge is met by implementing a limit of 86 scfm (Ref. 5). SME purge flow is monitored at FI-8856A and at FI-8856B (Ref. 6). This value was chosen to reflect the hardwired interlock setpoints detailed in LCO 3.1.1. The LCO limit for the SMECT purge flow will limit the gaseous concentration of flammables to less

(continued)

BASES

LCO (continued)

than or equal to 95% of the CLFL. This LCO ensures the Safety Analysis value of 8.5 scfm for the SMECT purge is met by implementing a limit of 12 scfm (Ref. 5). SMECT purge flow is monitored at FI-3144A and at FI-3144B (Ref. 9). The LCO limit for the DWTT purge flow will limit the gaseous concentrations of flammables to less than or equal to 25% of the CLFL. This LCO ensures the Safety Analysis value of 53 scfm for DWTT purge is met by implementing a limit of 61 scfm (Ref. 5). DWTT purge flow is monitored at FI-6167A and FI-6167B (Ref. 11).

Analysis has shown current design basis purge requirements for the SRAT, SME, and SMECT continue to control flammability when flammables other than hydrogen (e.g., ADPs) are generated (Ref. 17). ADPs are not of concern in the DWTT.

There is no margin of safety associated with the instrumented purge flow LCO value as the minimum purge flows for the SRAT, SME, SMECT, and DWTT during OPERATION are based on bounding hydrogen production values. Administrative controls are in place to maintain these assumptions by limiting feed constituents and concentrations. These purge flows are the minimum amount needed for each vessel to remain less than or equal to 60% of the CLFL in the SRAT and SME, 95% of the CLFL in the SMECT, and 25% of the CLFL in the DWTT. This LCO requires the primary purge source to be OPERABLE and in service during OPERATION. To be OPERABLE the primary purge source shall be supplying the purge through the manual purge flow control valve to the respective process vessel.

The CPC purge header pressure is monitored to ensure that the Primary purge system is supplying the required purge. This pressure is maintained greater than or equal to 72 psig, which is higher than the actuation pressure of the Safety Grade nitrogen supply system plus the instrument uncertainty (Ref. 10). There is no margin of safety associated with the instrumented CPC purge header pressure value as operating experience has shown this value to provide adequate pressure to prevent actuation of the Safety Grade nitrogen supply system.

MODE APPLICABILITY

This LCO applies when DWPF operations in the SRAT, SME, and DWTT could generate appreciable amounts of hydrogen. Therefore, this LCO is only applicable during OPERATION. During this MODE, temperatures in the SRAT, SME, and DWTT can be elevated to maximum temperatures and transfers are allowed in all process vessels.

(continued)

BASES

MODE APPLICABILITY (continued)

During OPERATION in the SRAT and SME, material can be carried over into the SMECT from the SRAT or SME. Therefore, the SMECT purge requirement is applicable while the SRAT or SME is in OPERATION. The SMECT does not process and therefore does not have any specified MODES.

PROCESS AREA APPLICABILITY

This LCO is only applicable to the SRAT, SME, and DWTT which are located in the CPC. The SMECT does not process and therefore is not considered a PROCESS AREA. However, the SMECT purge requirement is applicable while the SRAT or SME is in OPERATION. The FSAR analysis indicates that an explosion in any of these vessels can occur and have significant impacts on the FACILITY workers and possibly the offsite public.

ACTIONS

A.1 and A.2

Condition A is entered if the primary purge flow rate is less than 222 scfm to the SRAT, less than 86 scfm to the SME, or less than 61 scfm to the DWTT as indicated by an OPERABLE flow instrument. A NOTE in the LCO does not require entry into this Condition if one of the flow instruments measuring purge flow to the vessel is inoperable (covered in LCO 3.1.6). This condition can occur as a result of a loss of primary purge flow. With less than the proper purge flow rates, flammable gas generation rates could cause the LFL/CLFL to be exceeded in the SRAT, SME, and/or DWTT. Therefore, Required Actions shall be initiated IMMEDIATELY to stop transfers and isolate the steam supply into the affected process vessel. The isolation of steam, Nitric and formic acid, and PFSFT should have already occurred for the SRAT and SME upon the low purge flow setpoint being reached in those vessels. However, if not, operator action shall be taken IMMEDIATELY to initiate the proper response of the low-flow interlock (LCO 3.1.6). These Required Actions require operator action to be taken IMMEDIATELY for the DWTT. A NOTE has been included to alert operators that the closure of the SRAT steam valve will result in an interlock, described in LCO 3.1.11, to stop the SEFT and PRFT transfer pumps. These Required Actions will decrease the production of flammable gases and lessen the need for large purge flows.

(continued)

BASES

ACTIONS (continued)

A.1 and A.2 (continued)

The following are not considered transfers into the affected process vessel for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

A.3

When a process vessel does not possess the required primary purge flows for OPERATION, operator action shall be initiated IMMEDIATELY to ensure that the STANDBY purge flow is established in the affected process vessel. The STANDBY purge flow rates are sufficient to prevent a flammable mixture from developing in OPERATION. This Condition requires that purge flow be established IMMEDIATELY.

A.4

The affected process vessel(s) (SRAT, SME, and/or DWTT) shall be placed in STANDBY within 2 hours of the vessel reaching 70°C. The 2-Hour Completion Time recognizes that a formal MODE change declaration may require completion of activities that cannot be completed IMMEDIATELY. Required Actions A.1 and A.2 ensure that the activities necessary to place the affected process vessel(s) in a stable condition are initiated IMMEDIATELY. This Completion Time allows adequate time to cool the SRAT, SME, and/or DWTT and to safely transition to STANDBY. The Completion Time recognizes that actions to place the affected process vessel in STANDBY are underway.

(continued)

BASES

ACTIONS (continued)

B.1 and B.2

Condition B is entered if the primary purge flow rate is less than 12 scfm to the SMECT as indicated by an OPERABLE flow instrument. NOTE-1 does not require entry into this Condition if one of the flow instruments measuring purge flow to the vessel is inoperable (covered in LCO 3.1.6).

The NOTE-2 requires purge flow to be maintained until the minimum amount of vessel purge volume per Table 3.1.4-2 has been supplied. The time for minimum vessel purge volume is calculated by dividing the purge volume required by Table 3.1.4-2 with the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty) re-established per Required Action B.3. This delay in exiting Condition B will maintain the assumptions on which the recovery time is based.

This condition can occur as a result of a loss of primary purge flow. With less than the proper purge flow rates, flammable gas generation rates could cause the CLFL criteria to be exceeded in the SMECT. Therefore, Required Actions shall be initiated IMMEDIATELY to stop transfers and isolate the steam supply into the SRAT and SME. A NOTE has been included to alert operators that the closure of the SRAT steam valve will result in an interlock, described in LCO 3.1.11, to stop the SEFT and PRFT transfer pumps. These Required Actions will decrease the likelihood of solids carryover from the SRAT or SME into the SMECT.

The following are not considered transfers into the affected process vessel for compliance with this Required Action: Water additions from: bubbler blow-down, filling jumper seal pots, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

(continued)

BASES

ACTIONS (continued)

B.1 and B.2 (continued)

The purge system upset conditions that lead to low purge flows on all supported vessels are typically first noted by multiple DCS alarm conditions for the SRAT, SME, DWTT, and MFT (low purge flow alarmed vessels). This condition can be verified by observation of multiple low flow indications locally at the purged vessels. CPC primary purge header flow indication can also be used to provide assurance of a stable, consistent purge flow to the CPC vessels. Either of these indications may be used to determine flow transient durations or when validating purge system steady state flow conditions when monitoring for vapor space turnover times. Field observations of the local indicators are used to confirm the actual purge flow loss or to verify restoration of adequate purge flow.

B.3

When the SMECT does not possess the required primary purge flows, operator action shall be initiated to ensure that the proper purge flow is established in the SMECT within the Recovery Times in Table 3.1.4-1.

The Completion Time for recovering purge flow is based upon calculations performed to determine how long the SMECT could be without purge flow and still keep the flammable concentration less than 100% CLFL (Ref. 16). Table 3.1.4-1 specifies the recovery time associated with the SMECT. This table is based upon the time it takes for the vessel to reach 100% CLFL. The time for restoration is based on the temperature and the volume of the contents in the vessel.

(continued)

BASES

ACTIONS (continued)

B.3 (continued)

The Completion Time for Required Action B.3 is preceded by a NOTE which provides guidance for determining the recovery time if purge flow is less than the LCO requirement again prior to completing the required purge volume as determined per Table 3.1.4-1. In this case the flammable vapors in the vessel may be greater than the flammables concentration at the time of initial inadequate purge. Therefore, the time to reach 100% CLFL from this elevated level is less than that determined initially. The NOTE requires that the subsequent Completion Time be reduced by the amount of time already used during previous attempts to restart the purge. The time allowed to restore the purge is determined as follows:

- the calculated recovery time from the Table 3.1.4-1 minus the cumulative recovery time(s) used in the previous attempt(s), or

- if temperature or volume has increased, the more restrictive calculated recovery time for those conditions minus the cumulative recovery time(s) used in the previous attempt(s).

The NOTE in Table 3.1.4-1 requires that conservative values for liquid temperature and volume are to be used at all times in determination of recovery time. Therefore, if vessel temperature or volume falls between two values listed in the table, then the higher value is chosen because the higher temperature reduces the CLFL and higher volume reduces the tank vapor space. The values used for the recovery time determination are the liquid temperature and volume that existed prior to entry into this Condition. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach CLFL. This will ensure the vessel does not reach a flammable mixture within the recovery time. Recovery times are not re-calculated for conditions that decrease the liquid temperature or volume during purge recovery.

NOTE-1 in Table 3.1.4-2 addresses less than the LCO requirement of purge for 5 minutes or less. This reduction in purge could be a single event or multiple events within the 5-minute period. The NOTE establishes that if the purge flow is restored within 5 minutes, then maintaining the minimum purge flow continuously to the vessel for a period of twenty minutes satisfies the required purge volume.

(continued)

BASES

ACTIONS (continued)

B.3 (continued)

References 15 and 16 determined that for 5 minutes of less than the LCO requirement of purge, continuous purge of the vessel at the minimum required purge flow rate for 20 minutes will reduce the flammable concentration in the vessel to within 10% of that existing prior to the loss or reduction of purge. This duration is based on the bounding vessel liquid volume and temperature.

However, if purge is less than the LCO requirement again during the 20 minutes, the purge flow shall be maintained until the purge has supplied the minimum vessel purge volume per Table 3.1.4-2.

The Bases for LCO 3.1.4 provides examples for additional guidance in applying this NOTE.

NOTE-2 in Table 3.1.4-2 requires that conservative values for liquid temperature and volume are to be used at all times in determination of required purge volume. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (lower temperature is conservative) and volume (lower volume is conservative) shall be used. The values used for the purge volume determination are the liquid temperature and volume that existed at the time of re-establishing the required purge flow. The purge volume must be re-determined if the liquid temperature or volume decreases, as these conditions increase the required purge volume.

NOTE-3 in Table 3.1.4-2 provides guidance for calculating the purge time. The purge time can be obtained by dividing the purge volume (required by Table 3.1.4-2) by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

(continued)

BASES

ACTIONS (continued)

B.4

The SRAT and SME shall be placed in STANDBY within 2 hours of the vessel reaching 70 ºC. The 2-Hour Completion Time recognizes that a formal MODE change declaration may require completion of activities that cannot be completed IMMEDIATELY. Required Actions B.1 and B.2 ensure that the activities necessary to place the affected process vessel(s) in a stable condition are initiated IMMEDIATELY. This Completion Time allows adequate time to cool the SRAT and/or the SME and to safely transition to STANDBY, and recognizes that actions to place the affected process vessel in STANDBY are underway.

C.1 and C.2

Condition C is entered if the CPC purge header pressure is less than 72 psig as indicated by PI-1233 or if the Required Actions and Completion Times of Condition D are not met. This condition can occur as a result of losing the Primary purge system (thus the Safety Grade purge system is supplying the purge) or inoperability of CPC Purge Header Pressure Indicator for an extended period of time. Therefore, Required Actions shall be initiated IMMEDIATELY to stop transfers into the SRAT, SME, and DWTT and isolate the steam supply to the SRAT, SME, and DWTT. A NOTE has been included to alert operators that the closure of the SRAT steam valve will result in an interlock, described in LCO 3.1.11, to stop the SEFT and PRFT transfer pumps. A separate NOTE in the LCO does not require entry into this Condition solely due to an inoperable PI unless entering due to Required Actions and/or associated Completion Times of Condition D are not met. The inoperability of the PI does not impact the purge flows to the CPC vessels.

The following are not considered transfers into the affected process vessel for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

(continued)

BASES

ACTIONS (continued)

C.3

The SRAT, SME, and DWTT shall be placed in STANDBY within 2 hours of the vessel reaching 70 ºC. The 2-Hour Completion Time recognizes that a formal MODE change declaration may require completion of activities that cannot be completed IMMEDIATELY. Required Actions C.1 and C.2 ensure that the activities necessary to place the SRAT, SME, and DWTT in a stable condition are initiated IMMEDIATELY. This Completion Time allows adequate time to cool the SRAT, SME, and DWTT and to safely transition to STANDBY. The Completion Time recognizes that actions to place the SRAT, SME, and DWTT in STANDBY are underway.

D.1

A NOTE for LCO 3.0.4 exception allows MODE change if PI-1233 is inoperable because the indicator has no effect on OPERABILITY or function of the Primary Purge System. The increased frequency of monitoring Safety Grade nitrogen inventory for unexpected depletion will provide assurance that Primary Purge source is supplying the purge flow.

Condition D is entered if the CPC Purge Header Pressure Indicator PI-1233 is inoperable. With PI-1233 being inoperable, the ability to ensure that the primary purge system is supplying the required purge, is compromised. The intent of Required Action D.1 is to verify that Safety Grade nitrogen system is not supplying the purge flow. This can be verified by one or more means such as: monitoring Safety Grade nitrogen inventory, verifying operation of primary air compressors, monitoring bulk nitrogen system, or absence of frosting on Safety Grade nitrogen vaporizer lines. To increase assurance and to maintain the required Safety Grade nitrogen source inventory, the Required Action shall be performed within 1 hour and every 4 hours thereafter. The Completion Time is an increase from the normal frequency of every 12 hours.

(continued)

BASES

ACTIONS (continued)

D.2

The Required Action D.2 ensures that the inoperable instrument PI-1233 is restored within 72 hours. During the restoration period, all affected PROCESS AREAS may remain in their current MODE provided the compensatory measures taken in Required Action D.1 are satisfied. The 72-Hour Completion Time is acceptable based upon the required inventory of the Safety Grade Nitrogen system and the compensatory measures taken in Required Action D.1. If the PI is not restored to OPERABLE status within 72 hours, Condition C shall be entered.

SURVEILLANCE REQUIREMENTS

SR 4.1.3.1

The purge flow rate to the SRAT shall be verified every 12 hours to be greater than or equal to 222 scfm. This value is determined by FI-3034A and FI-3034B. The 12-Hour surveillance is considered adequate to track and trend instrument performance. This verification ensures that the minimum required flow rate is present to dilute the flammable gas produced in the SRAT. The actual readings of the purge flow must be obtained from flow equipment that is within the required INSTRUMENT LOOP CALIBRATION frequency listed in LCO 3.1.6. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

SR 4.1.3.2

The purge flow to the SME shall be verified every 12 hours to be greater than or equal to 86 scfm. This value is determined by FI-8856A and FI-8856B. The 12-Hour surveillance is considered adequate to track and trend instrument performance. This verification ensures that the minimum required flow is present to dilute the flammable gas produced in the SME. The actual readings of the purge flow must be obtained from equipment that is within the required INSTRUMENT LOOP CALIBRATION frequency listed in LCO 3.1.6. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.3.3

The purge flow to the SMECT shall be verified every 12 hours to be greater than or equal to 12 scfm. This value is determined by FI-3144A and FI-3144B. The 12-Hour surveillance is considered adequate to track and trend instrument performance. This verification ensures that the minimum required flow rate is present to dilute the flammable gas produced in the SMECT in the event of solids carryover from the SRAT or SME. The actual readings of the purge flow must be obtained from equipment that is within the required INSTRUMENT LOOP CALIBRATION frequency listed in LCO 3.1.6. Failure to meet the requirements of this SR requires entering Condition B of this LCO.

SR 4.1.3.4

The CPC Purge header pressure shall be verified every 12 hours to be greater than or equal to 72 psig. This value is determined by reading PI-1233. The 12-Hour surveillance is considered adequate to track and trend instrument performance. This verification ensures that the required purge is from the Primary Purge system and thus the purge from the Safety Grade purge system is not being used. Failure to meet the requirements of this SR requires entering Condition C of this LCO.

SR 4.1.3.5

The CPC Purge Header Pressure Indicator PI-1233 shall have an INSTRUMENT LOOP CALIBRATION performed at least every 1 year. Performance of this SR ensures that the instrumentation is maintained in a sufficiently accurate condition. The calibration involves response testing of the instrument over the full range with the known values. The yearly INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition D of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.3.6

The purge flow rate to the DWTT shall be verified every 12 hours to be greater than or equal to 61 scfm. This value is determined by FE-6167, which has its output at FI-6167A and at FI-6167B. The 12-Hour surveillance is considered adequate to track and trend instrument performance. This verification ensures that the minimum required flow rate is present to dilute the flammable vapors produced in the DWTT. The actual readings of the purge flow must be obtained from equipment that is within the required INSTRUMENT LOOP CALIBRATION frequency listed in LCO 3.1.6. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

(continued)

BASES

REFERENCES

1. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U), WSRC-SA-6.

2. Instrumentation Uncertainties Evaluation Loop: S350-FI-3034A and FI-3034B SRAT Purge Flow Indicators (U), J-CLC-S-00147.

3. Deleted.

4. Deleted.

5. Determination of TSR Setpoints for CPC Nitrogen System for SDI, U-CLC-S-00031.

6. Instrumentation Uncertainties Evaluation Loop: S350-FI-8856A and FI-8856B SME Purge Flow Indicators (U), J-CLC-S-00152.

7. Deleted.

8. Deleted.

9. Instrument Uncertainties Evaluation Loop: S350-FI-3144 A and FI-3144B SMECT Purge Flow Indicators (U), J-CLC-S-00159.

10. Instrument Uncertainties Evaluation CPC Purge Header Pressure S350-PI-1233, J-CLC-S-00126.

11. Instrument Uncertainties Evaluation Loop: S395-FI-6167A and FI-6167B DWTT Purge Flow Indicators (U), J-CLC-S-00153.

12. Purge Requirements for the Sludge Receipt and Adjustment Tank, X-CLC-S-00308.

13. Purge Requirements for the Slurry Mix Evaporator, X-CLC-S-00309.

14. Purge Requirements for the Slurry Mix Evaporator Condensate Tank, X-CLC-S-00311.

15. Purge Requirements for the Decontaminated Waste Treatment Tank, X-CLC-S-00314.

16. Recovery Time and Purge Volumes for DWPF Tanks with Antifoam Degradation Products, S-CLC-S-00159.

17. Evaluation of Inclusion of Antifoam Degradation Products in Current Flammability Strategy, X-CLC-S-00353.

B 3/4.1 CPC/SPC FLAMMABILITY CONTROL

B 3.1.4 SRAT, SME, SMECT, and DWTT Flammability Control - Limited Processing, Standby, and Shutdown

BASES

BACKGROUND SUMMARY	In performing the DWPF mission, several Chemical Process Cell (CPC) operations result in the production of flammable gas which, if ignited, could cause a significant release of radioactive material. The CPC process vessels identified in the accident analysis which possess the potential to explode and cause a release of radioactive material include the SRAT, SME, SMECT, and DWTT. During LIMITED PROCESSING, STANDBY, and SHUTDOWN in the SRAT, SME, SMECT, and DWTT, an appreciable amount of hydrogen is generated via the following mechanisms: radiolytic, thermolytic, and catalytic decomposition in each of the process vessels. Additionally, in the DWTT de minimis quantities of Isopar L were accounted for. The CPC process vessels have a purge supply that provides either air or nitrogen gas to dilute the produced flammable gases below their established LFL/CLFL safety values. An additional flammability concern is from antifoam degrading into flammable degradation products and off gassing in the SRAT, SME, and SMECT.
APPLICATION TO SAFETY ANALYSIS	The accident analyses indicate that an explosion in the SRAT, SME, SMECT, or DWTT can produce significant radiological consequences for the onsite worker. The SRAT, SME, SMECT, and DWTT are predicted to fail as a result of the calculated pressure generated by a hydrogen explosion (FSAR Sections 9.4.2.1). The FSAR assumes that the progression of the event has the potential to damage other tanks within the CPC, either by the ejection of fragments or by the dislodging of cell covers. The requirements of this LCO ensure that the flammable fuel concentration of the SRAT, SME, and DWTT are maintained less than 95% of the CLFL by ensuring a minimum purge through the vessels at boiling temperatures. This purge flow is also sufficient to maintain the flammable fuel concentrations less than 25% of the CLFL in conjunction with STANDBY, LIMITED PROCESSING and SHUTDOWN definition temperature requirements. Ensuring the minimum purge to the SMECT will maintain its vapor space less than or equal to 95% of the CLFL based on incredible conditions and 25% of the CLFL for the bounding set of conditions.

(continued)

BASES

LCO

This LCO requires a purge source during LIMITED PROCESSING, STANDBY, and SHUTDOWN. This ensures that a flammable mixture cannot be formed in the vessels by maintaining the flammable fuel concentration less than or equal to 25% of the LFL/CLFL, in conjunction with LIMITED PROCESSING, STANDBY, and SHUTDOWN definition temperature requirements, for the SRAT, SME, and DWTT, and 95% of the LFL/CLFL for the SMECT. Due to flammable gas generation, a buildup of flammable vapors to the LFL/CLFL is possible while the CPC process vessels are in LIMITED PROCESSING, STANDBY, and SHUTDOWN.

The LCO limit for the SRAT, SME, and DWTT purge flows will limit the concentrations of flammable gases to 95% of the LFL/CLFL at boiling conditions.

The purge flows are the minimum amount needed for each vessel to remain less than or equal to 95% of the established LFL/CLFL in the SRAT, SME, and DWTT.

This LCO ensures the Safety Analysis value of 112 scfm for SRAT purge is met by implementing a limit of 142 scfm (Ref. 5). SRAT purge flow is monitored at FI-3034A and FI-3034B (Ref. 2). This LCO ensures the Safety Analysis value of 41 scfm for SME purge is met by implementing a limit of 51 scfm (Ref. 5). SME purge flow is monitored at FI-8856A and FI-8856B (Ref. 6). This LCO ensures the Safety Analysis value of 16 scfm for DWTT purge is met by implementing a limit of 23 scfm (Ref. 5). DWTT purge flow is monitored at FI-6167A and FI-6167B (Ref. 10). There is no margin of safety associated with the instrumented purge flow LCO values as the minimum purge flows for the SRAT, SME, and DWTT during LIMITED PROCESSING, STANDBY, and SHUTDOWN are based on peak hydrogen production rates assuming the maximum temperatures in the SRAT, SME, and DWTT. These flows are the minimum needed for each process vessel to remain less than or equal to 95% of the LFL/CLFL.

The LCO limit for the SMECT purge flow will limit the gaseous concentrations of flammable gas to less than or equal to 95% of the CLFL. This LCO ensures the Safety Analysis value of 8.5 scfm for SMECT purge is met by implementing a limit of 12 scfm (Ref. 5). SMECT purge flow is monitored at FI-3144A and FI-3144B (Ref. 9).

(continued)

BASES

LCO (continued)	Analysis has shown current design basis purge requirements for the SRAT, SME, and SMECT continue to control flammability when flammables other than hydrogen (e.g., ADPs) are generated (Ref. 16); ADPs are not of concern in the DWTT.
MODE APPLICABILITY	This LCO applies when the SRAT, SME, and DWTT generate a reduced amount of hydrogen gas (i.e. the temperature is less than or equal to 70 ºC). Therefore, this LCO is only applicable during STANDBY and SHUTDOWN in the SRAT and SME and LIMITED PROCESSING, STANDBY, and SHUTDOWN in the DWTT. Material may have been carried over to the SMECT, therefore, the SMECT purge must be maintained while the SRAT and SME are in STANDBY or SHUTDOWN. The SMECT does not process and therefore does not have any specified MODES.
PROCESS AREA APPLICABILITY	This LCO is applicable to the SRAT, SME, and DWTT which are located in the CPC. The SMECT does not process and therefore is not considered a PROCESS AREA. However, the SMECT purge requirement is applicable while in the following situations: 1) the SRAT and SME are in STANDBY or SHUTDOWN; 2) the SRAT is in STANDBY or SHUTDOWN and the SME is in DEINVENTORIED; or 3) the SME is in STANDBY or SHUTDOWN and the SRAT is in DEINVENTORIED. The FSAR analysis indicates that an explosion in any of these vessels can occur and have significant impacts.
ACTIONS	A.1 The NOTE-1 does not require entry into Condition A if one of the flow instruments measuring purge flow to the vessel is inoperable (covered in LCO 3.1.6). The NOTE-2 requires purge flow to be maintained until the minimum amount of vessel purge volume per Table 3.1.4-2 has been supplied. The time for minimum vessel purge volume is calculated by dividing the purge volume required by Table 3.1.4-2 with the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty) re-established per Required Action A.1. This delay in exiting Condition A will protect the assumptions on which the recovery time is based. When the purge flow rate, as indicated by an OPERABLE flow instrument, is less than 142 scfm to the SRAT or 51 scfm to the SME or 12 scfm to the SMECT or 23 scfm to the DWTT, continued flammable gas generation could cause the exceedance of LFL/CLFL in the SRAT, SME, SMECT, or DWTT. The SRAT purge flow is indicated by

(continued)

ACTIONS (continued)

A.1 (continued)

FI-3034A and at FI-3034B. The SME purge flow is indicated by FI-8856A and at FI-8856B. FI-3144A and FI-3144B indicate the SMECT purge flow. FI-6167A and FI-6167B indicate the DWTT purge flow.

The purge system upset conditions that lead to low purge flows on all supported vessels are typically first noted by multiple DCS alarm conditions for the SRAT, SME, DWTT, and MFT (low purge flow alarmed vessels). This condition can be verified by observation of multiple low flow indications locally at the purged vessels. CPC primary purge header flow indication can also be used to provide assurance of a stable, consistent purge flow to the CPC vessels. Either of these indications may be used to determine flow transient durations or when validating purge system steady state flow conditions when monitoring for vapor space turnover times. Field observations of the local indicators are used to confirm the actual purge flow loss or to verify restoration of adequate purge flow.

The Completion Time associated with this Required Action is based upon calculations performed to determine how long a process vessel could be without purge flow and the flammable concentration remain less than 100% of the LFL/CLFL assuming the temperature is maintained within the temperature requirements of the Table 3.1.4-1.

Table 3.1.4-1 specifies the recovery time associated with the SRAT, SME, SMECT, and DWTT. This table is based upon the time it takes for the vessel to reach 100% LFL/CLFL. The Completion Time for restoration is directly dependent on the temperature and the volume of the contents in the vessel.

The Completion Time for Required Action A.1 is preceded by a NOTE which provides guidance for determining the recovery time if purge flow is less than the LCO requirement again prior to completing the required purge volume as determined per Table 3.1.4-2. In this case the flammable vapors in the vessel(s) may be greater than the flammable concentration at the time of initial inadequate purge. Therefore, the time to reach 100% LFL/CLFL from this elevated level is less than that determined initially. The NOTE requires that subsequent Completion Time be reduced by the amount of time already used to account for the higher starting point. The time allowed to restore the purge is determined as follows:

(continued)

BASES

ACTIONS (continued)

A.1 (continued)

- the calculated recovery time from the Table 3.1.4-1 minus the cumulative recovery time(s) used in the previous attempt(s), or
- if temperature or volume has increased, the more restrictive calculated recovery time for those conditions minus the cumulative recovery time(s) used in the previous attempt(s).

The NOTE in Table 3.1.4-1 requires that conservative values for liquid temperature and volume are to be used at all times in determination of recovery time. Therefore, if vessel temperature or volume falls between two values listed in the table, then the higher value is chosen because the higher temperature reduces the LFL/CLFL and higher volume reduces the tank vapor space. The values used for the recovery time determination are the liquid temperature and volume that existed prior to entry into this Condition. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach flammable conditions. This will ensure the vessel does not reach a flammable mixture within the recovery time. Recovery times are not re-calculated for conditions that decrease the liquid temperature or volume during purge recovery.

NOTE-1 in Table 3.1.4-2 addresses less than the LCO requirement of purge for 5 minutes or less. This reduction in purge could be a single event or multiple events within the 5-minute period. The NOTE establishes that if the purge flow is restored within 5 minutes, then maintaining the minimum purge flow continuously to the vessel for a period of twenty minutes satisfies the required purge volume. References 14 and 15 determined that for 5 minutes of less than the LCO requirement of purge, continuous purge of the vessel at the minimum required purge flow rate for 20 minutes will reduce the flammable concentration in the vessel to within 10% of that existing prior to the loss or reduction of purge. This duration is based on the bounding vessel liquid volume and temperature.

However, if purge is less than the LCO requirement again during the 20 minutes, the purge flow shall be maintained until the purge has supplied the minimum vessel purge volume per Table 3.1.4-2.

(continued)

BASES

ACTIONS (continued)

A.1 (continued)

The following examples provide additional guidance:

Example-1: The purge flow for a vessel is less than the LCO requirement at 1500 hours, purge is restored at 1502 hours, purge is continuous for 20 minutes; the applicable LCO can be exited.

Example-2: The purge flow for a vessel is less than the LCO requirement at 1500 hours, purge is restored at 1502 hours, purge flow is less than the LCO requirement again at 1503 hours and restored at 1504 hours, purge is continuous for 20 minutes; the applicable LCO can be exited.

Example-3: The purge flow for a vessel is less than the LCO requirement at 1500 hours, purge is restored at 1502 hours, purge flow is less than the LCO requirement again at 1503 hours and restored at 1506 hours. Use the applicable tables for the recovery time and required purge volume prior to exiting the applicable LCO.

Example-4: The purge flow for a vessel is less than the LCO requirement at 1500 hours, purge is restored at 1504 hours and purge is continuous for 15 minutes then is less than the LCO requirement again. Use the applicable table for the recovery time and required purge volume prior to exiting the applicable LCO.

NOTE-2 in Table 3.1.4-2 requires that conservative values for liquid temperature and volume are to be used at all times in determination of required purge volume. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (lower temperature is conservative) and volume (lower volume is conservative) shall be used. The values used for the purge volume determination are the liquid temperature and volume that existed at the time of re-establishing the required purge flow. The purge volume must be re-determined if the liquid temperature or volume decreases, as these conditions increase the required purge volume.

NOTE-3 in Table 3.1.4-2 provides guidance for calculating the purge time. The purge time can be obtained by dividing the purge volume (required by Table 3.1.4-2) by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 4.1.4.1

The purge flow rate to the SRAT shall be verified every 12 hours to be greater than or equal to 142 scfm. SRAT purge flow is indicated on FI-3034A and FI-3034B. This verification ensures that the minimum required flow rate is present to dilute the flammable gas produced in the SRAT. The actual readings of the flows must be obtained from equipment that is within the required INSTRUMENT LOOP CALIBRATION frequency listed in LCO 3.1.6 requirements. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

SR 4.1.4.2

The purge flow rate to the SME shall be verified every 12 hours to be greater than or equal to 51 scfm. SME purge flow is indicated on FI-8856A and at FI-8856B. This verification ensures that the minimum required flow rate is present to dilute the flammable gas produced in the SME. The actual readings of the flows must be obtained from equipment that is within the required INSTRUMENT LOOP CALIBRATION frequency listed in LCO 3.1.6. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

SR 4.1.4.3

The purge flow rate to the SMECT shall be verified every 12 hours to be greater than or equal to 12 scfm. SMECT purge flow is indicated on FI-3144A and FI-3144B. The 12-Hour surveillance is considered adequate to track and trend instrument performance. This verification ensures that the minimum required flow rate is present to dilute the flammable gas produced in the SMECT in the event of solids carryover from the SRAT or SME. The actual readings of the flows must be obtained from equipment that is within the required INSTRUMENT LOOP CALIBRATION frequency listed in LCO 3.1.6. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.4.4

The purge flow rate to the DWTT shall be verified every 12 hours to be greater than or equal to 23 scfm. DWTT purge flow is indicated on FI-6167A and FI-6167B. This verification ensures that the minimum required flow rate is present to dilute the flammable vapors in the DWTT. The actual readings of the flows must be obtained from equipment that is within the required INSTRUMENT LOOP CALIBRATION frequency listed in LCO 3.1.6 requirements. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

REFERENCES

1. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U), WSRC-SA-6.

2. Instrumentation Uncertainties Evaluation Loop: S350-FI-3034A and FI-3034B SRAT Purge Flow Indicators (U), J-CLC-S-00147.

3. Deleted.

4. Deleted.

5. Determination of TSR Setpoints for CPC Nitrogen System for SDI, U-CLC-S-00031.

6. Instrumentation Uncertainties Evaluation Loop: S350-FI-8856A and FI-8856B SME Purge Flow Indicators (U), J-CLC-S-00152.

7. Deleted.

8. Deleted.

9. Instrument Uncertainties Evaluation Loop: S350-FI-3144 A and FI-3144B SMECT Purge Flow Indicators (U), J-CLC-S-00159.

10. Instrument Uncertainties Evaluation Loop: S395-FI-6167A and FI-6167B DWTT Purge Flow Indicators (U), J-CLC-S-00153.

11. Purge Requirements for the Sludge Receipt and Adjustment Tank, X-CLC-S-00308.

(continued)

BASES

REFERENCES (continued)

12. Purge Requirements for the Slurry Mix Evaporator, X-CLC-S-00309.

13. Purge Requirements for the Slurry Mix Evaporator Condensate Tank, X-CLC-S-00311.

14. Purge Requirements for the Decontaminated Waste Treatment Tank, X-CLC-S-00314.

15. Recovery Time and Purge Volumes for DWPF Tanks with Antifoam Degradation Products, S-CLC-S-00159.

16. Evaluation of Inclusion of Antifoam Degradation Products in Current Flammability Strategy, X-CLC-S-00353.

B 3/4.1 CPC/SPC FLAMMABILITY CONTROL

B 3.1.5 MFT and RCT Flammability Control

BASES

BACKGROUND SUMMARY

The CPC process vessels identified in the accident analysis which possess the potential to explode and cause a release of radioactive material include the MFT and RCT. The CPC process vessels have a purge supply that provides either air or nitrogen gas to dilute the produced flammable gases below their established LFL safety values. The purge systems maintain the MFT less than or equal to 95% of the CLFL for hydrogen and organics from ADPs and the RCT less than or equal to 25% of the CLFL for hydrogen, Isopar L, and ADPs.

The purge can be supplied by either of the two sources, the Primary Purge System or the Safety Grade Nitrogen System. Both of these sources can provide the necessary purge flow to meet the LCO requirements.

The purge is sufficient to maintain the vessel vapor less than the flammable concentrations.

APPLICATION TO SAFETY ANALYSIS

The accident analyses indicate that an explosion in the MFT and/or RCT can produce significant radiological consequences for the onsite worker. The MFT and/or RCT is predicted to fail as a result of the calculated pressure generated by a hydrogen explosion (FSAR Section 9.4.2.1). The FSAR assumes that the progression of the event has the potential to damage other tanks within the CPC, either by the ejection of fragments or by the dislodging of cell covers.

The requirements of this LCO ensure that the flammable fuel concentration of the MFT is maintained less than or equal to 95% of the CLFL and that the RCT is maintained less than or equal to 25% of the CLFL, by ensuring a minimum purge through the vessels.

LCO

This LCO requires a purge source to be in service satisfying the purge flow rate requirements below. Due to hydrogen and ADP generation in the MFT and RCT and the presence of Isopar L in the RCT, a buildup of flammable gas to the CLFL is possible in the MFT or RCT.

(continued)

BASES

LCO (continued)	The LCO limit for the MFT purge flow is based upon the premise that the purge flow will limit the gaseous concentrations of hydrogen to 95% of the CLFL. This LCO ensures the Safety Analysis value of 41 scfm for MFT purge is met by implementing a limit of 49 scfm (Ref. 7). MFT purge flow is indicated at FI-0687A and FI-0687B (Ref. 2). There is no margin of safety associated with the instrumented purge flow LCO value as the minimum purge flow for the MFT is based on peak hydrogen production rates assuming the maximum temperatures (boiling) in the process vessels. The LCO limit for the RCT purge flow is based upon the premise that the purge flow will limit the gaseous concentration of flammables to 25% of the CLFL. This LCO ensures the Safety Analysis value of 5.1 scfm for RCT purge is met by implementing a limit of 7 scfm (Ref. 7). RCT purge flow is indicated at FI-6149A and FI-6149B (Ref. 8). There is no margin of safety associated with the instrumented purge flow LCO value as bounding conditions were used in the determination of the minimum purge flow for the RCT. Analysis has shown current design basis purge requirements for the tanks subject to this LCO continue to control flammability when flammables other than hydrogen (e.g., ADPs) are generated (Ref. 12). These purge flow values were chosen for processes without automatic interlock actuation to shut down a flammable mixture process.
MODE APPLICABILITY	This LCO applies when DWPF operations in the MFT or RCT could generate flammable amounts of hydrogen gas. Therefore, this LCO is applicable during OPERATION, STANDBY and SHUTDOWN.
PROCESS AREA APPLICABILITY	This LCO is applicable to the MFT and RCT which are located in the CPC. The FSAR analysis indicates that an explosion in the MFT or RCT can occur and have significant impacts on the FACILITY workers and possibly the offsite public.
ACTIONS	The NOTE-1 does not require entry into Condition A if one of the flow instruments measuring purge flow to the vessel is inoperable (covered in LCO 3.1.6). The NOTE-2 requires purge flow to be maintained until the minimum amount of vessel purge volume per Table 3.1.5-2 has been supplied prior to exiting the Condition A. The time for minimum vessel purge volume is calculated by dividing the purge volume required by Table 3.1.5-2 with

(continued)

BASES

ACTIONS (continued)

the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty) re-established per Required Action A.1. This delay in exiting Condition A will protect the assumptions on which the recovery time is based.

A.1

When the required purge flow for the MFT or RCT is not present, as indicated by an OPERABLE flow instrument, flammable concentrations of hydrogen and organics from ADPs can be created in the process vessel. The required purge flow must be restored. The Completion Time for recovering purge flow is based upon calculations performed to determine how long the process vessel could be without purge flow and the flammable concentration remain less than 100% CLFL (Ref. 11). Table 3.1.5-1 specifies the recovery time associated with the MFT and RCT. This table is based upon the time it takes for the vessel to reach 100% CLFL. The Completion Time for restoration is directly dependent on the temperature and the volume of the contents in the vessel.

The purge system upset conditions that lead to low purge flows on all supported vessels are typically first noted by multiple DCS alarm conditions for the SRAT, SME, DWTT, and MFT (low purge flow alarmed vessels). This condition can be verified by observation of multiple low flow indications locally at the purged vessels. CPC primary purge header flow indication can also be used to provide assurance of a stable, consistent purge flow to the CPC vessels. Either of these indications may be used to determine flow transient durations or when validating purge system steady state flow conditions when monitoring for vapor space turnover times. Field observations of the local indicators are used to confirm the actual purge flow loss or to verify restoration of adequate purge flow.

The Completion Time for Required Action A.1 is preceded by a NOTE which provides guidance for determining the recovery time if purge flow is less than the LCO requirement prior to completing the required purge volume as determined per Table 3.1.5-2. In this case the flammable gas concentration in the vessel(s) may be greater than the flammable gas

(continued)

BASES

ACTIONS (continued)

A.1 (continued)

concentration at the time of initial loss or reduction of purge. Therefore, the time to reach 100% CLFL from this elevated level is less than that determined initially. The NOTE requires that the subsequent Completion Time be reduced by the amount of time already used during previous attempts to restart the purge. The time allowed to restore the purge is determined as follows:

- the calculated recovery time from the Table 3.1.5-1 minus the cumulative recovery time(s) used in the previous attempt(s), or
- if temperature or volume has increased, the more restrictive calculated recovery time for those conditions minus the cumulative recovery time(s) used in the previous attempt(s).

The NOTE in the Table 3.1.5-1 requires that conservative values for liquid temperature and volume are to be used at all times in determination of recovery time. Therefore, if vessel temperature or volume falls between two values listed in the table, then the higher value is chosen because the higher temperature reduces the CLFL and higher volume reduces the tank vapor space. The values used for the recovery time determination are the liquid temperature and volume that existed prior to entry into this Condition. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach CLFL. This will ensure the vessel does not reach a flammable mixture within the recovery time. Recovery times are not re-calculated for conditions that decrease the liquid volume or temperature during purge recovery.

(continued)

BASES

ACTIONS (continued)

A.1 (continued)

NOTE-1 in Table 3.1.5-2 addresses less than the LCO requirement of purge for 5 minutes or less. This reduction in purge could be a single event or multiple events within the 5-minute period. The NOTE establishes that if the purge flow is restored within 5 minutes, then maintaining the minimum purge flow continuously to the vessel for a period of twenty minutes satisfies the required purge volume. Reference 11 determined that for 5 minutes of less than the LCO requirement of purge, continuous purge of the vessel at the minimum required purge flow rate for 20 minutes will reduce the flammable concentration in the vessel to within 10% of that existing prior to the loss or reduction of purge. This duration is based on the bounding vessel liquid volume and temperature.

However, if purge is less than the LCO requirement again during the 20 minutes, the purge flow shall be maintained until the purge has supplied the minimum vessel purge volume per Table 3.1.5-2.

The Bases for LCO 3.1.4 provides examples for additional guidance for applying this NOTE.

NOTE-2 in Table 3.1.5-2 requires that conservative values for liquid temperature and volume are to be used at all times in determination of required purge volume. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (lower temperature is conservative) and volume (lower volume is conservative) shall be used. The values used for the purge volume determination are the liquid temperature and volume that existed at the time of re-establishing the required purge flow. The purge volume must be re-determined if the liquid temperature or volume decreases, as these conditions increase the required purge volume.

NOTE-3 in Table 3.1.5-2 provides guidance for calculating the purge time. The purge time can be obtained by dividing the purge volume (required by Table 3.1.5-2) by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 4.1.5.1

This SR has been deleted.

SR 4.1.5.2

The purge flow to the MFT shall be verified every 12 hours to be greater than or equal to 49 scfm. MFT purge flow is indicated on FI-0687A and FI-0687B. This verification ensures that the minimum required flow is present to dilute the flammable gas produced in the MFT. The readings of the purge flow must be obtained from flow equipment that is within the required INSTRUMENT LOOP CALIBRATION frequency listed in LCO 3.1.6. The 12-Hour surveillance frequency is considered adequate to track and trend the instrument performance. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

SR 4.1.5.3

The purge flow to the RCT shall be verified every 12 hours to be greater than or equal to 7 scfm. RCT purge flow is indicated at FI-6149A and FI-6149B. This verification ensures that the minimum required flow is present to dilute the flammable gas produced in the RCT. The readings of the purge flow must be obtained from flow equipment that is within the required INSTRUMENT LOOP CALIBRATION frequency listed in LCO 3.1.6. The 12-Hour surveillance frequency is considered adequate to track and trend the instrument performance. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

(continued)

BASES

REFERENCES

1. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U), WSRC-SA-6.

2. Instrumentation Uncertainties Evaluation Loop: S350-FI-0687A and FI-0687B MFT Purge Flow Indicators (U), J-CLC-S-00157.

3. Deleted.

4. Deleted.

5. Deleted.

6. Deleted.

7. Determination of TSR Setpoints for CPC Nitrogen System for SDI, U-CLC-S-00031.

8. Instrument Uncertainties Evaluation Loop: S395-FI-6149A and FI-6149B RCT Purge Flow Indicators (U), J-CLC-S-00154.

9. Purge Requirements for the Melter Feed Tank, X-CLC-S-00310.

10. Purge Requirements for the Recycle Collection Tank, X-CLC-S-00315.

11. Recovery Time and Purge Volumes for DWPF Tanks with Antifoam Degradation Products, S-CLC-S-00159.

12. Evaluation of Inclusion of Antifoam Degradation Products in Current Flammability Strategy, X-CLC-S-00353.

B 3/4.1 CPC/SPC FLAMMABILITY CONTROL

B 3.1.6 CPC Purge Source

BASES

BACKGROUND SUMMARY

In performing the DWPF mission, several Chemical Process Cell (CPC) / Salt Process Cell (SPC) operations result in the production of flammable gases (hydrogen and/or volatile organics) which, if ignited, could cause a significant release of radioactive material. The CPC/SPC process vessels identified in the accident analysis which possess the potential to explode and cause a release of radioactive material are the SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, and MFT.

To prevent an explosion in any of these vessels, the Safety Analysis requires the safety grade purge system to remove flammable fuels being produced in these tanks.

The above CPC/SPC process vessels have a purge supply that provides a motive force of air or nitrogen gas to maintain the produced hydrogen and/or volatile organic gas concentrations below the established CLFL safety values. The SEFT and PRFT also have temperature controls and interlocks to limit the concentration of organic vapor in the vessels' vapor space. Additional accident analysis assumptions were provided to lower the flammable gas production rates and thus prevent an explosion in a process vessel. Interlocks on the isolation of steam supply and the isolation of Nitric & Formic acid additions are provided for the SRAT and SME. Additionally, operator actions are taken to terminate the transfers.

The CPC purge supply utilizes two sources of purge flow (Primary and Safety Grade) that dilute the gas mixtures produced in the CPC/SPC process vessels. The primary purge source uses air and/or nitrogen. The Safety Grade purge source uses nitrogen and is required to be available because the manual and/or automatic actions taken following a failure of the primary purge source do not result in the instantaneous cessation of flammable gas production due to the elevated temperature of the vessel(s). The Safety Grade purge source has capacity based upon the time required to maintain CPC/SPC nitrogen purge after a DBA event.

(continued)

BASES

BACKGROUND SUMMARY (continued)

The safety grade purge source allows the SRAT, SME, and DWTT to possess adequate purge flow not to exceed 95% LFL during shutdown of the process vessels in the event the normal purge source fails or during design basis events. While in LIMITED PROCESSING or STANDBY, the hydrogen production rate is slowed but not totally stopped because radiolytic decomposition is still occurring.

The electrical equipment for the air is not supplied with standby power; therefore, a loss of normal power will cause the loss of the air compressors. The primary purge source will continue to supply the purge header until the pressure in the supply line falls below the pressure of the safety grade nitrogen supply source. At this point, the pressure control valve in the safety grade nitrogen supply line opens to allow the safety grade purge supply to the process vessels.

The safety grade source utilizes nitrogen from a dedicated CPC supply. The system is pressurized to the final pressure control valve (primary purge/safety grade nitrogen interface). Upon low pressure in the CPC primary purge, the safety grade nitrogen gas will begin to discharge into the purge header and provide purge flow to the process vessels.

The safety grade purge source does not need standby power to operate and is sized to maintain necessary dilution purge flows to process vessels. The primary purge header and safety grade nitrogen purge header are inter-related and share the same inlet piping to the process vessels.

The required purge flow is provided through a manual purge flow control valve. The valve is set to provide at least the minimum purge flow value for STANDBY.

Purge flow instrumentation loops are provided for the SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, and MFT to ensure proper purge flows are maintained to prevent exceeding the CLFL in the process vessels. The flow control loop on the SRAT and SME has hardwired interlock capabilities to stop processing. The interlock actions are similar to those that occur with a high LFL concentration. Different purge flow setpoints are provided for each process vessel based upon the gas production rates.

The Safety Grade Level instruments on the nitrogen tanks needed to meet the minimum inventory are required to be in the TSR to enable verification of the minimum required inventory of the safety grade purge source.

(continued)

BASES

APPLICATION TO SAFETY ANALYSIS

The accident analyses indicate that an explosion in the SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, or MFT could produce significant radiological consequences for the onsite worker. The SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, and MFT are predicted to fail as a result of the calculated pressure generated by a hydrogen explosion (FSAR Section 9.4.2.1). The FSAR assumes that the progression of the event has the potential to damage other tanks within the CPC/SPC, either by the ejection of fragments or by the dislodging of cell covers.

The low purge flow interlock is relied upon in the accident analysis to ensure that the flammable concentration of hydrogen and/or volatile organics does not accumulate in the process vessels. In the event that the purge flow drops below the required flow, this LCO requires hardwired interlock features to perform the same interlock functions as a high LFL level. There are no purge flow interlock functions on the SEFT, PRFT, SMECT, RCT, DWTT, or MFT.

LCO

This LCO requires the safety grade nitrogen purge source to be OPERABLE and capable of maintaining proper dilution flow rates to the CPC/SPC vessels. The safety grade nitrogen purge source provides the necessary dilution rate in the event the primary purge source fails and is a dedicated nitrogen purge source that is available for 96 hours after a DBA.

OPERABILITY of the safety grade nitrogen purge source to the CPC/SPC vessels can be verified by ensuring that the proper amount of liquid nitrogen is available to sustain 96 hours of STANDBY purge flows and that the pressure control valve required for swap-over will open to allow nitrogen purge flow. The primary purge/nitrogen pressure control valve must open when the Primary Purge header pressure drops. There is no margin of safety associated with the instrumented level value as the minimum required volume in the safety grade storage tanks is based on a maximum measured usage at the process vessels local flow indicators per Safety Grade Nitrogen Purge System setup flow for 24 hours and STANDBY flow for 72 hours, check valve leakage, and system leakage (Ref. 4). This requires a nitrogen capacity of at least 900 in. wc in the safety grade nitrogen storage tanks (Ref. 4). This inventory is implemented as 936 in. wc to account for the total CPC and SPC nitrogen inventory uncertainty of ± 36.0 in. wc (Ref. 8). Manual Valves, which could inhibit the operation of the purge system, shall be administratively controlled.

(continued)

BASES

LCO (continued)

The Safety Grade nitrogen purge system includes redundant pressure control valves which maintain the required purge supply pressure to the process vessels. Failure of either pressure control valve compromises the required redundancy for these components. Therefore, both pressure control valves are required to be OPERABLE. The safety grade nitrogen pressure control valves must be set greater than 63 psig to protect the safety grade nitrogen inventory. The safety grade nitrogen system is assumed to be actuated when the CPC purge header pressure with associated instrument uncertainty (Ref. 7) is less than 69 psig. Accounting for instrument calibration accuracy using IPI or M&TE, +/- 1 psig or better, the safety grade nitrogen pressure control valves are set between 64 and 68 psig.

In the event that the SRAT and SME purge flow rates drop below these setpoints, this LCO requires hardwired interlock features to stop processing in these process vessels. There are no purge flow interlocks for the SEFT, PRFT, SMECT, RCT, DWTT, or MFT. To be OPERABLE, the instrument loop must be INSTRUMENT LOOP CALIBRATED to ensure proper actuation at the correct setpoint and correct purge flow rate indications.

Level instrumentation on each of the Safety Grade nitrogen storage tanks is considered part of the nitrogen purge source, because it is needed for Safety Grade System inventory determination. Therefore, this instrumentation is required to be OPERABLE. Only the instrumentation on the nitrogen tanks required to meet the minimum inventory requirements is required to be OPERABLE. This means that if the tank level indicators are inoperable on a tank, the sum of the usable nitrogen inventory in the remaining tanks that do have OPERABLE tank level indication shall be greater than or equal to 936 inches. The inoperable tank level indicators are not considered to be “required” and therefore this LCO is not required to be entered.

(continued)

BASES

LCO (continued) The SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, and MFT purge supply lines include redundant pressure control valves which maintain the required purge supply pressure to these vessels. The pressure to the SEFT and PRFT purge supply lines must be maintained between 13.5 and 25 psig to ensure accurate purge flow indication (Ref. 5, 6). Accounting for instrument calibration accuracy using IPI or M&TE, +/- 1 psig or better, the SEFT and PRFT purge pressure control valves should be set between 15 and 24 psig. The pressure to the SRAT purge supply lines must be maintained between 37 and 65 psig (Ref. 11). Accounting for instrument calibration accuracy using IPI or M&TE, +/- 1 psig or better, the SRAT purge pressure control valves should be set between 38 and 64 psig. The pressure to the SME purge supply lines must be maintained between 20 and 36 psig (Ref. 12). Accounting for instrument calibration accuracy using IPI or M&TE, +/- 1 psig or better, the SME purge pressure control valves should be set between 21 and 35 psig. The pressure to the SMECT purge supply lines must be maintained between 28 and 44 psig (Ref. 13). Accounting for instrument calibration accuracy using IPI or M&TE, +/- 1 psig or better, the SMECT purge pressure control valves should be set between 29 and 43 psig. The pressure to the RCT purge supply lines must be maintained between 27 and 45 psig to ensure accurate purge flow indication (Ref. 10). Accounting for instrument calibration accuracy using IPI or M&TE, +/- 1 psig or better, the RCT purge pressure control valves should be set between 28 and 44 psig. The pressure to the DWTT purge supply lines must be maintained between 27 and 45 psig to ensure accurate purge flow indication (Ref. 9). Accounting for instrument calibration accuracy using IPI or M&TE, +/- 1 psig or better, the DWTT purge pressure control valves should be set between 28 and 44 psig. The pressure to the MFT purge supply lines must be maintained between 21 and 37 psig (Ref. 14). Accounting for instrument calibration accuracy using IPI or M&TE, +/- 1 psig or better, the MFT purge pressure control valves should be set between 22 and 36 psig. Failure of either pressure control valve for the SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, and/or MFT compromises the required redundancy for these components. Therefore, both pressure control valves for each vessel are required to be OPERABLE. The installed purge pressure monitoring instrumentation's active function to indicate pressure is not required to be OPERABLE for the associated purge flow meters to be considered OPERABLE.

(continued)

BASES

MODE APPLICABILITY	This LCO applies when DWPF operations in the SEFT, PRFT, SRAT, SME, RCT, DWTT, and MFT could generate hydrogen and/or volatile organic gas mixtures. Therefore, this LCO is applicable during OPERATION, LIMITED PROCESSING, STANDBY, and SHUTDOWN. The SMECT does not process and therefore does not have any specified MODES.
PROCESS AREA APPLICABILITY	This LCO is applicable to the SEFT, SRAT, SME, RCT, DWTT, and MFT, which are located in the CPC, and the PRFT, which is located in the SPC. The SMECT does not process and therefore is not considered a Process Area. However, the SMECT purge requirement is applicable while the SRAT or SME is in OPERATION, STANDBY, or SHUTDOWN. The FSAR analysis indicates that an explosion in any of these vessels can occur and have significant impacts on the FACILITY workers and possibly the offsite public.

(continued)

BASES

ACTIONS

A.1.1 or A.1.2

With the Safety Grade nitrogen purge system not being capable of supplying the required standby purge flow to the SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT or MFT the DWPF FACILITY has degraded purge source capability for flammability control. This Condition is limited to the incapability of the system to supply one or more individual vessel(s); failure of the system as a whole is addressed in Condition B. Therefore, Required Actions shall be taken within 1 hour to verify the status of the purge sources.

Required Actions A.1.1 and A.1.2 verify the purge flows to the affected CPC/SPC vessels are within the limits of the LCO 3.1.3, 3.1.4, 3.1.5, or 3.1.9 requirements. Successful performance of the Required Actions indicates that purge is operating properly and that the safety grade nitrogen purge source is not required to be in service. To increase assurance and to add to the basis for remaining in this degraded condition, the Required Actions shall also be performed every 4 hours thereafter. The Completion Time is an increase from the normal frequency of every 12 hours. Failure to meet the Completion Times of Required Action A.1.1 or A.1.2 requires entry into Condition I.

A.2

With the CPC Safety Grade nitrogen purge source incapable of supplying the required STANDBY purge flow to a specific vessel or vessels, the affected vessel(s) has degraded purge source capability for flammability control. Therefore, the capability of the CPC Safety Grade nitrogen purge source to supply the required STANDBY purge to the affected vessel or vessels shall be restored within 72 hours. During the restoration period, all affected PROCESS AREAS may remain in their current MODE provided the compensatory measures taken in Required Action A.1 are satisfied.

The capability of the CPC Safety Grade nitrogen purge source to supply the required purge to the affected vessel or vessels shall be restored to OPERABLE status for OPERATION to continue beyond 72 hours. The probability for failure of the primary purge system during the 72-Hour restoration period permitted by this Required Action is judged to be small; therefore, the incremental risk of continuing to operate for 72 hours is not considered significant. The Completion Time is also deemed acceptable based upon the knowledge that the LFL interlocks

(continued)

ACTIONS (continued)

A.2 (continued)

associated with steam isolation are OPERABLE for the applicable vessel(s), and the primary air or nitrogen purge source will normally be available. If the equipment is not restored to OPERABLE status within 72 hours, Condition G of this LCO shall be entered.

B.1.1 or B.1.2

With the safety grade nitrogen purge source inoperable or incapable of supplying purge flow, excessive leakage past the Safety Grade Nitrogen Purge Isolation Check Valves, failure of one or more of the Safety Grade Nitrogen pressure control valves, or failure to meet Condition E, the DWPF FACILITY has degraded purge source capability for flammability control. This Condition is limited to failure of the system as a whole; failures limited to the ability to supply an individual vessel is addressed in Condition A. Therefore, Required Actions shall be taken within 1 hour to verify the status of the purge sources.

These Required Actions verify the purge flows to the affected CPC/SPC vessels are within the limits of the LCO 3.1.3, 3.1.4, 3.1.5, or 3.1.9 requirements. Successful performance of the Required Actions indicates that purge is operating properly and that the safety grade nitrogen purge source is not required to be in service. To increase assurance and to add to the basis for remaining in this degraded condition, the Required Actions shall also be performed every 4 hours thereafter. The Completion Time is an increase from the normal frequency of every 12 hours. Failure to meet the Completion Times of Required Action B.1.1 or B.1.2 requires entry into Condition I.

B.2

With the Safety Grade nitrogen purge source inoperable, the ability to support the CPC /SPC vessel purge flow requirements, in the event that the DBA was to occur, is compromised. Therefore, the Safety Grade nitrogen purge source shall be restored to OPERABLE status within 72 hours. During the restoration period, all affected PROCESS AREAS may remain in their current MODE provided the compensatory measures taken in Required Action B.1 are satisfied.

(continued)

BASES

ACTIONS (continued)

B.2 (continued)

The inoperable Safety Grade nitrogen purge source shall be restored to OPERABLE status for OPERATION to continue beyond 72 hours. The probability for failure of the primary purge system during the 72-Hour restoration period permitted by this Required Action is judged to be small; therefore, the incremental risk of continuing to operate for 72 hours is not considered significant. The Completion Time is also deemed acceptable based upon the knowledge that the LFL interlocks associated with steam isolation are OPERABLE, and the primary air or nitrogen purge source will normally be available. If the equipment is not restored to OPERABLE status within 72 hours, Condition H of this LCO shall be entered.

Condition C has been deleted.

D.1 and D.2

While in OPERATION, the SRAT and SME are maintained at less than 60% CLFL by the minimum required purge flow established by LCO 3.1.3. These vessels are prevented from reaching flammable conditions by the GCs (LCO 3.1.1) and the low purge flow interlocks. If the low purge flow interlocks are determined to be inoperable, then the interlock actions shall be taken manually. Termination of all transfers into the affected process vessel and isolation of the steam from the SRAT or SME reduces the amount of flammable fuel being generated. A NOTE has been included to alert operators that the closure of the SRAT steam valve will result in an interlock, described in LCO 3.1.11, to stop the SEFT and PRFT transfer pumps. These Required Actions are initiated IMMEDIATELY to place the PROCESS AREA in a safe state as quickly as possible.

(continued)

BASES

ACTIONS (continued)

D.1 and D.2 (continued)

The following are not considered transfers into the affected process vessel for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

D.3

The affected process vessel(s) (SRAT and/or SME) shall be placed in STANDBY within 2 hours of reaching 70 ºC if the vessel was above this temperature at the time of entry into this condition. The 2-Hour Completion Time recognizes that a formal MODE change declaration may require completion of activities that cannot be completed IMMEDIATELY and is the usual time to reach STANDBY conditions. Required Actions D.1 and D.2 ensure that the activities necessary to place the affected process vessels in a stable condition are initiated IMMEDIATELY. The Completion Time allows adequate time to cool these vessels and to safely transition to STANDBY, and recognizes that actions to place the affected process vessel in STANDBY are underway.

E.1

If one of the two safety grade nitrogen tank level indicators per nitrogen tank is inoperable on a tank required to establish minimum inventory requirements, the FACILITY is relying on just one indicator to monitor safety parameters. A restoration time of 7 days ensures the FACILITY does not operate in this degraded condition for an extended period of time. If the equipment is not restored to OPERABLE status within 7 days, Condition B of this LCO shall be entered.

A NOTE permits MODE changes while in this Condition while attempting to comply with Required Action E.1.

(continued)

ACTIONS (continued)

F.1

If the SRAT or SME steam or nitric acid addition or formic acid addition isolation valve is inoperable this requires entry into Condition F of this LCO.

To ensure the FACILITY does not rely on these valves to operate while they are inoperable, the Required Actions take the actions the inoperable valve would be required to if an interlock actuated (i.e. if the SRAT steam valve fails, steam will be manually isolated from the SRAT). This Required Action is taken IMMEDIATELY to ensure no additions are made with an inoperable valve. This places the Process Area in a conservative condition while allowing it to maintain its current mode of operation if it does not require the material which would be isolated by interlock actions. A NOTE permits MODE changes if Required Action F.1 has been completed. This action provides assurance that the safety function of the valve(s) has been performed.

G.1, G.2.1 or G.2.2, and G.3

If the Required Actions and Completion Times of Condition F, Required Action A.2, or Required Action J.2 are not met, actions to place the affected PROCESS AREA(s) in STANDBY within 2 hours after the vessel content's temperature is 70ºC for the SRAT, SME, or DWTT and within 2 hours for the SEFT, PRFT, RCT, or MFT shall be IMMEDIATELY initiated. Required Action G.1 requires all transfers into the affected PROCESS AREA(s) be stopped. The following are not considered transfers into the affected process vessel for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, laboratory drains, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

(continued)

ACTIONS (continued)

G.1, G.2.1 or G.2.2, and G.3 (continued)

A NOTE precedes Required Action G.2 to alert operators that if the SEFT or PRFT agitator is stopped prior to the transfer pump, then an interlock described in LCO 3.1.10 will actuate to stop the SEFT or PRFT transfer pump. An additional NOTE has been added to alert operators that the closure of the SRAT steam valve will result in an interlock, described in LCO 3.1.11, to stop the SEFT and PRFT transfer pumps. Performance of the Required Actions ensures that the generation rate for flammable gases in the affected process vessel is significantly slowed and prohibits transfers into the process vessel, thereby placing the vessel in a stable condition.

A NOTE preceding Required Action G.3 allows that if the affected PROCESS AREA(s) are in SHUTDOWN, a transition to STANDBY is not required.

H.1, H.2, H.3, H.4 and H.5

If the Safety Grade Nitrogen System is inoperable for greater than 72 hours (i.e., Required Action B.2 cannot be met within its Completion Time), actions to place the affected process vessel(s) in STANDBY within 2 hours after the vessel content's temperature is 70ºC for the SRAT, SME, and DWTT and within 2 hours for the SEFT, PRFT, RCT, and MFT shall be IMMEDIATELY initiated. Required Action H.1 requires all transfers into the SEFT, PRFT, SRAT, SME, RCT, DWTT, and MFT be stopped. The following are not considered transfers into the affected process vessel for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, laboratory drains, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

(continued)

ACTIONS (continued)

H.1, H.2, H.3, H.4 and H.5 (continued)

A NOTE has been included to alert operators that if the PRFT or SEFT agitator is stopped prior to the transfer pump, then an interlock described in LCO 3.1.10 will actuate to stop the SEFT or PRFT transfer pump. An additional NOTE has been added to alert operators that the closure of the SRAT steam valve will result in an interlock, described in LCO 3.1.11, to stop the SEFT and PRFT transfer pumps. Performance of the Required Actions ensures the generation rate for flammable gases in the affected process vessel is significantly slowed and prohibits transfers into the process vessel, thereby placing the vessel in a stable condition.

If the process vessel is presently in SHUTDOWN, a transition to STANDBY is not required.

IMMEDIATELY is specified for restoring Safety Grade Nitrogen system to OPERABLE status, since this condition warrants immediate actions.

I.1

If all purge flow monitoring instrumentation to a process vessel is inoperable, a process vessel has no purge flow (cannot meet Required Action A.1, B.1 or J.1), or both PCVs for the SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, and/or MFT are inoperable, LCO 3.1.3, 3.1.4, 3.1.5, or 3.1.9 shall be entered IMMEDIATELY for the affected process vessel and its applicable MODE (for the SMECT enter LCO 3.1.3 or 3.1.4 based on the higher of the SRAT or SME MODES).

(continued)

BASES

ACTIONS (continued)

J.1 and J.2

If one of the SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, or MFT flowmeters or pressure control valves is inoperable, additional verification of the purge flow is necessary. This verification shall occur IMMEDIATELY and every Recovery Time as calculated from Table 3.1.4-1, Table 3.1.5-1, or Table 3.1.9-1. If no Recovery Time exists on the table for the current conditions a conservative value shall be used. If this condition is entered due to SRAT, SME, or DWTT indicator(s) while in OPERATION, this verification shall occur IMMEDIATELY and continuously.

A restoration time of 7 days ensures the FACILITY does not operate in this degraded condition for an extended period of time. If the equipment is not restored to OPERABLE status within 7 days, Condition G of this LCO shall be entered.

SURVEILLANCE REQUIREMENTS

SR 4.1.6.1

This SR has been deleted.

SR 4.1.6.2

The OPERABLE Safety Grade nitrogen storage tanks shall be verified every 12 hours to contain a volume of greater than or equal to 936 in. wc of nitrogen. The minimum required volume in the storage tanks is based on conservative OPERATION flows to the CPC/SPC applied over a period of 96 hours (Safety Grade Nitrogen Purge System setup flow for 24 hours and STANDBY flow for 72 hours). The 12-Hour frequency will ensure that the 96-Hour nitrogen storage tanks are maintained in a condition that can support 96 hours of backup nitrogen purge to the SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, and MFT. Failure to meet the requirements of this SR requires entering Condition B of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.3

The SEFT purge flow indicating loops (FI-3219A and FI-3219B), shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures that the instrumentation required by Table 3.1.6-1 is maintained in a sufficiently accurate condition. The calibration involves response testing of the instrument over the full range of the loop with known values. Verification is made that the parameter indications are correct. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition I or J of this LCO.

SR 4.1.6.4

The SRAT purge flow indicating loops (FI-3034A/FSLL-3034A and FI-3034B/FSLL-3034B) shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures that the instrumentation required by Table 3.1.6-1 is maintained in a sufficiently accurate condition. The calibration involves response testing of the instrument over the full range of the loop with known values. Verification is made that the parameter indications are correct and the established setpoints for the loop interlock response are within the required tolerance. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition I or J of this LCO.

SR 4.1.6.5

The SME purge flow indicating loops (FI-8856A/FSLL-8856A and FI-8856B/FSLL-8856B) shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures that the instrumentation required by Table 3.1.6-1 is maintained in a sufficiently accurate condition. The calibration involves response testing of the instrument over the full range of the loop with known values. Verification is made that the parameter indications are correct and the established setpoints for the loop interlock response is within the required tolerance. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition I or J of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.6

The MFT purge flow indicating loops (FI-0687A and FI-0687B) shall have an INSTRUMENT LOOP CALIBRATION at least Yearly. Performance of this SR ensures that the instrumentation required by Table 3.1.6-1 is maintained in a sufficiently accurate condition. The calibration involves response testing of the instrument over the full range of the loop with known values. Verification is made that the parameter indications are correct and the established setpoints for the loop response are within the required tolerance. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition I or J of this LCO.

SR 4.1.6.7

This SR has been deleted.

SR 4.1.6.8

An INSTRUMENT LOOP CHECK shall be performed every 24 hours on the SRAT purge flow instruments (FI-3034A and FI-3034B). The INSTRUMENT LOOP CHECK will compare the purge flow readings on the two indicators (FI-3034A and FI-3034B) to verify OPERABILITY of the SRAT purge flow instrumentation. This 24-Hour frequency is sufficient to provide assurance that the electronic flow measuring instrument calibration is accurate. The 24-Hour surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. This SR is only applicable when both SRAT purge flow instruments (FI-3034A and FI-3034B) are OPERABLE. One SRAT purge flow instrument inoperable is addressed by Condition J. Failure to meet the requirements of this SR requires entering Condition I or J of this LCO.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.9

An INSTRUMENT LOOP CHECK shall be performed every 24 hours on the SME purge flow indicating loops (FI-8856A and FI-8856B). The INSTRUMENT LOOP CHECK will compare the purge flow readings on the two indicators (FI-8856A and FI-8856B) to verify OPERABILITY of the SME purge flow instrumentation. This 24-Hour frequency is sufficient to provide assurance that the purge flow indicators are operating properly. The 24-Hour surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. This SR is only applicable when both SME purge flow instruments (FI-8856A and FI-8856B) are OPERABLE. One SME purge flow instrument inoperable is addressed by Condition J of this LCO. Failure to meet the requirements of this SR requires entering Condition I or J of this LCO.

SR 4.1.6.10

An INSTRUMENT LOOP CHECK shall be performed every 24 hours on the MFT purge flow indicating loops (FI-0687A and FI-0687B). The INSTRUMENT LOOP CHECK will compare the purge flow readings on the two indicators (FI-0687A and FI-0687B) to verify OPERABILITY of the MFT purge flow instrumentation. This 24-Hour frequency is sufficient to provide assurance that the purge flow indicators are operating properly. The 24-Hour surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. This SR is only applicable when both MFT purge flow instruments (FI-0687A and FI-0687B) are OPERABLE. One MFT purge flow instrument inoperable is addressed by Condition J of this LCO. Failure to meet the requirements of this SR requires entering Condition I or J of this LCO.

SR 4.1.6.11

This SR has been deleted.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.12

An INSTRUMENT LOOP CALIBRATION shall be performed at least Yearly on Safety Grade nitrogen storage tanks level instrumentation loops. The INSTRUMENT LOOP CALIBRATION will verify that the level instrumentation is sensing and indicating the correct level. This 1-Year frequency will provide the necessary assurance that the level instrumentation functions as needed to ensure that level verifications are made from instrumentation that is OPERABLE. The 1-Year surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. Failure to meet the requirements of this SR requires entering Condition B or E of this LCO.

SR 4.1.6.13

An INSTRUMENT LOOP TEST of the hardwired interlock functions detailed in Table 3.1.6-1 for the SRAT shall be performed at least Yearly to ensure the OPERABILITY of the interlock circuitry. This test shall verify with a simulated or actual input signal that the required equipment receives the proper signal to direct the actions outlined in the footnotes of Table 3.1.6-1. A successful completion of this test will ensure the required equipment receives the signal directing the actions required by this interlock at a setpoint within the requirements of Table 3.1.6-1. The 1-Year surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. A failure to meet the requirements of this SR requires entry into Condition D of this LCO.

SR 4.1.6.14

An INSTRUMENT LOOP TEST of the hardwired interlock functions detailed in Table 3.1.6-1 for the SME shall be performed at least Yearly to ensure the OPERABILITY of the interlock circuitry. This test shall verify with a simulated or actual input signal that the required equipment receives the proper signal to direct the actions outlined in the footnotes of Table 3.1.6-1. A successful completion of this test will ensure the required equipment receives the signal directing the actions required by this interlock at a setpoint within the requirements of Table 3.1.6-1. The 1-Year surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. A failure to meet the requirements of this SR requires entry into Condition D of this LCO.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.15

This SR has been deleted.

SR 4.1.6.16

An OPERABILITY check of the safety grade nitrogen purge supply to the SEFT, PRFT, SRAT, SME, SMECT, RCT, DWTT, and MFT shall be performed at least Yearly. This test will verify that the nitrogen supply is aligned and that the nitrogen supply pressure control valves will open allowing nitrogen to flow to the CPC/SPC vessels. Performance of this SR includes actuation of the safety grade purge feature, including verification of the system's ability to provide at least the minimum STANDBY purge flow rates and not more than assumed in the calculation of the inventory requirement through the Process Vessels' minimum purge flow valves (Ref. 4). The maximum purge flow is checked using the Process Vessels' local purge flow indicator. The 1-Year frequency is adequate to monitor the system capabilities for characteristics needed to determine OPERABILITY of the safety grade nitrogen purge source. Actual actuations which have occurred during the year can be taken credit for if actuations are properly documented. The 1-Year surveillance frequency is considered adequate based on equipment reliability, experience, and engineering evaluation. Failure to meet the requirements of this SR requires entering Condition B of this LCO.

SR 4.1.6.17

The SRAT and SME steam valves (FCV-3000 and FCV-3080) shall be verified at least Yearly to close when directed by a simulated or actual interlock signal. This SR verifies that, when an interlock requires these valves to close, they will perform the necessary actions. The 1-Year surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. A failure to meet the requirements of this SR requires entry into Condition F of this LCO.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.18

The SRAT and SME nitric acid addition valves (FCV-0716 and FCV-3119) shall be verified at least Yearly to close when directed by a simulated or actual interlock signal. This SR verifies that, when an interlock requires these valves to close, they will perform the necessary actions. The 1-Year surveillance frequency is considered adequate based on equipment reliability, experience and engineering evaluation. A failure to meet the requirements of this SR requires entry into Condition F of this LCO.

SR 4.1.6.19

The SRAT and SME formic acid addition valves (FCV-2045 and FCV-2044) shall be verified at least Yearly to close when directed by a simulated or actual interlock signal. This SR verifies, that when an interlock requires these valves to close, they will perform the necessary actions. The 1-Year surveillance frequency is considered adequate based on equipment reliability, experience, and engineering evaluation. A failure to meet the requirements of this SR requires entry into Condition F of this LCO.

SR 4.1.6.20

This SR has been deleted.

SR 4.1.6.21

This SR has been deleted.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.22

The SMECT purge flow indicating loops (FI-3144A or FI-3144B) shall have an INSTRUMENT LOOP CALIBRATION performed at least every 1 year. Performance of this SR ensures that the instrumentation required by Table 3.1.6-1 is maintained in a sufficiently accurate condition. The calibration involves response testing of the instrument over the full range of the loop with known values. Verification is made that the parameter indications are correct and the established setpoints for the loop response are within the required tolerance. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrument. Failure to meet or perform this SR requires entering Condition I or J of this LCO.

SR 4.1.6.23

This SR has been deleted.

SR 4.1.6.24

This SR has been deleted.

SR 4.1.6.25

This SR has been deleted.

SR 4.1.6.26

The Safety Grade Nitrogen Purge Isolation Check Valves shall be leak tested at least every 2 years to verify leakage past the check valves does not exceed 4 scfm. This test ensures the Safety Grade Nitrogen Purge System will be able to maintain the required purge flow rate for a 96-Hour duration following failure of the Primary Purge System. A 2-Year test frequency is sufficient to ensure adequate integrity of the check valves. Failure to meet or perform this SR requires entering Condition B of this LCO.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.27

The PRFT purge flow indicating loops (FI-1016A and FI-1016B), shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures that the instrumentation required by Table 3.1.6-1 is maintained in a sufficiently accurate condition. The calibration involves response testing of the instrument over the full range of the loop with known values. Verification is made that the parameter indications are correct. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition I or J of this LCO.

SR 4.1.6.28

An INSTRUMENT LOOP CHECK shall be performed every 24 hours on the SEFT purge flow indicating loops (FI-3219A and FI-3219B). The INSTRUMENT LOOP CHECK will compare the purge flow readings on the two indicators (FI-3219A to FI-3219B) to verify the OPERABILITY of the SEFT purge flow instrumentation. This 24-Hour frequency is sufficient to provide assurance that the purge flow indicators are operating properly. The 24-Hour surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. This SR is only applicable when both SEFT purge flow instruments (FI-3219A and FI-3219B) are OPERABLE. One SEFT purge flow instrument inoperable is addressed by Condition J of this LCO. Failure to meet the requirements of this SR requires entering Condition I or J of this LCO.

SR 4.1.6.29

An INSTRUMENT LOOP CHECK shall be performed every 24 hours on the PRFT purge flow indicating loops (FI-1016A and FI-1016B). The INSTRUMENT LOOP CHECK will compare the purge flow readings on the two indicators (FI-1016A to FI-1016B) to verify the OPERABILITY of the PRFT purge flow instrumentation. This 24-Hour frequency is sufficient to provide assurance that the purge flow indicators are operating properly. The 24-Hour surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.29 (continued)

reliability. This SR is only applicable when both PRFT purge flow instruments (FI-1016A and FI-1016B) are OPERABLE. One PRFT purge flow instrument inoperable is addressed by Condition J of this LCO. Failure to meet the requirements of this SR requires entering Condition I or J of this LCO.

SR 4.1.6.30

An INSTRUMENT LOOP CHECK shall be performed every 24 hours on the SMECT purge flow indicating loops (FI-3144A and FI-3144B). The INSTRUMENT LOOP CHECK will compare the purge flow readings on the two indicators (FI-3144A and FI-3144B) to verify the OPERABILITY of the SMECT purge flow instrumentation. This 24-Hour frequency is sufficient to provide assurance that the purge flow indicators are operating properly. The 24-Hour surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. This SR is only applicable when both SMECT purge flow instruments (FI-3144A and FI-3144B) are OPERABLE. One SMECT purge flow instrument inoperable is addressed by Condition J of this LCO. Failure to meet the requirements of this SR requires entering Condition I or J of this LCO.

SR 4.1.6.31

The SEFT pressure control valves (PCV-3219A and PCV-3219B) shall be verified to each be capable of controlling Primary and Safety Grade Purge pressure to the SEFT flow indicators greater than or equal to 15 psig and less than or equal to 24 psig. This surveillance shall be conducted using IPI or M&TE with a calibration accuracy of +/- 1 psig or better. This surveillance shall be conducted on a 1 year basis. Performance of this SR will ensure that the pressure is maintained within the analyzed pressures for SEFT flow indicators. A failure to meet the requirement of this SR for one PCV requires entry into Condition J of this LCO. A failure to meet the requirement of this SR for both PCVs requires entry into Condition I of this LCO.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.32

The PRFT pressure control valves (PCV-1016A and PCV-1016B) shall be verified to each be capable of controlling Primary and Safety Grade Purge pressure to the PRFT flow indicators greater than or equal to 15 psig and less than or equal to 24 psig. This surveillance shall be conducted using IPI or M&TE with a calibration accuracy of +/- 1 psig or better. This surveillance shall be conducted on a 1 year basis. Performance of this SR will ensure that the pressure is maintained within the analyzed pressures for PRFT flow indicators. A failure to meet the requirement of this SR for one PCV requires entry into Condition J of this LCO. A failure to meet the requirement of this SR for both PCVs requires entry into Condition I of this LCO.

SR 4.1.6.33

The Safety Grade Nitrogen pressure control valves (PCV-1233 and PCV-1234) shall be verified to each be capable of actuating Safety Grade Nitrogen to the CPC/SPC purge flow header pipe at a pressure greater than or equal to 64 psig and less than or equal to 68 psig. This surveillance shall be conducted using IPI or M&TE with a calibration accuracy of +/- 1 psig or better. This surveillance shall be conducted on a 1 year basis. Performance of this SR will ensure that the Safety Grade Nitrogen system will actuate upon low flow conditions. A failure to meet the requirement of this SR for one or both PCVs requires entry into Condition B of this LCO.

SR 4.1.6.34

The RCT pressure control valves (PCV-6149A and PCV-6149B) shall be verified to each be capable of controlling Primary and Safety Grade Purge pressure to the RCT flow indicators greater than or equal to 28 psig and less than or equal to 44 psig. This surveillance shall be conducted using IPI or M&TE with a calibration accuracy of +/- 1 psig or better. This surveillance shall be conducted on a 1 year basis. Performance of this SR will ensure that the pressure is maintained within the analyzed pressures for RCT flow indicators. A failure to meet the requirement of this SR for one PCV requires entry into Condition J of this LCO. A failure to meet the requirement of this SR for both PCVs requires entry into Condition I of this LCO.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.35

The DWTT pressure control valves (PCV-6167A and PCV-6167B) shall be verified to each be capable of controlling Primary and Safety Grade Purge pressure to the DWTT flow indicators greater than or equal to 28 psig and less than or equal to 44 psig. This surveillance shall be conducted using IPI or M&TE with a calibration accuracy of +/- 1 psig or better. This surveillance shall be conducted on a 1 year basis. Performance of this SR will ensure that the pressure is maintained within the analyzed pressures for DWTT flow indicators. A failure to meet the requirement of this SR for one PCV requires entry into Condition J of this LCO. A failure to meet the requirement of this SR for both PCVs requires entry into Condition I of this LCO.

SR 4.1.6.36

The RCT purge flow indicating loops (FI-6149A and FI-6149B), shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures that the instrumentation required by Table 3.1.6-1 is maintained in a sufficiently accurate condition. The calibration involves response testing of the instrument over the full range of the loop with known values. Verification is made that the parameter indications are correct. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition I or J of this LCO.

SR 4.1.6.37

The DWTT purge flow indicating loops (FI-6167A and FI-6167B), shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures that the instrumentation required by Table 3.1.6-1 is maintained in a sufficiently accurate condition. The calibration involves response testing of the instrument over the full range of the loop with known values. Verification is made that the parameter indications are correct. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition I or J of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.38

An INSTRUMENT LOOP CHECK shall be performed every 24 hours on the RCT purge flow indicating loops (FI-6149A and FI-6149B). The INSTRUMENT LOOP CHECK will compare the purge flow readings on the two indicators (FI-6149A to FI-6149B) to verify the OPERABILITY of the RCT purge flow instrumentation. This 24-Hour frequency is sufficient to provide assurance that the purge flow indicators are operating properly. The 24-Hour surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. This SR is only applicable when both RCT purge flow instruments (FI-6149A and FI-6149B) are OPERABLE. One RCT purge flow instrument inoperable is addressed by Condition J of this LCO. Failure to meet the requirements of this SR requires entering Condition I or J of this LCO.

SR 4.1.6.39

An INSTRUMENT LOOP CHECK shall be performed every 24 hours on the DWTT purge flow indicating loops (FI-6167A and FI-6167B). The INSTRUMENT LOOP CHECK will compare the purge flow readings on the two indicators (FI-6167A to FI-6167B) to verify the OPERABILITY of the DWTT purge flow instrumentation. This 24-Hour frequency is sufficient to provide assurance that the purge flow indicators are operating properly. The 24-Hour surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. This SR is only applicable when both DWTT purge flow instruments (FI-6167A and FI-6167B) are OPERABLE. One DWTT purge flow instrument inoperable is addressed by Condition J of this LCO. Failure to meet the requirements of this SR requires entering Condition I or J of this LCO.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.40

The SRAT pressure control valves (PCV-3034A and PCV-3034B) shall be verified to each be capable of controlling Primary and Safety Grade Purge pressure to the SRAT flow indicators greater than or equal to 38 psig and less than or equal to 64 psig. This surveillance shall be conducted using IPI or M&TE with a calibration accuracy of +/- 1 psig or better. This surveillance shall be conducted on a 1 year basis. Performance of this SR will ensure that the pressure is maintained within the analyzed pressures for SRAT flow indicators. A failure to meet the requirement of this SR for one PCV requires entry into Condition J of this LCO. A failure to meet the requirement of this SR for both PCVs requires entry into Condition I of this LCO.

SR 4.1.6.41

The SME pressure control valves (PCV-8856A and PCV-8856B) shall be verified to each be capable of controlling Primary and Safety Grade Purge pressure to the SME flow indicators greater than or equal to 21 psig and less than or equal to 35 psig. This surveillance shall be conducted using IPI or M&TE with a calibration accuracy of +/- 1 psig or better. This surveillance shall be conducted on a 1 year basis. Performance of this SR will ensure that the pressure is maintained within the analyzed pressures for SME flow indicators. A failure to meet the requirement of this SR for one PCV requires entry into Condition J of this LCO. A failure to meet the requirement of this SR for both PCVs requires entry into Condition I of this LCO.

SR 4.1.6.42

The MFT pressure control valves (PCV-0687A and PCV-0687B) shall be verified to each be capable of controlling Primary and Safety Grade Purge pressure to the MFT flow indicators greater than or equal to 22 psig and less than or equal to 36 psig. This surveillance shall be conducted using IPI or M&TE with a calibration accuracy of +/- 1 psig or better. This

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.6.42 (continued)

surveillance shall be conducted on a 1 year basis. Performance of this SR will ensure that the pressure is maintained within the analyzed pressures for MFT flow indicators. A failure to meet the requirement of this SR for one PCV requires entry into Condition J of this LCO. A failure to meet the requirement of this SR for both PCVs requires entry into Condition I of this LCO.

SR 4.1.6.43

The SMECT pressure control valves (PCV-3144A and PCV-3144B) shall be verified to each be capable of controlling Primary and Safety Grade Purge pressure to the SMECT flow indicators greater than or equal to 29 psig and less than or equal to 43 psig. This surveillance shall be conducted using IPI or M&TE with a calibration accuracy of +/- 1 psig or better. This surveillance shall be conducted on a 1 year basis. Performance of this SR will ensure that the pressure is maintained within the analyzed pressures for SMECT flow indicators. A failure to meet the requirement of this SR for one PCV requires entry into Condition J of this LCO. A failure to meet the requirement of this SR for both PCVs requires entry into Condition I of this LCO.

SR 4.1.6.44

The leakage past the SRAT and SME steam valves (FCV-3000 and FCV-3080) when closed shall be verified at least every 1 Year to be acceptably low. With the temperature of the appropriate vessel being less than 70ºC, verify that leakage past the SRAT and SME steam valves (FCV-3000 and FCV-3080) when closed is low enough to allow the temperature of the associated tanks to decrease at least 1 ºC within 6 hours with cooling water isolated. Note that since the steam isolation valves are required to be closed in STANDBY, an exception to SR 4.0.4 is allowed in order to go to OPERATION and open the steam isolation valves as necessary to raise the temperature in the affected vessel (SRAT or SME) sufficiently to perform this SR. If the temperature in the SRAT/SME under this condition (with cooling water isolated) is decreasing, then the valve has isolated sufficiently to ensure the tank will not reheat above 70ºC. The 1-Year surveillance frequency is considered adequate to track and trend the valve performance and is based on equipment reliability. A failure to meet the requirements of this SR requires entry into Condition F of this LCO.

(continued)

BASES

REFERENCES

1. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U). WSRC-SA-6.

2. Deleted.

3. Deleted.

4. Determination of TSR Setpoints for CPC Nitrogen System for SDI. U-CLC-S-00031.

5. Instrumentation Uncertainties Evaluation Loops: S355-FI-1016A and FI-1016B PRFT Purge Flow Indicators (U). J-CLC-S-00150.

6. Instrumentation Uncertainties Evaluation Loops: S350-FI-3219A and FI-3219B SEFT Purge Flow Indicators (U). J-CLC-S-00148.

7. Instrumentation Uncertainties Evaluation CPC Purge Header Pressure S350-PI-1233. J-CLC-S-00126.

8. Instrument Uncertainties Evaluation Loops: S422-LI-1240X, 1241X, 1247X, 1248X, 3610X, 3611X, 3617X, 3618X, 3630X, 3631X, 3650X, 3651X; S511-LI-5181X, 5182X DWPF CPC, SPC, LPPP, and OWST Nitrogen Tank Level Indication (U). J-CLC-S-00135.

9. Instrument Uncertainties Evaluation Loop S395-FI-6167A and FI-6167B DWTT Purge Flow Indicators (U). J-CLC-S-00153.

10. Instrument Uncertainties Evaluation Loop S395-FI-6149A and FI-6149B RCT Purge Flow Indicators (U). J-CLC-S-00154.

11. Instrumentation Uncertainties Evaluation Loops: S350-FI-3034A and FI-3034B SRAT Purge Flow Indicators (U). J-CLC-S-00147.

12. Instrumentation Uncertainties Evaluation Loops: S350-FI-8856A and FI-8856B SME Purge Flow Indicators (U). J-CLC-S-00152.

(continued)

REFERENCES (continued)

13. Instrumentation Uncertainties Evaluation Loops: S350-FI-3144A and FI-3144B SMECT Purge Flow Indicators (U). J-CLC-S-00159.

14. Instrumentation Uncertainties Evaluation Loops: S350-FI-0687A and FI-0687B MFT Purge Flow Indicators (U). J-CLC-S-00157.

B 3/4.1 CPC/SPC FLAMMABILITY CONTROL

B 3.1.7 Steam Heating of CPC Vessels

BASES

This LCO has been deleted.

B 3/4.1 CPC/SPC FLAMMABILITY CONTROL

B 3.1.8 Melter Feed Contents

BASES

This LCO has been deleted.

B 3/4.1 CPC/SPC FLAMMABILITY CONTROL

B 3.1.9 SEFT and PRFT Flammability Control

BASES

BACKGROUND SUMMARY

The processing of waste streams from the Salt Waste Processing Facility (SWPF) in DWPF can produce flammable gases in the CPC/SPC process vessels (hydrogen and/or organic) which, if ignited, could cause a significant release of radioactive material. The CPC/SPC process vessels identified in the accident analysis which possess the potential to explode and cause a release of radioactive material include the SEFT and PRFT.

The above CPC/SPC process vessels have a purge supply that provides either air or nitrogen gas to remove flammable gases generated in the SEFT and PRFT. The purge can be supplied by either of the two sources, the Primary Purge System or the Safety Grade Nitrogen System. Both of these sources can provide the necessary purge flow to meet the LCO requirements.

The concentration of organic vapor in the SEFT and PRFT is controlled by limiting the liquid temperature in the process vessels. Interlocks on high liquid temperature are provided to stop the affected process vessel's agitator, sample pump, and transfer pump. This removes sources of energy input to the affected vessel, which prevents an increase in vessel liquid temperature. The fuel concentration in the vapor space of the vessel(s) is thus prevented from reaching the CLFL.

An analysis was performed (Ref. 14 and 15) that showed for the SEFT and PRFT that at the levels that the SEFT and PRFT RTDs were no longer covered by the vessel liquid, that there was insufficient Isopar and hydrogen production present to allow the tank to become flammable.

The purge and temperature controls are sufficient to maintain the process vessels to less than 60% of the CLFL.

(continued)

BASES

APPLICATION TO SAFETY ANALYSIS

The accident analyses indicate that an explosion in the SEFT or PRFT can produce significant radiological consequences for the onsite worker. The SEFT and PRFT are predicted to fail as a result of the calculated pressure generated by a hydrogen gas and organic vapor explosion (FSAR Section 9.4.2.1). In addition, the FSAR assumes the progression of the event has the potential to damage other tanks within the CPC/SPC, either by the ejection of fragments or by the dislodging of cell covers.

The requirements of this LCO will ensure the fuel concentration in the vapor space of the SEFT and PRFT is maintained to less than or equal to 60% of the CLFL, by ensuring a minimum purge through the vessels and limiting the liquid temperature in the vessels. It has been shown that the minimum required purge rates along with the temperature limits for the SEFT and PRFT will maintain the fuel concentration in the vapor space of the vessels to less than or equal to 60% of the CLFL. When the liquid level drops below the RTDs, purge alone is sufficient to maintain the tank vapor space less than 60% CLFL at 105°C (Ref. 14 and 15).

Purge flow instrumentation is provided to measure the purge supplied to the SEFT and PRFT and temperature instrumentation is provided to monitor the liquid temperature in the process vessels. A high temperature condition causes an interlock to actuate which stops the affected vessel's agitator, sample pump, and transfer pump. The high temperature interlocks are relied upon in the accident analysis to remove sources of energy input to the vessel(s). This prevents an increase in vessel liquid temperature, which limits the fuel concentration in the vapor space of the vessel(s). The high temperature interlocks are not required when the RTDs are uncovered (Ref. 14, 15, 17 and 18).

(continued)

BASES

LCO

This LCO requires a purge source to be in service satisfying the purge flow rate requirements below. Due to radiolytic hydrogen generation and the receipt of volatile organic, a buildup of flammable fuel to the CLFL is possible in the CPC/SPC process vessels.

The LCO limit for the SEFT purge flow is based upon the premise that the purge flow will limit the contribution of gaseous concentrations of hydrogen such that the CLFL of a potential hydrogen gas and organic vapor mixture in the vessel is less than or equal to 60% of the CLFL. This LCO ensures the Safety Analysis value of 4.61 scfm (Ref. 13) for SEFT purge is met by implementing a limit of 6 scfm (Ref. 16). SEFT purge flow is indicated at FI-3219A and at FI-3219B (Ref. 13). There is no margin of safety associated with the instrumented SEFT purge flow LCO value as the minimum purge flow is based on the radiolytic hydrogen production in the vessel (at overflow liquid volume made up of a mixture of Strip Effluent and MST/Sludge Solid Streams) and at a maximum temperature of the tank contents (based on limiting the contribution of organics to the CLFL). Maximizing the tank liquid volume results in maximum hydrogen production and minimum vapor volume. This produces worst case vapor concentrations.

The LCO limit for the PRFT purge flow is based upon the premise that the purge flow will limit the contribution of gaseous concentrations of hydrogen such that the CLFL of a potential hydrogen gas and organic vapor mixture in the vessel is less than or equal to 60% of the CLFL. This LCO ensures the Safety Analysis value of 3.6 scfm (Ref. 12) for PRFT purge is met by implementing a limit of 5 scfm (Ref. 16). PRFT purge flow is indicated at FI-1016A and at FI-1016B (Ref. 12). There is no margin of safety associated with the instrumented PRFT purge flow LCO value as the minimum purge flow is based on the radiolytic hydrogen production in the vessel (at overflow liquid volume made up of a mixture of Strip Effluent and MST/Sludge Solid Streams) and at a maximum temperature of the tank contents (based on limiting the contribution of organics to the CLFL). Maximizing the tank liquid volume results in maximum hydrogen production and minimum vapor volume. This produces worst case vapor concentrations.

The LCO limit for the SEFT liquid temperature is provided to limit the concentration of organic vapor in the process vessel. The liquid temperature LCO limit will maintain the fuel concentration in the vessel to less than or equal to 60% of the CLFL when the SEFT purge flow requirements are met. This LCO ensures the Safety Analysis value of 42.4°C for SEFT liquid temperature is met by implementing a limit of

(continued)

BASES

LCO (continued)

38.4°C (Ref. 11). This LCO temperature limit was chosen to reflect the hardwired interlock setpoints detailed in Table 3.1.9-3. In the event the SEFT liquid temperature exceeds the setpoint value, hardwired interlocks will stop the process vessel's agitator, sample pump, and transfer pump. For the temperature instrumentation to be considered OPERABLE, the instrument loops must have an INSTRUMENT LOOP CALIBRATION performed to ensure proper actuation at the correct setpoint and correct temperature indications. The SEFT liquid temperature is indicated at TIT-3211A and TIT-3211B. An analysis has been performed to show the high temperature limit and high temperature interlocks are not required when the level is at or below 1,800 gallons which is the approximate level where the RTDs are uncovered (Ref. 14 and 17).

The LCO limit for the PRFT liquid temperature is provided to limit the concentration of organic vapor in the process vessel. The liquid temperature LCO limit will maintain the fuel concentration in the vessel to less than or equal to 60% of the CLFL when the PRFT purge flow requirements are met. This LCO ensures the Safety Analysis value of 42.4°C for PRFT liquid temperature is met by implementing a limit of 38.2°C (Ref. 3). This LCO temperature limit was chosen to reflect the hardwired interlock setpoints detailed in Table 3.1.9-3. In the event the PRFT liquid temperature exceeds the setpoint value, hardwired interlocks will stop the process vessel's agitator, sample pump, and transfer pump. For the temperature instrumentation to be considered OPERABLE, the instrument loops must have an INSTRUMENT LOOP CALIBRATION performed to ensure proper actuation at the correct setpoint and correct temperature indications. The PRFT liquid temperature is indicated at TIT-1141A and TIT-1141B. An analysis has been performed to show the high temperature limit and high temperature interlocks are not required when the level is at or below 600 gallons which is the approximate level where the RTDs are uncovered (Ref. 15 and 18).

There is no margin of safety associated with the instrumented temperature LCO values for the SEFT and PRFT as these values support the Safety Analysis values for purge flow which were derived using reasonable conservative analysis as described earlier. Also, the highest recorded temperatures in the SEFT and PRFT since April 2004 are below these limits.

(continued)

BASES

MODE APPLICABILITY

This LCO applies when DWPF operations in the SEFT and PRFT could generate a flammable concentration of hydrogen gas and/or organic vapor. For purge flow, this LCO is applicable during OPERATION, STANDBY and SHUTDOWN. For liquid temperature, temperature instrumentation, and temperature interlocks, this LCO is applicable during OPERATION, STANDBY and SHUTDOWN when the SEFT level is above 1800 gallons and the PRFT level is above 600 gallons.

PROCESS AREA APPLICABILITY

This LCO is applicable to the SEFT which is located in the CPC, and the PRFT which is located in the SPC. The FSAR analysis indicates that an explosion in either of these vessels can occur and have significant impacts on the FACILITY workers and possibly the offsite public.

ACTIONS

The NOTE-1 does not require entry into Condition A if one of the flow instruments measuring purge flow to the vessel is inoperable (covered in LCO 3.1.6).

The NOTE-2 requires purge flow to be maintained until the minimum amount of vessel purge volume per Table 3.1.9-2 has been supplied prior to exiting the Condition A. The time for minimum vessel purge volume is calculated by dividing the purge volume required by Table 3.1.9-2 with the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty) re-established per Required Action A.1. This delay in exiting Condition A will protect the assumptions on which the recovery time is based.

A.1

When the required purge flow for the SEFT or PRFT is not present, as indicated by an OPERABLE flow instrument, the fuel concentration in the vessel(s) could exceed the CLFL criteria due to an increase in the rate of hydrogen gas generation. The required purge flow for the affected vessel must be restored.

(continued)

BASES

ACTIONS (continued)

A.1 (continued)

The purge system upset conditions that lead to low purge flows on all supported vessels are typically first noted by multiple DCS alarm conditions for the SRAT, SME, DWTT, and MFT (low purge flow alarmed vessels). This condition can be verified by observation of multiple low flow indications locally at the purged vessels. CPC primary purge header flow indication can also be used to provide assurance of a stable, consistent purge flow to the CPC vessels. Either of these indications may be used to determine flow transient durations or when validating purge system steady state flow conditions when monitoring for vapor space turnover times. Field observations of the local indicators are used to confirm the actual purge flow loss or to verify restoration of adequate purge flow.

The Completion Times associated with this Required Action are based upon calculations performed to determine how long the process vessels could be without purge flow and the fuel concentration in the affected vessel remain less than 100% CLFL (Ref. 14 and 15). Table 3.1.9-1 specifies the recovery time for the SEFT and PRFT based upon the temperature and the volume of the contents in the vessels.

The Completion Time for Required Action A.1 is preceded by a NOTE which provides guidance for determining the recovery time if purge flow is less than the LCO requirement prior to completing the required purge volume as determined per Table 3.1.9-2. In this case the flammable vapors in the vessel(s) may be greater than the flammables concentration at the time of initial inadequate purge. Therefore, the time to reach 100% LFL from this elevated level is less than that determined initially. The NOTE requires that the subsequent Completion Time be reduced by the amount of time already used during previous attempts to restart the purge. The time allowed to restore the purge is determined as follows:

- the calculated recovery time from the Table 3.1.9-1 minus the cumulative recovery time(s) used in the previous attempt(s), or
- if temperature or volume has increased, the more restrictive calculated recovery time for those conditions minus the cumulative recovery time(s) used in the previous attempt(s).

(continued)

BASES

ACTIONS (continued)

A.1 (continued)

NOTE-1 in Table 3.1.9-1 requires that conservative values for liquid temperature and volume are to be used at all times in determination of recovery time. Therefore, if vessel temperature or volume falls between two values listed in the table, then the higher value is chosen because the higher temperature reduces the LFL and higher volume reduces the tank vapor space. The values used for the recovery time determination are the liquid temperature and volume that existed prior to entry into this Condition. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach flammable conditions. This will ensure the vessel does not reach a flammable mixture within the recovery time. Recovery times are not re-calculated for conditions that decrease the liquid volume or temperature during purge recovery.

NOTE-2 in Table 3.1.9-1 supplies recovery times for the waste volumes in the SEFT and PRFT that are below the RTDs. These values are based on a conservative temperature of 105°C since temperature monitoring is not available at those heel volumes (Ref. 14 and 15).

NOTE-1 in Table 3.1.9-2 addresses less than the LCO requirement of purge for 5 minutes or less. This reduction in purge could be a single event or multiple events within the 5-minute period. The NOTE establishes that if the purge flow is restored within 5 minutes, then maintaining the minimum purge flow continuously to the vessel for a period of twenty minutes satisfies the required purge volume. References 14 and 15 determined that for 5 minutes of less than the LCO requirement of purge, continuous purge of the vessel at the minimum required purge flow for 20 minutes will reduce the flammable concentration in the vessel to within 10% of that existing prior to the loss or reduction of purge. This duration is based on the bounding vessel liquid volume and temperature.

However, if purge is less than the LCO requirement again during the 20 minutes, the purge flow shall be maintained until the purge has supplied the minimum vessel purge volume per Table 3.1.9-2.

The Bases for LCO 3.1.4 provides examples for additional guidance in applying this NOTE.

(continued)

BASES

ACTIONS (continued)

A.1 (continued)

NOTE-2 in Table 3.1.9-2 requires that conservative values for liquid temperature and volume are to be used at all times in determination of required purge volume. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (lower temperature is conservative) and volume (lower volume is conservative) shall be used. The values used for the purge volume determination are the liquid temperature and volume that existed at the time of re-establishing the required purge flow. The purge volume must be re-determined if the liquid temperature or volume decreases, as these conditions increase the required purge volume.

NOTE-3 in Table 3.1.9-2 provides guidance for calculating the purge time. The purge time can be obtained by dividing the purge volume (required by Table 3.1.9-2) by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

NOTE-4 in Table 3.1.9-2 supplies purge volumes for the waste volumes in the SEFT and PRFT that are below the RTDs. These values are based on a conservative temperature of 105°C since temperature monitoring is not available at those heel volumes (Ref. 14 and 15).

B.1

If the SEFT liquid temperature is greater than 38.4°C and the SEFT level is greater than 1,800 gallons, or the PRFT liquid temperature is greater than 38.2°C and the PRFT level is greater than 600 gallons, as indicated by OPERABLE temperature instrumentation, the fuel concentration in the vessel(s) could exceed the CLFL criteria. Therefore, Required Actions shall be initiated IMMEDIATELY to stop the transfer pump, agitator, and sample pump for the affected vessel. This prevents an increase in vessel liquid temperature by removing sources of mechanical energy input to the vessel. NOTE 1 alerts operators that these actions should have already occurred upon detection of the high temperature condition via the hardwired interlocks. However, if not, operator action shall be taken IMMEDIATELY to initiate the proper response of the high temperature interlocks. NOTE 2 alerts operators that stopping the agitator prior to stopping the affected transfer pump will result in interlock actuation to stop the transfer pump, if a transfer to the SRAT is in progress. Stopping the transfer pump, agitator, and sample pump for the affected vessel prevents an increase in vessel liquid temperature, thereby limiting the fuel concentration in the vapor space of the vessel(s).

(continued)

BASES

ACTIONS (continued)

B.2

If the LCO liquid temperature limits are exceeded for the SEFT or PRFT, Required Actions shall be initiated IMMEDIATELY to stop transfers into the affected process vessel. This Required Action minimizes the further increase in flammable fuel generation and/or reduction of the vessel vapor space.

The following are not considered transfers into the affected process vessel for compliance with this Required Action: Water additions from: bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

C.1 and C.2

The high temperature limit and high temperature interlocks are not required for the SEFT when the SEFT level is less than or equal to 1,800 gallons (Ref. 14 and 17). The high temperature limit and high temperature interlocks are not required for the PRFT when the PRFT level is less than or equal to 600 gallons (Ref. 15 and 18).

Condition C is entered if either one or both SEFT or PRFT temperature indicators or hardwired interlocks are inoperable. The fuel concentration in the affected process vessel could be approaching the CLFL due to an elevated vessel temperature which is not being detected by operable instrumentation. Therefore, Required Actions shall be initiated IMMEDIATELY to stop the transfer pump, agitator, and sample pump for the affected vessel. This removes sources of mechanical energy input to the vessel(s), which prevents an increase in vessel liquid temperature and limits the fuel concentration in the vapor space of the vessel(s). A NOTE prior to Condition C.1 alerts operators that stopping the agitator prior to stopping the affected transfer pump will result in interlock actuation to stop the transfer pump, if a transfer to the SRAT is in progress.

Required Actions shall be initiated IMMEDIATELY to stop transfers into the affected process vessel. This action minimizes an increase in flammable fuel generation and/or reduction of the vessel vapor space when the liquid temperature is not being detected by operable instrumentation.

(continued)

BASES

ACTIONS (continued)

C.1 and C.2 (continued)

The following are not considered transfers into the affected process vessel for compliance with this Required Action: Water additions from: bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods

SURVEILLANCE REQUIREMENTS

SR 4.1.9.1

The purge flow rate to the SEFT shall be verified every 12 hours to be greater than or equal to 6 scfm. SEFT purge flow is indicated on FI-3219A or FI-3219B. This verification ensures the minimum required flow rate is present to dilute gaseous concentrations of hydrogen produced in the SEFT. The 12-Hour surveillance frequency is considered adequate to track and trend the instrument performance. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

SR 4.1.9.2

The purge flow rate to the PRFT shall be verified every 12 hours to be greater than or equal to 5 scfm. PRFT purge flow is indicated on FI-1016A or FI-1016B. This verification ensures the minimum required flow rate is present to dilute gaseous concentrations of hydrogen produced in the PRFT. The 12-Hour surveillance frequency is considered adequate to track and trend the instrument performance. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.9.3

The liquid temperature in the SEFT shall be verified every 12 hours to be less than or equal to 38.4°C. SEFT liquid temperature is indicated on TIT-3211A or TIT-3211B. This verification ensures the liquid temperature in the SEFT is less than the established high temperature limit, which is necessary to ensure the fuel concentration in the SEFT is maintained less than or equal to 60% of the CLFL. The 12-Hour surveillance frequency is considered adequate to track and trend the instrument performance. Failure to meet the requirements of this SR requires entering Condition B of this LCO. The high temperature limit and high temperature interlocks are not required when the SEFT level is at or below 1,800 gallons (Ref. 14 and 17).

SR 4.1.9.4

The liquid temperature in the PRFT shall be verified every 12 hours to be less than or equal to 38.2°C. PRFT liquid temperature is indicated on TIT-1141A or TIT-1141B. This verification ensures the liquid temperature in the PRFT is less than the established high temperature limit, which is necessary to ensure the fuel concentration in the PRFT is maintained less than or equal to 60% of the CLFL. The 12-Hour surveillance frequency is considered adequate to track and trend the instrument performance. Failure to meet the requirements of this SR requires entering Condition B of this LCO. The high temperature limit and high temperature interlocks are not required when the PRFT level is at or below 600 gallons (Ref. 15 and 18).

SR 4.1.9.5

An INSTRUMENT LOOP CHECK shall be performed every 24 hours on the SEFT local temperature instruments (TIT-3211A and TIT-3211B). The INSTRUMENT LOOP CHECK will compare the temperature readings on the two indicators (TIT-3211A to TIT-3211B) to verify the OPERABILITY of the SEFT temperature instrumentation. This 24-Hour frequency is sufficient to provide assurance that the electronic temperature measuring instruments are operating properly. The 24-Hour surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. Failure to meet the requirements of this SR requires entering Condition C of this LCO.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.9.6

An INSTRUMENT LOOP CHECK shall be performed every 24 hours on the PRFT local temperature instruments (TIT-1141A and TIT-1141B). The INSTRUMENT LOOP CHECK will compare the temperature readings on the two indicators (TIT-1141A to TIT-1141B) to verify the OPERABILITY of the PRFT temperature instrumentation. This 24-Hour frequency is sufficient to provide assurance that the electronic temperature measuring instruments are operating properly. The 24-Hour surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. Failure to meet the requirements of this SR requires entering Condition C of this LCO.

SR 4.1.9.7

The electronics of the SEFT liquid temperature instrumentation loops detailed in Table 3.1.9-3 shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures the electronics that form the instrument loop required by Table 3.1.9-3 are maintained in a sufficiently accurate condition. The calibration involves response testing of the electronics over the full range of the loop with known values. Verification is made that the indications are correct and the established setpoints for the loop interlock response are within the required tolerance. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition C of this LCO.

SR 4.1.9.8

An INSTRUMENT LOOP TEST of the hardwired interlock functions detailed in Table 3.1.9-3 for the SEFT shall be performed at least every 1 year to ensure the OPERABILITY of the interlock circuitry. This test shall verify with simulated input signal that the required equipment receives the proper signal to direct the actions outlined in the footnotes of Table 3.1.9-3. A successful completion of this test will ensure the required equipment receives the signal directing the actions required by this interlock at a setpoint within the requirements of Table 3.1.9-3. The 1-Year surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability.
A failure to meet the requirements of this SR requires entry into Condition C of this LCO.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.9.9

The electronics of the PRFT liquid temperature instrumentation loops detailed in Table 3.1.9-3 shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures the electronics that form the instrument loop required by Table 3.1.9-3 are maintained in a sufficiently accurate condition. The calibration involves response testing of the electronics over the full range of the loop with known values. Verification is made that the indications are correct and the established setpoints for the loop interlock response are within the required tolerance. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition C of this LCO.

SR 4.1.9.10

An INSTRUMENT LOOP TEST of the hardwired interlock functions detailed in Table 3.1.9-3 for the PRFT shall be performed at least every 1 year to ensure the OPERABILITY of the interlock circuitry. This test shall verify with simulated input signal that the required equipment receives the proper signal to direct the actions outlined in the footnotes of Table 3.1.9-3. A successful completion of this test will ensure the required equipment receives the signal directing the actions required by this interlock at a setpoint within the requirements of Table 3.1.9-3. The 1-Year surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability.
A failure to meet the requirements of this SR requires entry into Condition C of this LCO.

REFERENCES

1. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U). WSRC-SA-6.

2. Deleted.

3. Instrumentation Uncertainty Evaluation Precipitate Reactor Feed Tank Liquid Temperature. J-CLC-S-00118.

4. Deleted.

5. Deleted.

(continued)

BASES

REFERENCES (continued)

6. Deleted.

7. Deleted.

8. Deleted.

9. Deleted.

10. Deleted.

11. Instrumentation Uncertainty Evaluation Strip Effluent Feed Tank Liquid Temperature. J-CLC-S-00119.

12. Instrumentation Uncertainties Evaluation Loops: S355-FI-1016A and FI-1016B PRFT Purge Flow Indicators (U). J-CLC-S-00150.

13. Instrumentation Uncertainties Evaluation Loops: S350-FI-3219A and FI-3219B SEFT Purge Flow Indicators. J-CLC-S-00148.

14. Purge Requirements for the Strip Effluent Feed Tank. X-CLC-S-00395.

15. Purge Requirements for the Precipitate Reactor Feed Tank. X-CLC-S-00396.

16. Determination of TSR Setpoints for CPC Nitrogen System for SDI. U-CLC-S-00031.

17. Liquid Level of the SEFT RTDs. DWPF-I-CP-0023.

18. Liquid Level of the PRFT RTDs. DWPF-I-SP-0002.

B 3/4.1 CPC/SPC FLAMMABILITY CONTROL

B 3.1.10 SEFT and PRFT Agitator Power Monitoring

BASES

BACKGROUND SUMMARY

The processing of waste streams from the Salt Waste Processing Facility (SWPF) in DWPF can produce flammable gases in the CPC/SPC process vessels (hydrogen and/or organic) which, if ignited, could cause a significant release of radioactive material. The SRAT is identified in the accident analysis as a CPC process vessel which possesses the potential to explode and cause a release of radionuclide material.

The accumulation of volatile organics in the SRAT has been postulated to occur as a result of loss of agitation in the SEFT and/or PRFT wherein slugs of Isopar L are transferred to the SRAT. This results in a build-up of flammable fuel in the SRAT vapor space which can exceed the CLFL criteria. The SEFT and PRFT are both equipped with agitator power monitoring instrumentation to ensure sufficient agitation is provided for the process vessels prior to and during transfers to the SRAT. Interlocks on low agitator power will stop transfers from the affected process vessel(s).

APPLICATION TO SAFETY ANALYSIS

The accident analyses indicate that an explosion in the SRAT can produce significant radiological consequences for the onsite worker. The SRAT is predicted to fail as a result of the calculated pressure generated by a hydrogen gas and organic vapor explosion (FSAR Section 9.4.2.1). In addition to this event, the FSAR assumes the progression of the event has the potential to damage other tanks within the CPC/SPC, either by the ejection of fragments or by the dislodging of cell covers.

The requirements of this LCO ensure the contents of the SEFT and PRFT are well mixed immediately prior to and during transfers to the SRAT. This is accomplished by monitoring the SEFT and PRFT agitator power and stopping transfers to the SRAT when the power to the vessels' agitator drops below the established low power limit. A detected low power condition causes an interlock to actuate which stops transfers from the affected vessel to the SRAT. If sufficient agitation is not available for the PRFT and/or SEFT, slugs of Isopar L can be transferred to the SRAT. This results in a build-up of flammable fuel which could exceed the CLFL criteria. Sufficient agitator power, above the established

(continued)

BASES

APPLICATION TO SAFETY ANALYSIS (continued)

safe values, ensures the contents of the SEFT and PRFT are well mixed, thereby limiting the amount of organic transferred to the SRAT.

Additionally, interlocks are required to be OPERABLE while SRAT is in OPERATION to prevent any inadvertent transfers of unmixed contents of the SEFT and PRFT to the SRAT.

LCO

The LCO limit for the SEFT agitator power ensures the contents of the process vessel are well mixed immediately prior to and during transfers to the SRAT. This LCO ensures the Safety Analysis value of 2.5 kW for SEFT agitator power (Ref. 2) is met by implementing a limit of 2.92 kW which includes instrument uncertainty (Ref. 3). There is no margin of safety associated with the instrumented SEFT agitator power LCO value as it is set approximately 40% higher than the measured power for empty tank conditions. The agitator power indicators read out in % of scale, therefore the minimum required agitator power is 14.6%. The LCO low power limit was chosen to reflect the hardwired interlock setpoints detailed in Table 3.1.10-1. The required agitation time prior to transfer ensures adequate mixing in the SEFT to ensure a slug of organic material is not transferred to the SRAT (Ref. 2). This limiting condition is met by ensuring that the agitator is in operation and has been in operation continuously for at least 2 hours when the SEFT transfer pump is started. In the event the SEFT agitator power drops below the setpoint value, the hardwired interlocks will stop transfers from the SEFT to the SRAT. For the low agitator power interlock and power indicator to be considered OPERABLE, the instrument loop must have an INSTRUMENT LOOP CALIBRATION and INSTRUMENT LOOP TEST performed to ensure correct power indications and proper actuation at the correct setpoint. The SEFT agitator power is indicated at JIT-3210A and JIT-3210B.

The LCO limit for the PRFT agitator power ensures the contents of the process vessel are well mixed immediately prior to and during transfers to the SRAT. This LCO ensures the Safety Analysis value of 2.5 kW for PRFT agitator power (Ref. 2) is met by implementing a limit of 2.92 kW which includes instrument uncertainty (Ref. 4). There is no margin of safety associated with the instrumented PRFT agitator power LCO value as it is set approximately 40% higher than the measured power for empty tank conditions. The agitator power indicators read out in % of scale, therefore the minimum required agitator power is 14.6%. This LCO low power limit was chosen to reflect the hardwired interlock setpoints detailed in Table 3.1.10-1. The required agitation time prior to transfer ensures adequate mixing in

(continued)

BASES

LCO (continued)

the PRFT to ensure a slug of organic material is not transferred to the SRAT (Ref. 2). This limiting condition is met by ensuring that the agitator is in operation and has been in operation continuously for at least 2 hours when the PRFT transfer pump is started. In the event the PRFT agitator power drops below the setpoint value, the hardwired interlocks will stop transfers from the PRFT to the SRAT. For the low agitator power interlock and power indicator to be considered OPERABLE, the instrument loop must have an INSTRUMENT LOOP CALIBRATION and INSTRUMENT LOOP TEST performed to ensure correct power indications and proper actuation at the correct setpoint. The PRFT agitator power is indicated at JIT-1140A and JIT-1140B.

MODE APPLICABILITY

This LCO applies when transfers are made from the SEFT and/or PRFT to the SRAT. Therefore, this LCO is applicable during OPERATION.

PROCESS AREA APPLICABILITY

This LCO is applicable to the SRAT which is located in the CPC. The FSAR analysis indicates that insufficient agitation in the SEFT or PRFT prior to or during transfers to the SRAT could result in an explosion in the SRAT with significant impacts on the FACILITY workers.

ACTIONS

A.1

A NOTE prior to the Required Actions stipulates that entry into OPERATION for the SRAT is not prohibited due to entry into Condition A. This exception to LCO 3.0.4 is acceptable as Condition A is only applicable during transfers from the SEFT or PRFT to the SRAT. Condition A is entered if the SEFT agitator power is less than 14.6% which includes instrument uncertainty, or the PRFT agitator power is less than 14.6% which includes instrument uncertainty as indicated by OPERABLE power monitoring instrumentation. If the power to the SEFT or PRFT agitator is less than the established low power limit during OPERATION, slugs of Isopar L could be transferred to the SRAT which could result in the CLFL criteria being exceeded for the vessel. Therefore, Required Actions shall be initiated IMMEDIATELY to stop transfers from the affected vessel to the SRAT. A NOTE alerts operators that this action should have already occurred upon detection of the low agitator power condition via the hardwired interlocks. However, if not, operator action

(continued)

BASES

ACTIONS (continued)

A.1 (continued)

shall be taken IMMEDIATELY to initiate the proper response of the low power interlocks. Stopping transfers from the affected vessel will limit the amount of organic transferred to the SRAT.

If either or both SEFT or PRFT agitator power indicators or low power hardwired interlocks are inoperable, Required Actions shall be initiated IMMEDIATELY to stop transfers from the affected vessel to the SRAT. Without the ability to reliably detect and respond to a low agitator power condition, the fuel concentration in the SRAT vapor space could be approaching the CLFL due to the receipt of slugs of Isopar L from an inadequately mixed vessel. Stopping transfers from the affected vessel to the SRAT limits the amount of organic transferred to the SRAT.

SURVEILLANCE REQUIREMENTS

SR 4.1.10.1

The SEFT agitator power shall be verified, at least 2 hours prior to SEFT transfer to the SRAT and every 12 hours thereafter during SEFT transfers to the SRAT, to be greater than or equal to 14.6 % which equates to the Safety Analysis power requirement of 2.5 kW plus the instrument uncertainty. SEFT agitator power is indicated on JIT-3210A and JIT-3210B. This verification ensures the contents of the process vessel are adequately mixed prior to and during transfers to the SRAT, which is necessary to ensure the fuel concentration in the SRAT vapor space does not approach the CLFL. The frequency of performing this surveillance 2 hours before starting the SEFT transfer pump is intended to ensure that the agitator is in operation and has been in continuous operation for at least 2 hours when the transfer pump is started. The 12-Hour surveillance frequency is considered adequate to track and trend the instrument performance. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.10.2

The PRFT agitator power shall be verified, at least 2 hours prior to PRFT transfer to the SRAT and every 12 hours thereafter during PRFT transfers to the SRAT, to be greater than or equal to 14.6 % which equates to the Safety Analysis power requirement of 2.5 kW plus the instrument uncertainty. PRFT agitator power is indicated on JIT-1140A and JIT-1140B. This verification ensures the contents of the process vessel are adequately mixing during transfers to the SRAT, which is necessary to ensure the fuel concentration in the SRAT vapor space does not approach the CLFL. The frequency of performing this surveillance 2 hours before starting the PRFT transfer pump is intended to ensure that the agitator is in operation and has been in continuous operation for at least 2 hours when the transfer pump is started. The 12-Hour surveillance frequency is considered adequate to track and trend the instrument performance. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

SR 4.1.10.3

An INSTRUMENT LOOP CHECK shall be performed on the SEFT agitator power monitoring instruments (JIT-3210A and JIT-3210B) at least 2 hours prior to SEFT transfer to the SRAT and every 12 hours thereafter during SEFT transfer to the SRAT. The INSTRUMENT LOOP CHECK will compare the agitator power readings on the two indicators (JIT-3210A to JIT-3210B) to verify the OPERABILITY of the SEFT agitator power monitoring instrumentation. This conditional frequency is sufficient to provide assurance that the electronic power measuring instruments are operating properly. The surveillance is performed at the same frequency that the instrumentation is being used thus ensuring the readings are valid. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.10.4

An INSTRUMENT LOOP CHECK shall be performed on the PRFT agitator power monitoring instruments (JIT-1140A and JIT-1140B) at least 2 hours prior to PRFT transfer to the SRAT and every 12 hours thereafter during PRFT transfer to the SRAT. The INSTRUMENT LOOP CHECK will compare the agitator power readings on the two indicators (JIT-1140A to JIT-1140B) to verify the OPERABILITY of the PRFT agitator power monitoring instrumentation. This conditional frequency is sufficient to provide assurance that the electronic power measuring instruments are operating properly. The surveillance is performed at the same frequency that the instrumentation is being used thus ensuring the readings are valid. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

SR 4.1.10.5

The electronics of the SEFT agitator power instrumentation loops detailed in Table 3.1.10-1 shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures the electronics that form the instrument loop required by Table 3.1.10-1 are maintained in a sufficiently accurate condition. The calibration involves response testing of the electronics over the full range of the loop with known values. Verification is made that the indications are correct and the established setpoints for the loop interlock response are within the required tolerance. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition A of this LCO.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.10.6

An INSTRUMENT LOOP TEST of the hardwired interlock functions detailed in Table 3.1.10-1 for the SEFT shall be performed every 1 year to ensure the OPERABILITY of the interlock circuitry. This test shall verify with simulated input signal that the required equipment receives the proper signal to direct the actions outlined in the footnotes of Table 3.1.10-1. A successful completion of this test will ensure the required equipment receives the signal directing the actions required by this interlock at a setpoint within the requirements of Table 3.1.10-1. The 1-Year surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. A failure to meet the requirements of this SR requires entry into Condition A of this LCO.

SR 4.1.10.7

The electronics of the PRFT agitator power instrumentation loops detailed in Table 3.1.10-1 shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures the electronics that form the instrument loop required by Table 3.1.10-1 are maintained in a sufficiently accurate condition. The calibration involves response testing of the electronics over the full range of the loop with known values. Verification is made that the indications are correct and the established setpoints for the loop interlock response are within the required tolerance. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition A of this LCO.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.10.8

An INSTRUMENT LOOP TEST of the hardwired interlock functions detailed in Table 3.1.10-1 for the PRFT shall be performed every 1 year to ensure the OPERABILITY of the interlock circuitry. This test shall verify with simulated input signal that the required equipment receives the proper signal to direct the actions outlined in the footnotes of Table 3.1.10-1. A successful completion of this test will ensure the required equipment receives the signal directing the actions required by this interlock at a setpoint within the requirements of Table 3.1.10-1. The 1-Year surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. A failure to meet the requirements of this SR requires entry into Condition A of this LCO.

REFERENCES

1. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U). WSRC-SA-6.

2. Engineering Position Paper: Minimum Agitation Time and Agitator Power for the Strip Effluent Feed Tank and Precipitate Reactor Feed Tank for Transfers to the Sludge Receipt and Adjustment Tank. WSRC-TR-2006-00370.

3. Instrumentation Uncertainties Evaluation Strip Effluent Feed Tank Agitator Power S350-JIT-3210A/B; JSLL-3210AA/BA. J-CLC-S-00123.

4. Instrumentation Uncertainties Evaluation Precipitate Reactor Feed Tank Agitator Power S350-JIT-1140A/B; JSLL-1140AA/BA. J-CLC-S-00125.

B 3/4.1 CPC/SPC FLAMMABILITY CONTROL

B 3.1.11 SRAT Temperature and Steam Flow Monitoring

BASES

BACKGROUND SUMMARY

The processing of waste streams from the Salt Waste Processing Facility (SWPF) in DWPF can produce flammable gases in the CPC/SPC process vessels (hydrogen and/or volatile organic) which, if ignited, could cause a significant release of radioactive material. The SRAT is identified in the accident analysis as a CPC process vessel which possesses the potential to explode and cause a release of radionuclide material.

The SRAT receives waste for processing from the SEFT and PRFT that may have volatile organics in the liquid phase. The SRAT is maintained at boiling conditions during SEFT and PRFT transfers to strip the organic of concern (Isopar L) from the liquid contents of the SRAT. This allows for the vaporization of the organic as it enters the vessel for removal by the vessel purge. Decreasing temperatures in the SRAT can result in a buildup of organic and a subsequent increase in the fuel concentration in the SRAT vapor space, as well as carryover of organic to downstream process vessels.

The SRAT will be verified to be at boiling conditions prior to and during transfers into the SRAT from the SEFT and PRFT. A key indicator of boiling is the SRAT liquid temperature. As steam is introduced to the vessel, the temperature of the vessel's liquid contents will increase. Once the vessel reaches boiling conditions, the vessel's liquid temperature will stabilize. This combined with one of the following process parameters provides a positive indication the SRAT has reached boiling conditions: a change in the SRAT pressure, a change in the temperature of the SRAT condenser condensate temperature, or a gradual increase in the SMECT level and a decrease in the level of the SRAT. These parameters will be monitored/trended during feeding to verify boiling continues.

The SRAT is also equipped with steam flow instrumentation to assure the process vessel is maintained at boiling conditions during transfers from the SEFT and PRFT. Steam flow interlocks will interlock off the transfer of material from the SEFT and PRFT to the SRAT on low steam flow.

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BASES

BACKGROUND SUMMARY (continued)

SRAT temperature interlocks provide an additional indication of loss of steam flow to the vessel. This low temperature would be an indication of a loss of boiling during transfers from the SEFT and PRFT to the SRAT. The SRAT temperature interlocks will stop the transfer of material from the SEFT and PRFT to the SRAT on low SRAT liquid temperature.

While the interlock will not prevent the accumulation of Isopar L immediately upon loss of boiling, it will minimize the amount of accumulation in the vessel and minimize the potential for a flammable condition.

The SEFT and PRFT transfer flow rates are controlled by passive orifices installed in the discharge piping of each pump. The orifices, in conjunction with the pump characteristics, limit the flow rate to 10 gpm for each pump. The system design may allow for a VFD to be installed. With a setup of 60 hertz and the same pump characteristics, the limited orifice flow rate of 10 gpm is maintained. Calculations were performed to determine the maximum flow rate obtainable at higher VFD frequency outputs for the PRFT and SEFT pumps and concluded that the pump systems are not capable of producing a flow in excess of 14 gpm. The impact of operating the SEFT or PRFT pump at 14 gpm on the SRAT purge calculation and the calculation for maximum organic feed to prevent condensation in the FAVC was assessed (purge directly and condensation by substituting 14 gpm for 10 gpm) and determined that the SRAT purge was still adequate and that condensation in the FAVC would not occur at 14 gpm.

APPLICATION TO SAFETY ANALYSIS

The accident analyses indicate that an explosion in the SRAT can produce significant radiological consequences for the onsite worker. The SRAT is predicted to fail as a result of the calculated pressure generated by a hydrogen gas and organic vapor explosion (FSAR Section 9.4.2.1) (Ref. 1). In addition to this event, the FSAR assumes that the progression of the event has the potential to damage other tanks within the CPC/SPC, either by the ejection of fragments or by the dislodging of cell covers.

The requirements of this LCO ensure the liquid in the SRAT is boiling to strip the organic of concern (Isopar L) from the liquid during SEFT and PRFT transfers. If any organic is present in the material transferred from the SEFT or PRFT, boiling the vessel's contents will ensure the organic is vaporized as it enters the vessel for removal by the vessel purge. This

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BASES

APPLICATION TO SAFETY ANALYSIS (continued)

is accomplished by verifying the SRAT is boiling prior to transfers from the SEFT or PRFT to the SRAT and monitoring the SRAT temperature and steam flow rate. If the detected liquid temperature or the detected steam flow rate is below the required limits, hardwired interlocks are activated to stop the transfer of material to the SRAT from the SEFT and PRFT.

It should be noted that interlocks associated with the SRAT GCs and purge flow will close the SRAT steam supply when actuated. Such interlock action will result in the SEFT and PRFT steam flow interlock actuation to stop the transfer pumps.

The fuel concentration in the SRAT vapor space can exceed the CLFL criteria if the liquid in the SRAT is not boiling. Volatile organics could also accumulate in the downstream process vessels if the SRAT is not boiling to steam strip the organic. Ensuring boiling in the SRAT and monitoring temperature and steam flow during transfers ensures boiling conditions are maintained in the process vessel, thereby precluding the accumulation and potential carryover of volatile organics in the SRAT condenser train.

LCO

The LCO statement to ensure the SRAT contents are boiling prior to and during transfers to the SRAT from the SEFT or PRFT ensures the Isopar L received in the Strip Effluent is steam stripped upon entry into the SRAT. The SRAT is verified to be boiling using the SRAT liquid temperature when combined with one of the following process parameters: a pressure change in the SRAT vessel, a change in the SRAT condenser condensate temperature, or a gradual increase in level in the SMECT and decrease in the SRAT level. For the low temperature indicator to be considered OPERABLE, the instrument must have an INSTRUMENT LOOP CALIBRATION and INSTRUMENT LOOP TEST performed to ensure correct temperature indications. The SRAT liquid temperature is indicated at TIT 3008A and TIT 3008B. The indications of SRAT boiling will continue to be monitored during transfers to ensure boiling continues.

The LCO limit for the SRAT steam flow ensures the process vessel can be maintained at boiling conditions to strip the Isopar L during transfers. The Safety Analysis value of 1815 pph for the SRAT steam flow is based on maintaining the SRAT at boiling conditions. The LCO ensures the Safety Analysis value of 1815 pph for SRAT steam flow rate (Ref. 4) is met by implementing a limit of 2600 pph, which includes

(continued)

BASES

LCO (continued)

instrument uncertainty (Ref. 6) and jumper leakage (Ref. 5) plus 27 pph which has been judged as acceptable Critical Plant Air Isolation check valve leakage. The steam flow meters read out in % of scale, therefore the minimum required steam flow is 47.3%. This LCO low steam flow limit was chosen to reflect the hardwired interlock setpoints detailed in Table 3.1.11-1. In the event the SRAT steam flow rate drops below the setpoint value, the hardwired interlocks will stop transfers from the SEFT and PRFT to the SRAT. There is no margin of safety associated with the instrumented steam flow LCO value as the Safety Analysis value was derived using reasonably conservative analysis. Examples of conservatisms in the Safety Analysis value determination include assuming the maximum possible SE feed rates and conservative steam leak rates. For the low steam flow interlock and steam flow indicator to be considered OPERABLE, the instrument loop must have an INSTRUMENT LOOP CALIBRATION and INSTRUMENT LOOP TEST performed to ensure correct steam flow indications and proper actuation at the correct setpoint. The SRAT steam flow rate is indicated at FIT-3000AB and FIT-3000BB.

The LCO limit for the SRAT liquid temperature provides assurance the steam is effectively heating the vessel. The TSR setpoint value of 98°C was chosen as the closest temperature setpoint to boiling which could be monitored without causing nuisance alarms. This LCO low temperature limit was chosen to reflect the hardwired interlock setpoints detailed in Table 3.1.11-1. In the event the SRAT liquid temperature drops below the setpoint value, the hardwired interlocks will stop transfers from the SEFT and PRFT to the SRAT. For the low temperature interlock to be considered OPERABLE, the instrument loop must have an INSTRUMENT LOOP CALIBRATION and INSTRUMENT LOOP TEST performed to ensure proper actuation at the correct setpoint.

The LCO requirement that redundant check valves in the Critical Plant Air supply to the SRAT steam coil be OPERABLE provides assurance that the required steam flow for maintaining the vaporization temperature to strip the Isopar L from the liquid contents of the SRAT is reaching the SRAT. The Critical Plant Air header is a possible path through which steam could flow, bypassing the SRAT.

MODE APPLICABILITY

This LCO applies when transfers are made from the SEFT and/or PRFT to the SRAT. Therefore, this LCO is applicable during OPERATION.

(continued)

BASES

PROCESS AREA APPLICABILITY

This LCO is applicable to the SRAT which is located in the CPC. The FSAR analysis indicates that volatile organics from the SEFT and/or PRFT could accumulate in the SRAT, as a result of loss of boiling conditions in the vessel, which could result in an explosion in the SRAT with significant impacts on the FACILITY workers and possibly the offsite public.

ACTIONS

A.1

The action taken for low steam flow, inoperable temperature (one or both) or steam flow instrumentation/interlocks (one or both), or inoperable check valves (one or more) is to stop transfers from the SEFT or PRFT into the SRAT. This action will stop the introduction of Isopar L, a volatile organic hazard, to the SRAT and prevents the SRAT vapor space from reaching flammable conditions and prevents the carryover of Isopar L to downstream process vessels.

This action should be initiated by interlocks if due to low steam flow as indicated in the NOTE prior to the Action. Additionally, an exception to LCO 3.0.4 is noted for these Actions as the SRAT must be placed in OPERATION, at a temperature well below the SRAT low temperature interlock setpoint.

B.1 and B.2

NOTE 1 is provided for condition B which states the condition is not to be exited until actions B.3 and B.4 are completed. This is required to ensure any accumulated Isopar L is evaluated and the appropriate compensatory measures are taken to ensure the Isopar L is safely removed without creating a flammable atmosphere in the SRAT. NOTE 2 states this condition is not required to be entered if feed is stopped due to the low steam flow interlock. This is covered under condition A.

The action taken for lack of boiling during transfer is to stop transfers into and out of the SRAT and isolate steam supply to the vessel. A low temperature indication or interlock shall be considered an indication of lack of boiling. Stopping transfers into the SRAT from the PRFT and SEFT stops the additional introduction of Isopar L into the SRAT and minimizes the potential for accumulation of Isopar L in the SRAT and

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BASES

ACTIONS (continued)

B.1 and B.2 (continued)

the potential for the vapor space to reach flammable conditions. This action should be initiated by interlocks if due to low temperature as indicated in the NOTE prior to the Action. Stopping other transfers into the SRAT minimizes reduction of the vessel vapor space. Stopping transfers out of the SRAT prevents sending any accumulated Isopar L to downstream vessels. An exception to LCO 3.0.4 is noted for these Actions as the SRAT must be placed in OPERATION, at a temperature below the SRAT low temperature interlock setpoint.

The following are not considered transfers into the SRAT for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

B.3

This action requires an engineering evaluation to be performed to determine the potential impacts of any accumulated Isopar L and the required compensatory measures (if needed) to ensure the accumulated Isopar L is safely removed. This evaluation is required to be performed prior to restoring steam flow to the SRAT to ensure the resumption of steam flow will not result in a flammable condition in the SRAT vapor space. The engineering evaluation may take into consideration the following: the feed rates from the SEFT and PRFT, the actual Isopar L concentration based on sample results, the liquid level in the SRAT, the maximum anticipated hydrogen generation rate, and the time the vessel has been maintained at an elevated temperature since boiling was lost. The evaluation shall establish the compensatory measures which may include, but is not limited to, the time the vessel must be maintained at an elevated temperature to ensure the Isopar L is released without creating a flammable atmosphere in the SRAT vapor space. This engineering evaluation shall be a Type 1 calculation performed per Manual E7 requiring verification/checking.

(continued)

BASES

ACTIONS (continued)

B.4

This action requires the compensatory measures, if identified by action B.3, to be implemented. These compensatory measures may include the resumption of transfers into the SRAT or the restoration of steam flow to the vessel which were terminated per actions B.1 and B.2. This is allowed provided it has been evaluated per action B.3 and determined it will not result in a flammable condition in the SRAT.

SURVEILLANCE REQUIREMENTS

SR 4.1.11.1

The SRAT shall be verified to be boiling prior to SEFT or PRFT transfer to the SRAT. A key indicator used to verify boiling is the SRAT liquid temperature. SRAT liquid temperature is indicated on TIT-3008A or TIT-3008B as well as on the DCS. As the steam is introduced to the SRAT the temperature will increase. Upon reaching boiling conditions, the SRAT temperature will stabilize. This combined with one of the following process parameters provides positive indication the SRAT has reached boiling conditions: a pressure change in the SRAT vessel, a change in the SRAT condenser condensate temperature, or a gradual increase in level in the SMECT and decrease in the SRAT level. This verification ensures the proper process conditions exist in the SRAT to preclude the accumulation and/or carryover of volatile organics. The DCS system may be used to identify instrument trends (including temperature) to verify boiling since verification of trends by local instrumentation is not practical. Failure to meet the requirements of this SR requires entering Condition B of this LCO.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.11.2

The SRAT steam flow rate shall be verified, prior to SEFT or PRFT transfer to the SRAT and every 12 hours thereafter during SEFT or PRFT transfer to the SRAT, to be greater than or equal to 47.3% as indicated on the local flow indicator digital display. This equates to 2600 pph which includes the Safety Analysis required flow, instrument uncertainty, jumper leakage and check valve leakage. SRAT steam flow is indicated on FIT-3000AB or FIT-3000BB. This verification ensures the proper process conditions exist in the SRAT to preclude the accumulation and/or carryover of volatile organics. The actual readings of the steam flow rate must be obtained from equipment that is within the required INSTRUMENT LOOP CALIBRATION frequency given in SR 4.1.11.7. The 12-Hour surveillance frequency is considered adequate to track and trend the instrument performance. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

SR 4.1.11.3

An INSTRUMENT LOOP CHECK shall be performed on the SRAT local temperature instruments (TIT-3008A and TIT-3008B) prior to SEFT or PRFT transfer to the SRAT and every 12 hours thereafter during SEFT or PRFT transfer to the SRAT. The INSTRUMENT LOOP CHECK will compare the liquid temperature readings on the two indicators (TIT-3008A to TIT-3008B) to verify the OPERABILITY of the SRAT temperature instrumentation. This conditional frequency is sufficient to provide assurance that the electronic temperature measuring instruments are operating properly. The surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.11.4

An INSTRUMENT LOOP CHECK shall be performed on the SRAT local steam flow instruments (FIT-3000AB and FIT-3000BB) prior to SEFT or PRFT transfer to the SRAT and every 12 hours thereafter during SEFT or PRFT transfer to the SRAT. The INSTRUMENT LOOP CHECK will compare the steam flow readings on the two indicators (FIT-3000AB to FIT-3000BB) to verify the OPERABILITY of the SRAT steam flow instrumentation. This conditional frequency is sufficient to provide assurance that the electronic steam flow measuring instruments are operating properly. The surveillance frequency is performed at the same frequency that the instrumentation is being used thus ensuring the readings are valid. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

SR 4.1.11.5

The electronics of the SRAT liquid temperature instrumentation loops detailed in Table 3.1.11-1 shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures the electronics that form the instrument loop required by Table 3.1.11-1 are maintained in a sufficiently accurate condition. The calibration involves response testing of the electronics over the full range of the loop with known values. Verification is made that the indications are correct and the established setpoints for the loop interlock response are within the required tolerance. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition A of this LCO.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.11.6

An INSTRUMENT LOOP TEST of the SRAT low temperature hardwired interlock functions detailed in Table 3.1.11-1 shall be performed every 1 year to ensure the OPERABILITY of the interlock circuitry. This test shall verify with simulated input signal that the required equipment receives the proper signal to direct the actions outlined in the footnotes of Table 3.1.11-1. A successful completion of this test will ensure the required equipment receives the signal directing the actions required by this interlock at a setpoint within the requirements of Table 3.1.11-1. The 1-Year surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. A failure to meet the requirements of this SR requires entry into Condition A of this LCO.

SR 4.1.11.7

The electronics of the SRAT steam flow instrumentation loops detailed in Table 3.1.11-1 shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures the electronics that form the instrument loop required by Table 3.1.11-1 are maintained in a sufficiently accurate condition. The calibration involves response testing of the electronics over the full range of the loop with known values. Verification is made that the indications are correct and the established setpoints for the loop interlock response are within the required tolerance. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition A of this LCO.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.1.11.8

An INSTRUMENT LOOP TEST of the SRAT low steam flow hardwired interlock functions detailed in Table 3.1.11-1 shall be performed every 1 Year to ensure the OPERABILITY of the interlock circuitry. This test shall verify with simulated input signal that the required equipment receives the proper signal to direct the actions outlined in the footnotes of Table 3.1.11-1. A successful completion of this test will ensure the required equipment receives the signal directing the actions required by this interlock at a setpoint within the requirements of Table 3.1.11-1. The 1-Year surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. A failure to meet the requirements of this SR requires entry into Condition A of this LCO.

SR 4.1.11.9

The Critical Plant Air Isolation Check Valves shall be leak tested at least every 5 years to verify acceptable leakage past each check valve. This test ensures the steam supply to the SRAT steam coils will be able to maintain the required liquid temperature to strip Isopar L from the SEFT or PRFT waste stream at a rate equal to or greater than the rate it is being added to the SRAT. These valves are required to be OPERABLE during OPERATIONS MODE while transfers from the SEFT or PRFT to the SRAT are in progress. A failed isolation check valve prior to SEFT or PRFT transfers to the SRAT will result in an inability to raise temperature sufficiently to establish boiling conditions in the vessel. Failure of the check valves while transfers from the SEFT or PRFT are in progress will result in decreasing temperature and actuation of the low temperature interlock to stop transfers to the SRAT. For small amounts of check valve leakage (less than or equal to 27 pph), the impact on SRAT boiling should be negligible. A 5-Year test frequency is sufficient to ensure adequate integrity of the check valves due to the fact that the hazard, i.e., accumulation and carryover of Isopar L in the SRAT, will not occur if excessive leakage occurs. Failure to meet or perform this SR requires entering Condition A of this LCO.

(continued)

BASES

REFERENCES

1. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U). WSRC-SA-6.

2. Deleted.

3. Instrumentation Uncertainties Evaluation Sludge Receipt and Adjustment Tank Liquid Temperature. J-CLC-S-00122.

4. Minimum Steam Flow to Prevent Solvent Accumulation in the Sludge Receipt and Adjustment Tank. X-CLC-S-00158.

5. Sludge Receipt and Adjustment Tank (SRAT) Steam Jumper Leakage Calculation. M-CLC-S-00754.

6. Instrumentation Uncertainties Evaluation Sludge Receipt and Adjustment Tank Steam Flow. J-CLC-S-00124.

B 3/4.2 SPC FLAMMABILITY CONTROL

BASES

The following LCOs have been deleted:

3.2.1 SPC Flammability Monitoring

3.2.2 PVVH Flammability Monitoring

3.2.3 SPC Flammability Control – Operation

3.2.4 SPC Flammability Control – Standby

3.2.5 SPC Flammability Control – Shutdown

3.2.6 SPC Purge Sources

3.2.7 SPC Sump Level

3.2.8 PHA Composition

B 3/4.3 MELTER FLAMMABILITY

B 3.3.1 Melter Off-Gas Flammability Control

BASES

This LCO has been deleted.

B 3/4.4 LPPP FLAMMABILITY CONTROL

B 3.4.1 LPPP-PPT Temperature Control

BASES

BACKGROUND SUMMARY

The processing of waste streams from the Salt Waste Processing Facility (SWPF) in DWPF can produce flammable gases in the LPPP-PPT (hydrogen and/or organic) which, if ignited, could cause a significant release of radioactive material. The LPPP-PPT has a purge supply that is controlled in LCO 3.4.3 and 3.4.5 to address these potentially flammable gasses.

The purge is dependent on the concentration of organic vapor in the vessel vapor space. This concentration is controlled by limiting the liquid temperature in the LPPP-PPT. An interlock on high liquid temperature is provided to stop the LPPP-PPT agitator and transfer pump. This removes the significant sources of energy input to the LPPP-PPT. Additional heat may be introduced into the vessel through radiolytically generated decay heat, or self-heating. Analysis has shown the temperature can increase above the protected setpoint by self-heating without exceeding the CLFL provided the purge remains operable and the introduction of additional organics is stopped upon reaching the temperature limit (Ref. 1).

Additional analysis has been performed to show there was insufficient Isopar L and hydrogen production present to allow the LPPP-PPT to become flammable when the LPPP-PPT level is at or below 208 gallons, which is the approximate level where the RTDs are uncovered, when the designated purge is applied. (Ref. 1 and 4).

The temperature controls in this LCO support the purge controls to maintain the LPPP-PPT to less than 60% of the CLFL.

(continued)

BASES

APPLICATION TO SAFETY ANALYSIS

The accident analyses indicate that an explosion in the LPPP-PPT can produce significant radiological consequences for the onsite worker. The LPPP-PPT is predicted to fail as a result of the calculated pressure generated by a hydrogen gas and organic vapor explosion (FSAR Section 9.4.2.4 [Ref. 2]). In addition to this event, the FSAR assumes the progression of the event has the potential to damage other tanks within the LPPP by the dislodging of cell covers.

The requirements of this LCO will ensure the fuel concentration in the vapor space of the LPPP-PPT is maintained to less than or equal to 60% of the CLFL, by ensuring the temperature assumptions in the purge calculation remain valid. It has been shown that the minimum required purge rates along with the temperature limits for the LPPP-PPT will maintain the fuel concentration in the vapor space of the vessels to less than or equal to 60% of the CLFL. When the liquid level drops below the RTDs, purge alone is sufficient to maintain the tank vapor space less than 60% CLFL at 105°C and temperature controls are no longer required (Ref. 1).

Temperature instrumentation is provided to monitor the liquid temperature in the LPPP-PPT. A high temperature condition causes an interlock to actuate which stops the LPPP-PPT agitator and transfer pump. The high temperature interlocks are relied upon in the accident analysis to remove significant sources of energy input to the vessel. This limits the fuel concentration in the vapor space of the vessel. The high temperature interlocks are not required when the RTDs are uncovered (Ref. 1 and 4).

(continued)

BASES

LCO	The LCO limit for the LPPP-PPT liquid temperature is provided to limit the concentration of organic vapor in the process vessel. The liquid temperature LCO limit will maintain the fuel concentration in the vessel to less than or equal to 60% of the CLFL when the LPPP-PPT purge flow requirements are met. This LCO ensures the Safety Analysis value of 41°C for LPPP-PPT liquid temperature is met by implementing a limit of 38.1°C which includes instrument uncertainty (Ref. 1). This LCO temperature limit was chosen to reflect the hardwired interlock setpoints detailed in Table 3.4.1-1. In the event the LPPP-PPT liquid temperature exceeds the setpoint value, hardwired interlocks will stop the LPPP-PPT agitator and transfer pump. For the temperature instrumentation to be considered OPERABLE, the instrument loops must have an INSTRUMENT LOOP CALIBRATION performed to ensure proper actuation at the correct setpoint and correct temperature indications. The LPPP-PPT liquid temperature is indicated at TIT-7170A and TIT-7170B. An analysis has been performed to show the high temperature limit and high temperature interlocks are not required when the level is at or below 208 gallons, which is the approximate level where the RTDs are uncovered, when the designated purge is applied. (Ref. 1 and 4). There is no margin of safety associated with the instrumented temperature LCO values as these values support the Safety Analysis values for purge flow which were derived using reasonable conservative analysis as described earlier.
MODE APPLICABILITY	This LCO applies when DWPF operations in the LPPP-PPT could generate a flammable concentration of hydrogen gas and/or organic vapor. Therefore, this LCO is applicable during OPERATION, STANDBY and SHUTDOWN when the LPPP-PPT liquid level is greater than 208 gallons.

(continued)

BASES

PROCESS AREA APPLICABILITY

This LCO is applicable to the LPPP-PPT which is located in the LPPP. The FSAR analysis indicates that an explosion in the LPPP-PPT can occur and have significant impacts on the onsite workers.

ACTIONS

A.1 and A.2

If the LPPP-PPT is at a level greater than 208 gallons and the liquid temperature is greater than 38.1°C as indicated by OPERABLE temperature instrumentation, the fuel concentration in the vessel could exceed the CLFL criteria. Additionally, if either one or both LPPP-PPT temperature indicators or hardwired interlocks are inoperable, the temperature controls on the vessel may be inadequate and the vessel could exceed CLFL criteria.

Therefore, Required Actions shall be initiated IMMEDIATELY to stop the transfer pump and agitator for the LPPP-PPT. Stopping the agitator prevents an increase in vessel liquid temperature by removing the significant source of mechanical energy input to the vessel. NOTE 1 alerts operators that these actions should have already occurred upon detection of the high temperature condition via the hardwired interlocks. However, if not, operator action shall be taken IMMEDIATELY to initiate the proper response of the high temperature interlocks. Required Actions A.1 and A.2 are sequenced to prevent entry into LCO 3.4.2 Condition A. NOTE 2 alerts operators that stopping the transfer pump prior to stopping the agitator will prevent LCO 3.4.2 low agitator power interlock actuation to stop the transfer pump, if a transfer to the PRFT is in progress. Stopping the transfer pump and agitator for the LPPP-PPT prevents an increase in vessel liquid temperature, thereby limiting the fuel concentration in the vapor space of the vessel.

A.3

If the LCO liquid temperature limit is exceeded for the LPPP-PPT, Required Actions shall be initiated IMMEDIATELY to stop material transfers into the LPPP-PPT. This Required Action prevents the further increase in flammable fuel generation and/or reduction of the vessel vapor space. Additionally, this prevents the potential for further introduction of organics which may be released into the vessel vapor space. Because this transfer is from an interfacing facility, an interface control requires the transfer is terminated and isolated upon notification by DWPF of a high temperature alarm in the LPPP-PPT (Ref. 2).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 4.4.1.1

The liquid temperature in the LPPP-PPT shall be verified every 12 hours to be less than or equal to 38.1°C as indicated on TIT-7170A and TIT-7170B. This verification ensures the liquid temperature in the LPPP-PPT is less than the established high temperature limit, which is necessary to ensure the fuel concentration in the LPPP-PPT vapor space is maintained less than or equal to 60% of the CLFL. The 12-Hour surveillance frequency is considered adequate to track and trend the liquid temperature. Failure to meet the requirements of this SR requires entering Condition A of this LCO. The temperature instrumentation is not required when the LPPP-PPT level is less than or equal to 208 gallons (Ref. 1 and 4).

SR 4.4.1.2

An INSTRUMENT LOOP CHECK shall be performed every 24 hours on the LPPP-PPT local temperature instruments (TIT-7170A and TIT-7170B). The INSTRUMENT LOOP CHECK will compare the temperature readings on the two indicators (TIT-7170A to TIT-7170B) to verify the OPERABILITY of the LPPP-PPT temperature instrumentation. This 24-Hour frequency is sufficient to provide assurance that the electronic temperature measuring instruments are operating properly. The 24-Hour surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

SR 4.4.1.3

The electronics of the LPPP-PPT liquid temperature instrumentation loops detailed in Table 3.4.1-1 shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures the electronics that form the instrument loop required by Table 3.4.1-1 are maintained in a sufficiently accurate condition. The calibration involves response testing of the electronics over the full range of the loop with known values. Verification is made that the indications are correct and the established setpoints for the loop interlock response are within the required tolerance. A 1-Year surveillance frequency is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition A of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.4.1.4

An INSTRUMENT LOOP TEST of the hardwired interlock functions detailed in Table 3.4.1-1 for the LPPP-PPT shall be performed at least Yearly to ensure the OPERABILITY of the interlock circuitry. This test shall verify with simulated input signal that the required equipment receives the proper signal to direct the actions outlined in the footnotes of Table 3.4.1-1. A successful completion of this test will ensure the required equipment receives the signal directing the actions required by this interlock at a setpoint within the requirements of Table 3.4.1-1 and a verification of equipment/component actuation to stop the LPPP-PPT transfer pump and agitator. The 1-Year surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. A failure to meet the requirements of this SR requires entry into Condition A of this LCO.

REFERENCES

1. Purge Requirements for the Precipitate Pump Tank (PPT) for Interim Operation of SWPF. X-CLC-S-00397.

2. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U). WSRC-SA-6.

3. Low Point Pump Pit – Precipitate Pump Tank Temperature S511-TIT-7170A/B; S511-TSHH-7170AA/BA/BB/AB. J-CLC-S-00130.

4. Volume of Liquid Below the PPT RTDs. DWPF-I-LP-0028.

B 3/4.4 LPPP FLAMMABILITY CONTROL

B 3.4.2 LPPP-PPT Agitator Power Monitoring

BASES

BACKGROUND SUMMARY

Waste streams from the Salt Waste Processing Facility (SWPF) contain an organic of concern (Isopar L) which poses a potential flammability hazard in the process vessels in the LPPP and the CPC/SPC. Flammability controls exist to prevent reaching the CLFL in these vessels but is predicated on a known concentration of the organic in the waste stream. Waste Acceptance Criteria (WAC) controls ensure the concentration of the waste stream is known when the waste streams are received into the DWPF. However, additional controls are required to ensure the waste stream remains well mixed during transfers within the DWPF facilities.

The LPPP-PPT is equipped with agitator power monitoring instrumentation to ensure sufficient agitation is provided for the process vessel prior to and during transfers to the PRFT. Interlocks on low agitator power will stop transfer from the LPPP-PPT. These controls ensure the transfer remains well mixed and the concentration of the organic of concern (Isopar L) remains within analyzed limits.

APPLICATION TO SAFETY ANALYSIS

The accumulation of volatile organics in the PRFT has been postulated to occur as a result of loss of agitation in the LPPP-PPT wherein slugs of Isopar L are transferred to the PRFT. When temperature monitoring is present and the temperature remains within the normal range (as controlled by LCO 3.1.9), the flammability controls for the PRFT are not impacted by an increase in the concentration of Isopar L. However, in the event the vessel reaches higher temperatures due to radiolytic decay heat, mechanical heat sources, or due to being at levels below temperature monitoring, then the increased concentration of Isopar L may pose a flammability hazard. This is also true for vessels downstream of the PRFT. During transfers from the PRFT to the SRAT, it is postulated that material from the PRFT may leak into the SEFT through a three-way valve. The SEFT has similar controls to the PRFT and has similar flammability concerns. This is also of concern in the SRAT where the material from the PRFT is metered into the SRAT while the SRAT is boiling (LCO 3.1.11) to strip the organic of concern (Isopar L) from the process. An increased organics concentration being introduced to the SRAT can result in a potential flammable condition in the SRAT vapor space or off-gas system.

(continued)

BASES

APPLICATION TO SAFETY ANALYSIS (continued)

These vessels are predicted to fail as a result of the calculated pressure generated by a hydrogen gas and organic vapor explosion (FSAR Section 9.4.2.1). In addition to this event, the FSAR assumes the progression of the event has the potential to damage other tanks within the CPC/SPC, either by the ejection of fragments or by the dislodging of cell covers.

The requirements of this LCO ensure the contents of the LPPP-PPT are well mixed immediately prior to and during transfers to the PRFT. This is accomplished by monitoring the LPPP-PPT agitator power and stopping transfer to the PRFT when the power to the vessel agitator drops below the established low power limit. A detected low power condition causes an interlock to actuate which stops transfer from the LPPP-PPT to the PRFT. These controls ensure the transfer remains well mixed and the concentration of the organic of concern (Isopar L) remains within analyzed limits preventing the explosion event.

LCO

The LCO limit for the LPPP-PPT agitator power ensures the contents of the LPPP-PPT are well mixed immediately prior to and during transfers to the PRFT. This LCO requires the agitator power to be greater than or equal to 12.6% for 2 hours prior to and during transfer to the PRFT. This LCO ensures the Safety Analysis value of 2.5 kW (Ref. 2) for LPPP-PPT agitator power is met by implementing a limit of 3.02 kW which includes instrument uncertainty (Ref. 3). There is no margin of safety associated with the instrumented agitator power LCO value as it is set approximately 40% higher than the measured power for empty tank conditions (Ref. 2). The agitator power indicators read out in percent of scale, therefore the minimum required agitator power is 12.6%. The LCO low power limit was chosen to reflect the hardwired interlock setpoints detailed in Table 3.4.2-1. The required agitation time prior to transfer ensures adequate mixing in the LPPP-PPT to ensure a slug of organic material is not transferred to the PRFT (Ref. 2). In the event the LPPP-PPT agitator power drops below the setpoint value, the hardwired interlocks will stop transfer from the LPPP-PPT to the PRFT. For the low agitator power interlock and power indicator to be considered OPERABLE, the instrument loop must have an INSTRUMENT LOOP CALIBRATION and INSTRUMENT LOOP TEST performed to ensure correct power indications and proper actuation at the correct setpoint. The LPPP-PPT agitator power is indicated at JIT-7171A and JIT-7171B.

(continued)

BASES

MODE APPLICABILITY	This LCO applies when transfers are made from the LPPP-PPT to the PRFT. Therefore, this LCO is applicable during OPERATION and STANDBY.
PROCESS AREA APPLICABILITY	This LCO is applicable to the LPPP-PPT which is located in the LPPP. The FSAR analysis indicates that insufficient agitation in the LPPP-PPT prior to or during transfers to the PRFT could result in an explosion in the PRFT with significant impacts on the FACILITY workers.
ACTIONS	A.1 A NOTE prior to the Required Actions stipulates that entry into OPERATION or STANDBY for the PRFT is not prohibited due to entry into Condition A. This exception to LCO 3.0.4 is acceptable as Condition A is only applicable during transfers from the LPPP-PPT to the PRFT. Condition A is entered if the LPPP-PPT agitator power is less than 12.6% (which includes instrument uncertainty) as indicated by OPERABLE power monitoring instrumentation. If the power to the LPPP-PPT agitator is less than the established low power limit during transfers to the PRFT, slugs of Isopar L could be transferred to the PRFT which could result in the CLFL criteria being exceeded for the vessel and downstream vessels. Therefore, Required Action shall be initiated IMMEDIATELY to stop transfer from the LPPP-PPT to the PRFT. A NOTE alerts operators that this action should have already occurred upon detection of the low agitator power condition via the hardwired interlocks. However, if not, operator action shall be taken IMMEDIATELY to initiate the proper response of the low power interlocks. Stopping transfers from the LPPP-PPT will limit the amount of organic transferred to the PRFT. If one or both of the LPPP-PPT agitator power indicators or low power hardwired interlocks are inoperable, Required Actions shall be initiated IMMEDIATELY to stop transfers from the LPPP-PPT to the PRFT. Without the ability to reliably detect and respond to a low agitator power condition, the fuel concentration in the PRFT vapor space could be approaching the CLFL due to the receipt of slugs of Isopar L from an inadequately mixed LPPP-PPT. Stopping transfer from the LPPP-PPT to the PRFT limits the amount of organic transferred to the PRFT.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 4.4.2.1

The LPPP-PPT agitator power shall be verified, at least 2 hours prior to LPPP-PPT transfer to the PRFT to be greater than or equal to 12.6% which equates to the Safety Analysis power requirement of 2.5 kW plus the instrument uncertainty. LPPP-PPT agitator power is indicated on JIT-7171A and JIT-7171B. This verification ensures the contents of the LPPP-PPT are adequately mixed prior to and during transfers to the PRFT. Performing this surveillance 2 hours before starting the LPPP-PPT transfer pump is intended to provide assurance that the agitator is in operation and will have been in continuous operation for at least 2 hours when the transfer pump is started. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

SR 4.4.2.2

An INSTRUMENT LOOP CHECK shall be performed on the LPPP-PPT agitator power monitoring instruments (JIT-7171A and JIT-7171B) at least 2 hours prior to LPPP-PPT transfer to the PRFT. The INSTRUMENT LOOP CHECK will compare the agitator power readings on the two indicators (JIT-7171A to JIT-7171B) to verify the OPERABILITY of the LPPP-PPT agitator power monitoring instrumentation. This conditional frequency is sufficient to provide assurance that the electronic power measuring instruments are operating properly. The surveillance is performed at the same frequency as SR 4.4.2.1 to provide additional assurance the readings are valid. Failure to meet the requirements of this SR requires entering Condition A of this LCO.

SR 4.4.2.3

The electronics of the LPPP-PPT agitator power instrumentation loops detailed in Table 3.4.2-1 shall have an INSTRUMENT LOOP CALIBRATION performed at least Yearly. Performance of this SR ensures the electronics that form the instrument loop are maintained in a sufficiently accurate condition. The calibration involves response testing of the electronics over the full range of the loop with known values. Verification is made that the indications are correct and the established setpoints for the loop interlock response are within the required tolerance. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation. Failure to meet or perform this SR requires entering Condition A of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.4.2.4

An INSTRUMENT LOOP TEST of the hardwired interlock functions detailed in Table 3.4.2-1 for the LPPP-PPT shall be performed at least Yearly to ensure the OPERABILITY of the interlock circuitry. This test shall verify with simulated input signal that the required equipment receives the proper signal to direct the actions outlined in the footnotes of Table 3.4.2-1. A successful completion of this test will ensure the required equipment receives the signal directing the actions required by this interlock at a setpoint within the requirements of Table 3.4.2-1 and a verification of equipment/component actuation to stop the LPPP-PPT transfer pump. The 1-Year surveillance frequency is considered adequate to track and trend the instrument performance and is based on equipment reliability. A failure to meet the requirements of this SR requires entry into Condition A of this LCO.

REFERENCES

1. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U). WSRC-SA-6.

2. Minimum Agitation Time and Agitator Power for the Low Point Pump Pit Precipitate Pump Tank. X-ESR-S-00051.

3. Instrumentation Uncertainties Evaluation Low Point Pump Pit PPT Agitator Power S511-JIT-7171A/B; S511-JSLL-7171AA/BA/BB/AB. J-CLC-S-00129.

B 3/4.4 LPPP FLAMMABILITY CONTROL

B 3.4.3 LPPP Flammability Control

BASES

BACKGROUND SUMMARY

The Low Point Pump Pit (LPPP) vessels identified in the accident analysis which possess the potential to explode and cause a release of radioactive material include the Precipitate Pump Tank (PPT), Sludge Pump Tank (SPT), and Recycle Pump Tank (RPT).

The LPPP purge systems are designed to keep the SPT from reaching a combustible hydrogen concentration of 25% of the LFL, the PPT from reaching 60% CLFL for hydrogen and Isopar L, and the RPT from reaching 25% of the CLFL for hydrogen, Isopar L, ammonia and ADPs by supplying enough purge flow to dilute the flammables concentration. By maintaining the purge to the PPT, SPT, and RPT, flammable vapors are forced into the PPV or out into the cell. If hydrogen were to escape the vessel, it would already be less than the LFL, and the air in the PPV or cell would further dilute its concentration, thus preventing any possible explosion. Nitrogen is normally supplied to the vessel from the 422-S bulk nitrogen tank through a flow control valve. The LPPP PPT, SPT, and RPT purge systems do not rely on electrical power.

The PPT purge is reliant on limiting the vessel to not exceed the maximum temperature assumed in the purge calculation. This maximum temperature is protected by LCO 3.4.1.

APPLICATION TO SAFETY ANALYSIS

The PPT, SPT, and RPT explosion scenario description FSAR Section 9.4.2.4 results in acceptable offsite chemical and radiological consequences. The FSAR, Table 9.3-10 addresses a hydrogen fire/explosion and identifies the following features to prevent and/or mitigate this event for the onsite worker: Primary and Safety Grade Nitrogen Purge Systems.

This LCO ensures that the tank vapor space does not reach 25% of the LFL in the SPT, 60% CLFL in the PPT, and 25% of the CLFL in the RPT. This LCO, therefore, helps prevent explosions from occurring in the LPPP PPT, SPT, and RPT.

(continued)

BASES

LCO

The PPT Purge system is designed to keep the flammable concentration less than 60% of the CLFL by requiring a purge flow rate of greater than or equal to 1.3 scfm (Ref. 14). The LCO ensures the SAV of 0.731 scfm is met by implementing a limit of 1.3 scfm, which accounts for instrument uncertainties.

The SPT Purge system is designed to keep the hydrogen concentration less than 25% of the LFL by requiring a purge flow rate of greater than or equal to 1.5 scfm (Ref. 14). The LCO ensures the SAV of 0.97 scfm is met by implementing a limit of 1.5 scfm, which accounts for instrument uncertainties.

The RPT Purge system is designed to keep the flammable concentration less than 25% of the CLFL by requiring a purge flow rate of greater than or equal to 3.8 scfm (Ref. 14). The LCO ensures the SAV of 2.81 scfm is met by implementing a limit of 3.8 scfm, which accounts for instrument uncertainties.

Analysis has shown current design basis purge requirements for the RPT continue to control flammability when flammables other than hydrogen (e.g., ADPs) are generated (Ref. 23). ADPs are not of concern in the PPT and SPT.

There is no margin of safety associated with the instrumented purge flow rate LCO values for the PPT, SPT and the RPT as the minimum purge flow is based on the radiolytic hydrogen production in the tank at overflow liquid volume. Maximizing the tank liquid volume results in maximum hydrogen production and minimum vapor volume. This produces worst case vapor concentrations.

To assure adequate indication of the purge flow, at least one of the purge flow meters for the SPT (FI-6944A or FI-6944B), PPT (FI-7470A or FI-7470B), and RPT (FI-6962A or FI-6962B) is required to be OPERABLE. In addition, a pressure indicator (PI-5183) is installed to indicate actuation of the safety grade nitrogen system. This pressure indicator must be OPERABLE to enable response to loss of primary nitrogen supply.

The LPPP purge header pressure is monitored to ensure that the Primary purge system is supplying the required purge. This pressure is maintained greater than or equal to 52 psig, which is higher than the actuation pressure of the Safety Grade nitrogen supply system plus the instrument uncertainty (Ref. 12).

(continued)

BASES

MODE APPLICABILITY

This LCO applies to OPERATION, STANDBY and SHUTDOWN, since hydrogen is generated anytime there is radioactive material in the tanks.

PROCESS AREA APPLICABILITY

The limitations of this LCO apply to the LPPP – PPT, SPT, and RPT.

ACTIONS

NOTE 1 in the LCO does not require entry into this Condition solely due to an inoperable PI unless entering due to Required Action(s) and associated Completion Time(s) of Condition F are not met. The inoperability of the PI does not impact the purge flows to the LPPP vessels.

NOTE 2 in Condition A requires the Primary Nitrogen purge system to be restored prior to exiting this condition. Note 3 requires that, if purge flow (from either Primary or Safety Grade Systems) to the applicable vessels drops below the LCO requirement, the vessel purge volume per Table 3.4.3-2 must be supplied to the affected vessel(s) prior to exiting Condition A. The time for minimum vessel purge volume is calculated by dividing the purge volume required by Table 3.4.3-2 with the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty) re-established per Required Action A.2. This delay in exiting Condition A will maintain the assumptions on which the recovery time is based.

The primary nitrogen purge source is required to be supplying the required purge to the LPPP – PPT, SPT, and RPT. A failure to meet this minimum requirement for one or more of the vessels will cause entry into Condition A.

Condition A is also entered if the LPPP purge header pressure is less than 52 psig as indicated by PI-5183 or if the Required Action(s) and/or Completion Time(s) specified for Condition F cannot be met. This condition can occur as a result of losing the Primary purge system (thus the Safety Grade purge system is supplying the purge) or inoperability of LPPP Safety Grade Nitrogen System Actuation Pressure Indicator (PI-5183) for an extended period of time. Then the condition is treated as a loss of primary purge flow to the PPT, SPT, and RPT.

The purge flow meters for the PPT (FI-7470A and FI-7470B), SPT (FI-6944A and FI-6944B), and RPT (FI-6962A and FI-6962B) provide indication that adequate purge flow is being provided to PPT, SPT, and RPT, respectively. A failure of both purge flow meters for one or more vessel(s) requires entry into Condition A.

(continued)

BASES

ACTIONS (continued)

A.1

Application of the Required Action is intended to place the affected vessel in a safe condition. IMMEDIATELY stopping transfers into the affected vessel will minimize the addition of more material (hazard) into the PROCESS AREA and minimize impact to the Recovery Time calculated in Required Action A.2. The following are not considered transfers into the affected process vessel for compliance with this Required Action: Water additions from: bubbler blow-down, maintaining minimum liquid level above agitator interlock, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

A.2

The required purge flow to the affected vessel must be restored within the Completion Time. The Completion Time for recovering purge flow is based upon calculations performed to determine how long a process vessel could be without purge flow and the flammable concentration remain less than 100% LFL/CLFL (Ref. 16, 17, and 22). Table 3.4.3-1 specifies the recovery time based on the temperature and volume of the contents in the vessel.

The Completion Time is preceded by a NOTE which provides guidance for determining the recovery time if purge flow is less than the LCO requirement prior to completing the required purge volume as determined per Table 3.4-2. In this case the flammable vapors in the vessel(s) may be greater than the flammables concentration at the time of initial inadequate purge. Therefore, the time to reach 100% LFL/CLFL from this elevated level is less than that determined initially. The NOTE requires that the subsequent Completion Time be reduced by the amount of time already used during previous attempts to restart the purge. The time allowed to restore the purge is determined as follows:

- the calculated recovery time from the Table 3.4.3-1 minus the cumulative recovery time(s) used in the previous attempt(s), or
- if temperature or volume has increased, the more restrictive calculated recovery time for those conditions minus the cumulative recovery time(s) used in the previous attempt(s).

(continued)

BASES

ACTIONS (continued)

A.2 (continued)

The NOTE in the Table 3.4.3-1 requires the conservative liquid temperature and volume to be used at all times in determination of the recovery time. Therefore, if vessel temperature or volume falls between two values listed in the table, then the higher value is chosen because the higher temperature reduces the LFL/CLFL and higher volume reduces the tank vapor space. The values used for the recovery time determination are the liquid temperature and volume that existed prior to entry into this Condition. Recovery times must be re-calculated if the liquid temperature or volume increases while purge flow is being re-established, as these conditions decrease the vessel vapor space and time to reach LFL/CLFL. This will ensure the vessel does not reach a flammable mixture within the recovery time. Recovery times are not re-calculated for conditions that decrease the liquid volume or temperature during purge recovery.

The purge flow shall be maintained until the purge has supplied the minimum vessel purge volume per Table 3.4.3-2.

References 16, 17, and 22 determined that for 5 minutes of less than the LCO requirement of purge, continuous purge of the vessel at the minimum required purge flow rate for 20 minutes will reduce the flammable concentration in the vessel.

NOTE-1 in Table 3.4.3-2 addresses less than the LCO requirement of purge for 5 minutes or less. This reduction in purge could be single event or multiple events within the 5-minute period. The NOTE establishes that if the purge flow is restored within 5 minutes, then maintaining the minimum purge flow continuously to the vessel for a period of twenty minutes satisfies the required purge volume. This duration is based on the bounding vessel liquid volume and temperature.

However, if purge is less than the LCO requirement again during the 20 minutes, the purge flow shall be maintained until the purge has supplied the minimum vessel purge volume per Table 3.4.3-2.

The Bases for LCO 3.1.4 provides examples for additional guidance for applying this NOTE.

(continued)

BASES

ACTIONS (continued)

A.2 (continued)

NOTE-2 in Table 3.4.3-2 requires that conservative values for liquid temperature and volume are to be used at all times in determination of required purge volume. If a questionable value of temperature or volume is present, the conservative value of liquid temperature (lower temperature is conservative) and volume (lower volume is conservative) shall be used. The values used for the purge volume determination are the liquid temperature and volume that existed at the time of re-establishing the required purge flow. The purge volume must be re-determined if the liquid temperature or volume decreases, as these conditions increase the required purge volume.

NOTE-3 in Table 3.4.3-2 provides guidance for calculating the purge time. The purge time can be obtained by dividing the purge volume (required by Table 3.4.3-2) by the actual purge flow rate (i.e. indicated flow rate minus the instrument uncertainty).

Condition B has been deleted.

Condition C has been deleted.

Condition D has been deleted.

Condition E has been deleted.

F.1

A NOTE for LCO 3.0.4 exception allows MODE change if PI-5183 is inoperable because the indicator has no effect on OPERABILITY or function of the Primary Purge System. The increased frequency of monitoring Safety Grade nitrogen inventory for unexpected depletion will provide assurance that Primary Purge source is supplying the purge flow.

(continued)

BASES

ACTIONS (continued)

F.1 (continued)

Condition F is entered if the LPPP Purge Header Pressure Indicator PI-5183 is inoperable. With PI-5183 being inoperable, the ability to ensure that the primary purge system is supplying the required purge is compromised. The intent of Required Action F.1 is to verify that Safety Grade nitrogen system is not supplying the purge flow. This can be verified by one or more means such as: monitoring Safety Grade nitrogen inventory, absence of frosting on Safety Grade nitrogen vaporizer lines, or other available means. To increase assurance and to maintain the required Safety Grade nitrogen source inventory, the Required Action shall be performed within one hour and every 4 hours thereafter. The Completion Time is an increase from the normal frequency of every 12 hours.

F.2

The Required Action F.2 ensures that the inoperable instrument PI-5183 is restored within 72 hours. The 72-Hour Completion Time is acceptable based upon the required inventory of the Safety Grade Nitrogen system and the compensatory measures taken in Required Action F.1. If the PI is not restored to OPERABLE status within 72 hours, Condition A of this LCO shall be entered.

SURVEILLANCE REQUIREMENTS

SR 4.4.3.1

The primary nitrogen purge system shall be verified, locally at FI-7470A or FI-7470B, to be supplying greater than or equal to 1.3 scfm of purge to the PPT. Performance of this SR every 12 hours will provide assurance that the purge system is performing its design function to prevent flammable conditions in the PPT. A failure to meet the requirements of this SR requires entry into Condition A of this LCO.

SR 4.4.3.2

The primary nitrogen purge system shall be verified, locally at FI-6944A or FI-6944B to be supplying greater than or equal to 1.5 scfm of purge to the SPT. Performance of this SR every 12 hours will provide assurance that the purge system is performing its design function to prevent flammable conditions in the SPT. A failure to meet the requirements of this SR requires entry into Condition A of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.4.3.3

An INSTRUMENT LOOP CHECK of the PPT purge flow meters (FI-7470A and FI-7470B) shall be conducted on a 7-Day basis. The INSTRUMENT LOOP CHECK will compare the purge flow readings on the two indicators to verify the OPERABILITY of the PPT purge flow instrumentation. A 7-Day frequency will ensure the flow detection instrumentation is operating properly. This SR is only applicable when both PPT purge flow instruments are OPERABLE. A failure to meet the requirement of this SR requires entry into Condition A of this LCO.

SR 4.4.3.4

An INSTRUMENT LOOP CHECK of the SPT purge flow meters (FI-6944A and FI-6944B) shall be conducted on a 7-Day basis. The INSTRUMENT LOOP CHECK will compare the purge flow readings on the two indicators to verify the OPERABILITY of the SPT purge flow instrumentation. A 7-Day frequency will ensure the flow detection instrumentation is operating properly. This SR is only applicable when both SPT purge flow instruments are OPERABLE. A failure to meet the requirement of this SR requires entry into Condition A of this LCO.

SR 4.4.3.5

This SR has been deleted.

SR 4.4.3.6

The Safety Grade Purge System header pressure shall be verified every 12 hours to be greater than or equal to 52 psig. This value is determined by reading PI-5183. The 12-Hour surveillance is considered adequate to track and trend instrument performance. This verification ensures that the required purge is from the Primary Nitrogen system and thus the purge from the Safety Grade purge system is not being used. Failure to meet the requirement of this SR due to inoperable PI-5183 requires entering Condition F of this LCO; PI-5183 indicated pressure less than 52 psig requires entering Condition A.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.4.3.7

An INSTRUMENT LOOP CALIBRATION of the Safety Grade Purge System Actuation Pressure Indicator (PI-5183) shall be conducted every 6 months. Performance of this SR provides verification that the Primary Nitrogen system is providing purge to the PPT and SPT. A 6-Month frequency will ensure appropriate accuracy of the pressure indicator. A failure to meet the requirement of this SR requires entry into Condition F of this LCO.

SR 4.4.3.8

An INSTRUMENT LOOP CALIBRATION of the PPT purge flow meters (FI-7470A and FI-7470B) shall be conducted on a 1-Year basis. Performance of this SR will ensure that the flow detection instrumentation is sufficiently accurate for the intended use. The calibration involves response testing of the instrument over the full range of the loop with known values. Verification is made that the parameter indications are correct. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation (Ref. 19). Failure to meet or perform this SR requires entry into Condition A of this LCO.

SR 4.4.3.9

An INSTRUMENT LOOP CALIBRATION of the SPT purge flow meters (FI-6944A and FI-6944B) shall be conducted on a 1-Year basis. Performance of this SR will ensure that the flow detection instrumentation is sufficiently accurate for the intended use. The calibration involves response testing of the instrument over the full range of the loop with known values. Verification is made that the parameter indications are correct. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation (Ref. 20). Failure to meet or perform this SR requires entry into Condition A of this LCO.

SR 4.4.3.10

The primary nitrogen purge system shall be verified, locally at FI-6962A or FI-6962B, to be supplying greater than or equal to 3.8 scfm of purge to the RPT. Performance of this SR every 12 hours will provide assurance that the purge system is performing its design function to prevent flammable conditions in the RPT. A failure to meet the requirements of this SR requires entry into Condition A of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.4.3.11

An INSTRUMENT LOOP CHECK of the RPT purge flow meters (FI-6962A and FI-6962B) shall be conducted on a 7-Day basis. The INSTRUMENT LOOP CHECK will compare the purge flow readings on the two indicators to verify the OPERABILITY of the RPT purge flow instrumentation. A 7-Day frequency will ensure the flow detection instrumentation is operating properly. This SR is only applicable when both RPT purge flow instruments are OPERABLE. A failure to meet the requirement of this SR requires entry into Condition A of this LCO.

SR 4.4.3.12

An INSTRUMENT LOOP CALIBRATION of the RPT purge flow meters (FI-6962A and FI-6962B) shall be conducted on a 1-Year basis. Performance of this SR will ensure that the flow detection instrumentation is sufficiently accurate for the intended use. The calibration involves response testing of the instrument over the full range of the loop with known values. Verification is made that the parameter indications are correct. A 1-Year INSTRUMENT LOOP CALIBRATION is sufficient to ensure adequate accuracy of the required instrumentation (Ref. 21). Failure to meet or perform this SR requires entry into Condition A of this LCO.

REFERENCES

1. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U). WSRC-SA-6.

2. Deleted.

3. Deleted.

4. Deleted.

5. Deleted.

6. Deleted.

7. Deleted.

8. Deleted.

9. Deleted.

(continued)

BASES

REFERENCES (continued)

10. Deleted.

11. Deleted.

12. Instrumentation Uncertainties Evaluation, LPPP Nitrogen Header Pressure (U). S511-PI-5183; J-CLC-S-00127.

13. Deleted.

14. Determination of TSR Setpoints for LPPP Nitrogen System for SDI. U-CLC-S-00029.

15. Deleted.

16. Purge Requirements for the Precipitate Pump Tank (PPT) for Interim Operation of SWPF. X-CLC-S-00397.

17. Purge Requirements for the Sludge Pump Tank. X-CLC-S-00316.

18. Deleted.

19. Instrumentation Uncertainties Evaluation Loop: S511-FI-7470A and FI-7470B LPPP-PPT Purge Flow Indicators (U). J-CLC-S-00156.

20. Instrumentation Uncertainties Evaluation Loop: S511-FI-6944A and FI-6944B LPPP-SPT Purge Flow Indicators (U). J-CLC-S-00151.

21. Instrumentation Uncertainties Evaluation Loop: S511-FI-6962A and FI-6962B LPPP-RPT Purge Flow Indicators (U). J-CLC-S-00149.

22. Recovery Time and Purge Volumes for DWPF Tanks with Antifoam Degradation Products. S-CLC-S-00159.

23. Evaluation of Inclusion of Antifoam Degradation Products in Current Flammability Strategy. X-CLC-S-00353.

B 3/4.4 LPPP FLAMMABILITY CONTROL

B 3.4.4 PPT Flammability Control - Standby & Shutdown

BASES

This LCO has been deleted.

B 3/4.4 LPPP FLAMMABILITY CONTROL

B 3.4.5 LPPP Purge Sources

BASES

BACKGROUND SUMMARY

Nitrogen is normally supplied to the vessels from the 422-S bulk nitrogen tank through a flow control valve. A second seismically qualified safety grade tank is available should the other source be unavailable.

The LPPP purge systems are designed to keep the SPT from reaching a combustible hydrogen concentration of 25% of the LFL, the PPT from reaching 60% of CLFL, and the RPT from reaching 25% of the CLFL by supplying enough purge flow to dilute the flammables concentration. If hydrogen were to escape the vessel, it would already be less than the LFL, and the air in the PPV or cell would further dilute its concentration, thus preventing any possible explosion.

The PPT purge is reliant on limiting the vessel to not exceed the maximum temperature assumed in the purge calculation. This maximum temperature is protected by LCO 3.4.1.

The LPPP purge systems do not rely on electrical power.

APPLICATION TO SAFETY ANALYSIS

The PPT/SPT/RPT explosion scenario description in the FSAR Section 9.4.2.4 results in acceptable offsite chemical and radiological consequences. The FSAR, Table 9.3-10 addresses a hydrogen fire/explosion and identifies the following features to prevent and/or mitigate this event for the onsite worker: Primary and Safety Grade Purge System.

This LCO ensures a nitrogen source is OPERABLE to perform the purge function to prevent flammability in the PPT/SPT/RPT.

(continued)

BASES

LCO

The availability of a nitrogen purge to the LPPP PPT, SPT, and RPT is required to prevent flammable conditions in the PPT, SPT, and RPT. A DBE/DBT qualified nitrogen backup tank is available which will automatically supply the purge system should the primary nitrogen supply system be unavailable. The Safety Grade Nitrogen System will actuate upon low pressure detection. The safety grade nitrogen pressure control valves (PCV-5181A and PCV-5181B) ensure pressures greater than 37 psig (to protect the upper limit of LPPP purge pressure control valves) and less than 47 psig (setpoint in LCO 3.4.3 at which the safety grade nitrogen system is assumed to be actuated with instrument uncertainty subtracted (Ref. 7)). Accounting for instrument calibration accuracy using IPI or M&TE, +/- 1 psig or better, the safety grade nitrogen pressure control valves are set between 38 and 46 psig. One Safety Grade Nitrogen pressure control valve is required to be OPERABLE to ensure actuation of Safety Grade Nitrogen.

The SR implementing limit of 90 in. wc for the safety grade nitrogen tank ensures the SAV of 75 in. wc is met (Ref. 4), accounting for uncertainties (Ref. 5). There is no margin of safety associated with the instrumented tank level LCO value as the SAV is based on the maximum purge flows to the PPT, SPT, and RPT assumed in the calculation of the inventory requirement (Ref. 4) for 96 hours and protected by SR 4.4.5.7. The SAV also assumes a leakage rate through the safety grade nitrogen system isolation check valves and system leakage.

It is permissible to utilize either of the two nitrogen purge sources, although only the safety grade nitrogen tank is qualified to survive a DBE/DBT.

Limits on leakage past the Safety Grade Nitrogen Purge Isolation Check Valves is limited to protect the required nitrogen inventory. Manual Valves, which could inhibit the operation of the purge system, shall be administratively controlled.

(continued)

BASES

LCO (continued)

The LPPP purge pressure control valves (PCV-7436A and PCV-7436B) are required to maintain pressure to the SPT, PPT, and RPT between 20 and 37 psig to ensure accurate purge flow indication (Ref. 8, 9, 10). Accounting for instrument calibration accuracy using IPI or M&TE, +/- 1 psig or better, the LPPP purge pressure control valves are set between 21 and 36 psig. One LPPP Purge pressure control valve is required to be OPERABLE to ensure pressure is maintained within analyzed pressures for purge flow instrumentation to the SPT, PPT, and RPT. The installed purge pressure monitoring instrumentation's active function to indicate pressure is not required to be OPERABLE for the associated purge flow meters to be considered OPERABLE.

MODE APPLICABILITY

This LCO applies to OPERATION, STANDBY, and SHUTDOWN.

PROCESS AREA APPLICABILITY

The limitations of this LCO apply to the LPPP – PPT, SPT, and RPT.

ACTIONS

A.1

Failure of the Safety Grade nitrogen purge source from insufficient inventory, the inability to supply the required purge, incorrect alignment, both Safety Grade Nitrogen Purge Isolation Check Valves inoperable, both Safety Grade Nitrogen tank level gauges inoperable, or both Safety Grade Nitrogen pressure control valves inoperable requires a higher consideration for the primary nitrogen source. The required nitrogen purges shall be verified within 1 hour and every 4 hours thereafter as being supplied by the primary source. Increasing the frequency of the verification of purge flow increases the confidence in the primary nitrogen purge system.

(continued)

BASES

ACTIONS (continued)

A.2

The Safety Grade nitrogen purge source shall be restored to OPERABLE status within 72 hours. This time is sufficient to perform maintenance on the system and is short enough that the risk of failure of the primary nitrogen purge source is extremely low.

B.1

If both LPPP Purge pressure control valves are inoperable or Required Action A.1 cannot be completed, purge is less than that required by LCO 3.4.3. Therefore, it is appropriate to enter LCO 3.4.3 Condition A.

C.1

If Safety Grade nitrogen purge source is not restored to OPERABLE status within the Completion Time of Required Action A.2, transfers into the affected vessel(s) shall be terminated IMMEDIATELY. Stopping transfers into the vessel(s) limits the amount of material available to produce hydrogen. Transfers out of the vessel(s) are allowed in order to further reduce the amount of hydrogen generated.

The following are not considered transfers into the affected process vessel for compliance with this Required Action: Water additions from: bubbler blow-down, maintaining minimum liquid level above agitator interlock, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

C.2

The affected vessel(s) shall be placed in STANDBY IMMEDIATELY until the Safety Grade nitrogen purge source can be restored to OPERABLE status.

C.3

The Safety Grade nitrogen purge source shall be restored to OPERABLE status IMMEDIATELY.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 4.4.5.1

The Safety Grade nitrogen storage tank shall be verified to contain greater than or equal to 90 in. wc of nitrogen on a 12-Hour-basis. Performance of this SR on a 12-Hour frequency will provide assurance that this backup nitrogen system is capable of supplying nitrogen during primary nitrogen system inoperability. A failure to meet the requirements of this SR requires entry into Condition A of this LCO.

SR 4.4.5.2

This SR has been deleted.

SR 4.4.5.3

An INSTRUMENT LOOP CALIBRATION of the Safety Grade nitrogen tank level indicator (LI-5181X or LI-5182X) shall be conducted on a 1 year basis. Performance of this SR will ensure that the level detection instrumentation is sufficiently accurate for the intended use. A 1-Year frequency will ensure appropriate accuracy of the level detection instrumentation. Failure to meet the requirements of this SR for both the level indicators requires entry into Condition A of this LCO.

SR 4.4.5.4, SR 4.4.5.5, and SR 4.4.5.6

These SRs have been deleted.

SR 4.4.5.7

On a yearly basis, verify that the Safety Grade nitrogen tank source to the PPT, SPT, and RPT is capable of supplying at least the minimum purge to all three vessels and not more than assumed in the calculation of the inventory requirement through the vessels' minimum purge flow valves (Ref. 4). The maximum purge flow is checked using the vessels' local purge flow indicator. This SR ensures that the Safety Grade nitrogen tank source is capable of providing the purge flow required by the LCO 3.4.3 to the PPT, SPT, and RPT. Fulfillment of this SR requires the Safety Grade nitrogen tank to be temporarily utilized to supply the combined minimum flow rates to the three vessels following an automatic initiation (swap over). A 1-Year frequency will ensure OPERABILITY. A failure to meet the requirements of this SR requires entry into Condition A of this LCO.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.4.5.8

The Safety Grade Nitrogen Purge Isolation Check Valves shall be leak tested at least every 2 years to verify leakage past the check valves does not exceed 10 scfm. This test ensures the Safety Grade Nitrogen Purge System will be able to maintain the required purge flow rate for a 96-Hour duration following failure of the Primary Purge System. A 2-Year test frequency is sufficient to ensure adequate integrity of the check valves. Failure to meet or perform this SR requires entering Condition A of this LCO.

SR 4.4.5.9

This SR has been deleted.

SR 4.4.5.10

The Safety Grade Nitrogen pressure control valves (PCV-5181A and PCV-5181B) shall be verified to each be capable of actuating Safety Grade Nitrogen to the SPT, PPT, and RPT purge flow header pipe at a pressure greater than or equal to 38 psig and less than or equal to 46 psig. This surveillance shall be conducted using IPI or M&TE with a calibration accuracy of +/- 1 psig or better. This surveillance shall be conducted on a 1-Year basis. Performance of this SR will ensure that the Safety Grade Nitrogen system will actuate upon low flow conditions. A failure to meet the requirement of this SR for both PCVs requires entry into Condition A of this LCO.

SR 4.4.5.11

The LPPP Purge pressure control valves (PCV-7436A and PCV-7436B) shall be verified to each be capable of controlling Primary and Safety Grade Purge pressure to the SPT, PPT, and RPT flow indicators greater than or equal to 21 psig and less than or equal to 36 psig. This surveillance shall be conducted using IPI or M&TE with a calibration accuracy of +/- 1 psig or better. This surveillance shall be conducted on a 1-Year basis. Performance of this SR will ensure that the pressure is maintained within the analyzed pressures for SPT, PPT, and RPT flow indicators. A failure to meet the requirement of this SR for both PCVs requires entry into Condition B of this LCO.

(continued)

BASES

REFERENCES

1. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U). WSRC-SA-6, Westinghouse Savannah River Company, Aiken, SC.

2. Deleted.

3. Deleted.

4. Determination of TSR Setpoints for LPPP Nitrogen System for SDI. U-CLC-S-00029.

5. Instrumentation Uncertainties Evaluation Loops: S422-LI-1240X, 1241X, 1247X, 1248X, 3610X, 3611X, 3617X, 3618X, 3630X, 3631X, 3650X, 3651X; S511-LI-5181X, 5182X DWPF CPC, SPC, and LPPP Nitrogen Tank Level Indication (U). J-CLC-S-00135.

6. Deleted.

7. Instrumentation Uncertainties Evaluation, LPPP Nitrogen Header Pressure (U). J-CLC-S-00127.

8. Instrumentation Uncertainties Evaluation Loop: S511-FI-7470A and FI-7470B LPPP-PPT Purge Flow Indicators (U). J-CLC-S-00156.

9. Instrumentation Uncertainties Evaluation Loop: S511-FI-6944A and FI-6944B LPPP-SPT Purge Flow Indicators (U). J-CLC-S-00151.

10. Instrumentation Uncertainties Evaluation Loop: S511-FI-6962A and FI-6962B LPPP-RPT Purge Flow Indicators (U). J-CLC-S-00149.

B 3/4.5 LWF FLAMMABILITY CONTROL

BASES

The following LCOs have been deleted:

3.5.1 LWF Flammability Monitoring

3.5.2 LWF PVV Flammability Monitoring

3.5.3 LWF Flammability Control

3.5.4 LWF Flammability Control - Standby & Shutdown

3.5.5 LWF Purge Sources

B 3/4.6 OWST FLAMMABILITY

BASES

The following LCOs have been deleted:

3.6.1 OWST Inventory Control

3.6.2 OWST Flammability Control

3.6.3 OWST Purge Sources

B 3/4.7 CONFINEMENT

B 3.7.1 Zone 1 Ventilation

BASES

BACKGROUND SUMMARY

Ventilation and contamination control in the DWPF Vitrification Building is divided into three zones. Zone boundaries are determined on the basis of expected contamination level. The ventilation system is designed so that airflow is directed from areas of lower contamination to areas of higher contamination. Zone 1 contains the areas with the highest potential for contamination, and Zone 3 contains the areas with the lowest potential for contamination. Zone 1 is at the lowest pressure; its exhaust air is filtered through a sand filter prior to discharging to the atmosphere with the exception of the Weld Test Cell (WTC), which exhausts through Zone 2. Zone 2 is at a higher pressure and its exhaust air is filtered through HEPA filters prior to discharge through the exhaust stack. Zone 3 is at the highest pressure, and the exhaust air from Zone 3 flows to Zone 2. All zones are at a negative pressure with respect to atmospheric pressure.

The Zone 1 Ventilation System is composed of four supply systems and an exhaust system comprised of four fans. By withdrawing more air with the exhaust system than is provided by the supply system, the Zone 1 Ventilation System is kept at a negative pressure (less than atmospheric pressure). This negative pressure is maintained, enabling Zone 1 to receive higher pressure leakage from the other zone ventilation systems.

The Zone 1 Exhaust System is used to remove and filter air from Zone 1 Areas. Air removal is accomplished by routing all Zone 1 exhaust air, except the WTC exhaust, through an underground exhaust tunnel, through the sand filter, fan house and out the exhaust stack. The WTC is exhausted through the Zone 2 HEPA filters. The Zone 1 Exhaust System consists of four centrifugal exhaust fans located in the 292-S Fan House. Three fans are normally in operation and one fan is in standby.

Each exhaust fan is equipped with the following inlet dampers: a manually controlled suction damper located in the suction piping to allow isolation of the blower for maintenance; and a pneumatically actuated variable inlet vane damper that allows the quantity of air supplied to the fan to be controlled. The inlet vane control damper fails open on loss of instrument air and/or loss of control signal. The backflow discharge damper opens if the respective fan is operating or closes if the fan is shut down without dependence on electrical power and/or instrument air.

(continued)

BASES

BACKGROUND SUMMARY (continued)	Local start/stop switches for the exhaust fans are provided in case of failure of the DCS and local control cabinet. Zone 1 Exhaust fans are on the buses powered by the standby Diesel Generators, and the Local Control Station (LCS-272) will attempt to restart one fan from each bus. One of the four Zone 1 Exhaust fans is sufficient to maintain adequate negative pressure within the Vitrification Building following a normal power failure with Zone 1 supply, Zone 2 exhaust, and Weld Test Cells fans off. The Sand Filter is located in a separate building connected to the Vitrification Building by an underground exhaust tunnel. The Sand Filter is made up of horizontal layers of successively finer rock, gravel, and sand from bottom to top.
APPLICATION TO SAFETY ANALYSIS	The Zone 1 Ventilation System is an engineered safety feature designed to mitigate potential radioactive material releases from the Vitrification Building (Reference 1). The ventilation system mitigates the consequences of an airborne release from radioactive material releases, uncontrolled reactions, fires, explosions, etc.
LCO	The function of the Zone 1 Ventilation System is to confine and filter radioactive particulates. This LCO is intended to protect this function. Zone 1 Ventilation System is performing the intended safety function when the system can maintain the proper negative pressure at the Sand Filter Inlet Plenum which causes transport of airborne radionuclides from the process area through the Sand Filter. This LCO ensures the Safety Analysis value (more negative than -1.1 in. wc) is met by implementation of an LCO limit which accounts for instrument uncertainties (more negative than or equal to -1.36 in. wc) per Reference 2. There is no margin of safety associated with the instrumented pressure LCO value as value was validated through testing (FA-02-08 test data). The proper pressures ensure that airflow is directed from areas of lower contamination to areas of higher contamination.

(continued)

BASES

LCO (continued)

Coupled with the functional OPERABILITY requirement (pressures and flows), the following equipment, instrumentation and interlocks shall be OPERABLE to ensure the system will function as designed.

Three of the four Zone 1 Exhaust Fans and associated equipment, instrumentation, interlocks, and dampers listed in Table 3.7.1-1 shall be OPERABLE.

This requirement ensures redundancy in the event of fan failure and ensures that the ventilation system can provide the required motive force for proper ventilation flow. The fourth Zone 1 Exhaust Fan is not required by the TSR to be OPERABLE. This requirement permits corrective or preventive maintenance to be conducted on one fan at a time; inoperability of one fan does not require entrance into an LCO Condition.

An OPERABLE fan must be aligned for automatic backup start (except for the time when LCS-272 is inoperable, i.e. when the FACILITY is in Condition E of this LCO) and be capable of starting from the local manual start/stop switch. In addition, the inlet vane dampers and backflow discharge dampers shall operate as designed.

LCO 3.0.6 provides an exception to entering the LCO of a supported system (in this case, the Zone 1 Ventilation system) when the inability of the supported system to perform its intended function is due solely to the supporting system's (i.e., DG system) inoperability, and an LCO for that supporting system is specified in the TSR. For that reason, a Zone 1 Exhaust Fan(s) can be considered OPERABLE, even if the fan(s) is aligned to an electrical bus supported by an inoperable Diesel Generator (DG).

In the case of a DG discovered to be inoperable, only the DG LCO 3.9.1 Conditions are required to be entered. These Required Actions and Completion Times establish the necessary safe plant conditions, even though it is recognized that the associated fans will not operate in the event of a loss of normal power. The fans still provide their credited safety function for other analyzed events (i.e., non-loss of power events).

An inoperable DG would require entry into LCO 3.9.1 Condition A (one DG system inoperable) while entering LCO 3.7.1 Condition A (two Zone 1 Exhaust Fans inoperable) would not be required if the inability of the Zone 1 Exhaust Fans to perform their intended function is due solely to the inoperability of the associated DG.

The Sand Filter shall be OPERABLE with a minimum efficiency of 99.5%. A value of greater than or equal to 99.5% is the accepted standard

(continued)

BASES

LCO (continued)

according to the FSAR, and is consistent with the efficiency assumed in the accident analysis. SR 4.7.1.6 periodically verifies that the sand filter efficiency is at least 99.5% at design flow (94,500 - 115,000 cfm).

Both Sand Filter Inlet Plenum Pressure transmitters and associated pressure interlocks are required to be OPERABLE at all times. The interlocks shall be considered OPERABLE if the stated function is performed at the required setpoint. The interlock shall trip the Zone 1 Supply fans upon receiving a High High Sand Filter Inlet Plenum Pressure (> -1.36 in. wc). The actuation of the interlock will also stop the operation of the Zone 2 Exhaust fans and the WTC Exhaust Fans.

The local Zone 1 Exhaust Fan manual start/stop switches and LCS-272 are required to be capable of starting the OPERABLE Zone 1 exhaust fans. The start/stop switch capability ensures that manual actions to start one or more Zone 1 Exhaust Fans can be completed locally. LCS-272 is the safety significant control panel for the exhaust fans. It must be able to start one fan on each electrical bus following a loss of normal power.

The instrumentation required to monitor the Zone 1 Ventilation System, as listed in Table 3.7.1-1, shall be OPERABLE. The instrumentation must have an INSTRUMENT LOOP CALIBRATION within the required frequency to be considered OPERABLE.

Zone 1 Exhaust Fan dampers associated with an OPERABLE Fan shall be OPERABLE. The Zone 1 Exhaust Fan Inlet Vane Control Damper shall fail open on loss of instrument air and/or control signal to ensure maximum flow through an exhaust fan when started on backup power. The Zone 1 Exhaust Fan Discharge Damper shall open when its associated fan is running and close when the fan is stopped.

MODE APPLICABILITY

The Zone 1 Ventilation System is required to be OPERABLE during OPERATION, LIMITED PROCESSING, STANDBY, and SHUTDOWN to ensure that the capability to prevent or mitigate abnormal events is maintained.

PROCESS AREA APPLICABILITY

The Zone 1 Ventilation System is an engineered safety feature designed, in part, to mitigate significant radioactive material releases from the CPC/SPC and Melter Cell.

(continued)

BASES

ACTIONS

Several ACTIONS contain a NOTE stating LCO 3.0.4 is not applicable with specified restrictions. This allows the FACILITY to change MODES while in an LCO Condition provided adequate compensatory measures are in place.

A NOTE preceding Condition A explains that entry into Condition A is not required solely due to the inoperability of a DG. In this case, entry into LCO 3.7.1 is not required per LCO 3.0.6. DG inoperability is covered by LCO 3.9.1.

A.1

If only two Zone 1 Exhaust Fans are OPERABLE (two exhaust fans are inoperable), verify the Sand Filter inlet plenum pressure is more negative than or equal to -1.36 in. wc IMMEDIATELY. This Required Action verifies that the required pressures are within the limits, and ensures that the ventilation system is functioning to perform its design function. The completion time of IMMEDIATELY places a high priority on initial assessment of the Zone 1 Exhaust System status.

Verification shall also be conducted every 6 Hours thereafter to ensure periodic oversight. Performance of the periodic verification is sufficient since interlock features required by this LCO will actuate to prevent unacceptable system operation. If the required pressure cannot be maintained, Condition F shall be entered.

A.2

LCO 3.7.1 requires three Zone 1 Exhaust Fans be OPERABLE. With two fans inoperable, it is therefore necessary to verify at least one of the OPERABLE Zone 1 fans is on an OPERABLE DG bus. This verification is required to be completed within 2 hours to ensure at least one fan is available to operate in the event of a loss of normal power.

If a fan cannot be verified to be on an OPERABLE DG bus, the Required Action is not met, and Condition F shall be entered.

A NOTE permits MODE changes if Required Actions A.1 and A.2 have been completed. These actions proved the minimum configuration of the exhaust fans and that the fans and the required diesel generator are OPERABLE. Processing of material is permitted in accordance with the FSAR.

(continued)

BASES

ACTIONS (continued)

A.3

With two Zone 1 Exhaust fans inoperable, the capability of the ventilation system to accommodate additional fan failures is reduced. At least one inoperable fan shall be restored to OPERABLE status within 14 Days. This Required Action ensures the FACILITY does not operate in a degraded condition for an extended period of time. The completion time of 14 Days is reasonable based on the low probability of the events which would require operation of the inoperable fans over the short period. The completion time restricts long-term processing with reduced redundancy.

If Required Actions and/or associated completion times for A.1, A.2 or A.3 are not met, Condition F shall be entered.

B.1

If one Sand Filter inlet plenum pressure transmitter or one High High Sand Filter inlet plenum pressure interlock is inoperable, the inoperable equipment shall be restored to OPERABLE status within 7 Days. A completion time of 7 Days is sufficient due to the reliability of the other pressure transmitter and its associated interlock. If the equipment cannot be restored to OPERABLE status within the 7-Day completion time, Condition F shall be entered.

A NOTE permits MODE changes while in this Condition, since the safety functions of the inoperable equipment will be performed by the redundant equipment.

C.1

If the sand filter inlet plenum pressure is more positive than -1.36 in. wc, then Zone 1 Exhaust fan(s) shall be started IMMEDIATELY to restore required plenum pressure. The more positive pressure indicates either none of the fans are running or blockage in the sand filter. Starting Zone 1 Exhaust fan(s) will increase the flow through the sand filter.

(continued)

BASES

ACTIONS (continued)

C.2

If the sand filter inlet plenum pressure is more positive than -1.36 in. wc, then the Zone 1 Supply fans, Zone 2 Exhaust fans, and Weld Test Cell fans shall be stopped IMMEDIATELY. This Required Action will be manually performed if not performed by hardwired interlock. This Required Action will ensure the negative pressure in Zone 1 is maintained.

C.3, C.4, C.5

When the Sand Filter Inlet Plenum pressure is more positive than -1.36 in. wc, actions to place the affected PROCESS AREAS in the specified condition shall be implemented IMMEDIATELY. These immediate actions include 1) isolating the steam supply to the SRAT, SME, and DWTT to retard the reaction in these vessels and minimize the potential explosion hazards by minimizing the flammable generation rate, 2) terminating transfers to these vessels which assists in placing the process vessels in a stable condition, and 3) verifying the status of purge flow rates to the CPC/SPC vessels.

The following are not considered transfers into the affected PROCESS AREA for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, laboratory drains, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

C.6

The SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter shall be verified to be in STANDBY within 24 Hours. If the affected process vessel is in SHUTDOWN it is not required to go to STANDBY since SHUTDOWN is conservative to STANDBY. The 24-Hour Completion Time allows adequate time to cool heated vessels and to transition to STANDBY.

(continued)

BASES

ACTIONS (continued)

D.1 and D.2

If both Sand Filter Inlet Plenum Pressure Transmitters and/or both High High Sand Filter Inlet Plenum Pressure Interlocks are inoperable, then the Zone 1 Supply fans, Zone 2 Exhaust fans, and Weld Test Cell fans shall be stopped IMMEDIATELY. At least one Zone 1 Exhaust fan shall be verified to be running IMMEDIATELY and every 4 Hours thereafter. Requiring that one Zone 1 Exhaust fan pull air from Zone 1 ensures that the Sand Filter Inlet Plenum Pressure is negative.

D.3

One of the two inoperable interlock trains (transmitter and interlock circuit) shall be restored to OPERABLE status within 72 Hours. This Completion Time is based on the frequency of a DBA occurring while in this degraded condition. If a minimum of one train of equipment (transmitter and interlock circuit) cannot be restored to OPERABLE status within 72 Hours, Condition G shall be entered.

E.1

If the capability of the OPERABLE fans to be restarted automatically following a loss of offsite power is lost (for example if Local Control Station LCS-272 is inoperable), manual action would be required to start the fans. Upon entering this condition, to ensure that manual action can be taken, an operator shall be IMMEDIATELY stationed in the Fan House where the manual start/stop switches are located. If this Required Action cannot be performed, Condition F shall be entered.

E.2

To minimize the time that manual action is required to start the Zone 1 OPERABLE Exhaust fans, a Completion Time of 14 Days is specified for restoring the inoperable equipment (LCS-272) to OPERABLE status. This Completion Time accounts for the frequency of a loss of offsite power occurring which would require these components to function. If the equipment cannot be restored to OPERABLE status, Condition F shall be entered.

(continued)

BASES

ACTIONS (continued)

F.1 and F.2

If the Required Actions and/or associated Completion Times of Conditions A, B, or E are not met, actions to place the FACILITY in a safe condition shall be implemented IMMEDIATELY. To minimize the risk with the FACILITY in this degraded condition, it is necessary to IMMEDIATELY stop all transfers into and out of the affected PROCESS AREAS and isolate steam. These actions reduce the production of flammable vapors in the process areas. If this Condition is entered from Condition E, a qualified operator is already stationed in the Fan House to ensure the safety function of LCS-272 can be completed in a short period of time.

The following are not considered transfers into the affected PROCESS AREA for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, laboratory drains, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

F.3

The SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter shall be verified to be in STANDBY within 24 Hours. If the affected process vessel is in SHUTDOWN it is not required to go to STANDBY since SHUTDOWN is conservative to STANDBY. A completion time of 24 Hours allows adequate time to cool heated vessels and to transition to STANDBY and recognizes that actions to place the CPC/SPC and Melter in STANDBY are underway. (If Process Cooling Water is available, it may be used to cool the vessels.)

(continued)

BASES

ACTIONS (continued)

G.1, G.2, G.3

If only one Zone 1 Exhaust Fan is OPERABLE (three exhaust fans are inoperable) or when the Required Action(s) and/or associated Completion Time(s) of Condition D are not met, actions to place the affected PROCESS AREAS in the specified condition shall be implemented IMMEDIATELY. These immediate actions include 1) terminating transfers to these vessels which assists in placing the process vessels in a stable condition, 2) isolating the steam supply to the SRAT, SME, and DWTT to retard the reaction in these vessels and minimize the potential explosion hazards by minimizing the flammable generation rate, and 3) verifying the status of purge flow rates to the CPC/SPC vessels ensures that a flammable condition does not develop inside the CPC/SPC tanks coincident with Zone 1 Ventilation inoperability.

These ACTIONS are specified to ensure that conservative measures are implemented IMMEDIATELY to minimize the potential for a release of radioactive material while the Zone 1 Exhaust System OPERABILITY is degraded.

The following are not considered transfers into the affected PROCESS AREA for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, laboratory drains, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

G.4

With three Zone 1 Exhaust Fans inoperable, it is important that the OPERABLE fan is verified to be on an OPERABLE DG bus. This verification is required to be completed IMMEDIATELY.

G.5

The SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter shall be verified to be in STANDBY within 24 Hours. If the affected process vessel is in SHUTDOWN it is not required to go to STANDBY since SHUTDOWN is conservative to STANDBY. The 24-Hour Completion Time allows adequate time to cool heated vessels and to transition to STANDBY, and recognizes that actions to place the CPC/SPC and Melter in STANDBY are underway.

(continued)

BASES

ACTIONS (continued)

H.1, H.2, and H.3

A NOTE preceding Condition H explains that entry into Condition H is not required solely due to the inoperability of the associated DGs. In this case, entry into LCO 3.7.1 is not required per LCO 3.0.6. DG inoperability is covered by LCO 3.9.1.

When all four Zone 1 Exhaust Fans are inoperable, or when the Sand Filter is inoperable, or when Required Action(s) and/or Completion Times of Condition C or G are not met, Required Actions to place the affected PROCESS AREAS in the specified condition shall be implemented IMMEDIATELY. These actions include 1) terminating transfers to these vessels which assists in placing the process vessels in a stable condition, 2) isolating the steam supply to the SRAT, SME, and DWTT to retard the reaction in these vessels and minimize the potential explosion hazards by minimizing the flammable generation rate, and 3) verifying the status of purge flow rates to the CPC/SPC vessels to ensure that a flammable condition does not develop inside the CPC/SPC tanks coincident with Zone 1 inoperability. These Required Actions are specified to ensure that conservative measures are implemented IMMEDIATELY to minimize the potential for a release of radioactive material while the Zone 1 Exhaust System is degraded.

The following are not considered transfers into the affected PROCESS AREA for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, laboratory drains, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

H.4

Actions to restore inoperable equipment to OPERABLE status shall be implemented IMMEDIATELY since the FACILITY is in a condition which warrants immediate actions.

(continued)

BASES

ACTIONS (continued)

H.5

The SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter shall be verified to be in STANDBY within 24 Hours. If the affected process vessel is in SHUTDOWN it is not required to go to STANDBY since SHUTDOWN is conservative to STANDBY. A Completion Time of 24 Hours allows adequate time to cool heated vessels and to transition to STANDBY, and recognizes that actions to place the CPC/SPC and Melter in STANDBY are underway.

SURVEILLANCE REQUIREMENTS

SR 4.7.1.1

The Sand Filter Inlet Plenum pressure shall be verified to be more negative than or equal to -1.36 in. wc at PIC-5755A. This verification shall be performed every 12 Hours to ensure that the system is functioning as required by the LCO. This ensures flow through the sand filter. This SR is performed with non-credited instrumentation managed under the IPI Program.

Condition C of this LCO shall be entered if pressure is more positive than -1.36 in. wc. The 12-Hour frequency of this SR is adequate to monitor and trend system performance.

SR 4.7.1.2

Each Sand Filter Inlet Plenum Pressure Transmitter shall have an INSTRUMENT LOOP CALIBRATION every 1 Year. This INSTRUMENT LOOP CALIBRATION will ensure that the instrumentation is accurately detecting its associated parameters.

Condition B or D of this LCO shall be entered when one or both, respectively, of the Sand Filter Inlet Plenum Pressure transmitters are found to be inoperable or the SR frequency for both of the transmitters is not met. The 1-Year frequency is adequate to ensure that the required instrumentation is maintained in a sufficiently accurate state.

SR 4.7.1.3

An INSTRUMENT LOOP TEST of the High High Sand Filter Inlet Plenum pressure interlock shall be performed at least every 1 Year. Performance of this SR ensures that the equipment is operating properly to support processing. The LOOP TEST will verify that, when conditions are present to actuate interlocks from each required parameter of loops 5755 and 5756, the proper signal is sent to the interlock circuitry. A successful INSTRUMENT LOOP TEST requires all essential support systems and equipment to be OPERABLE, including power. Verification of the output interlock signals will assure OPERABILITY. Actual

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.7.1.3 (continued)

actuation of the interlock function at the affected components is not required to meet the intent of the INSTRUMENT LOOP TEST. The frequency of the SR is based on the failure frequency of the interlock functions.

Condition B or D of this LCO shall be entered when one or both, respectively, of the interlocks are found to be inoperable or the SR frequency for both of the interlocks is not met.

SR 4.7.1.4

A functional test of the Zone 1 Ventilation System dampers shall be conducted every 1 Year. Each Zone 1 Exhaust Fan Discharge Damper shall open when its fan is operating and close when the fan is stopped. Each Zone 1 Exhaust Fans Inlet Vane Damper shall fail open on loss of control signal and/or instrument air.

If a Zone 1 Exhaust Fan Discharge or Inlet Vane Damper is found to be inoperable the respective fan shall be considered inoperable. Failure to meet this SR may require entering Condition A, G, or H of this LCO.

The 1-Year surveillance frequency is considered adequate to track and trend the equipment performance.

SR 4.7.1.5

The Zone 1 Exhaust Fan(s) shall be started each 1 Year by use of the local start/stop switch at the load centers. This test ensures that the switches are capable of performing their safety function of starting the fans. Successful completion of this SR shall require an actual demonstration of the switch functions.

When a start/stop switch is found to be inoperable the respective fan shall be considered inoperable. Failure to meet this SR requires entering Condition A, G, or H of this LCO.

The 1-Year surveillance frequency is considered adequate to track and trend the equipment performance.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.7.1.6

The OPERABILITY of the sand filter shall be verified every 18 Months. This test shall ensure that filter efficiency is greater than 99.5% by using aerosol (DOP or equivalent) testing. This verification is performed using M&TE, therefore, the implementing procedure must account for the M&TE instrument uncertainty to insure the acceptance criteria of 99.5% is met. This SR ensures that the sand filter is capable of performing its design function at design flow (94,500 - 115,000 cfm). The acceptance criteria of 99.5% is based on the assumption contained in the accident analysis that the sand filter will operate at this level.

Condition H of this LCO shall be entered when the sand filter is found to be inoperable or the SR frequency is not met. The 18-Month surveillance frequency is based on past operating experience at F & H Canyons and engineering judgment.

SR 4.7.1.7

LCS-272 is required to start one Zone 1 exhaust fan on each safety bus (B9 and/or B10) following a loss of offsite power. To ensure the OPERABILITY of this function, it shall be tested every 2 Years. The test shall verify following an actual or simulated loss of offsite power to B9 or B10 that LCS-272 starts a fan on a safety bus within 30 seconds of the bus being energized. The 30-second requirement ensures timely start of the fan. The 2-Year surveillance frequency is consistent with the loss of power test frequency. Condition E of this LCO shall be entered if this SR is not met.

SR 4.7.1.8

Each of the Zone 1 Exhaust Fans shall be verified to have its fan switch on the load center set to remote. This verification shall be performed every 12 Hours. The 12-Hour frequency of this SR is adequate to monitor the system alignment. Condition A, G, or H of this LCO may be entered if the SR is not met unless failure to meet this surveillance requirement is due solely to the inoperability of one or both Diesel Generators.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.7.1.9

The Zone 1 exhaust fan(s) is required to pull sufficient air through the sand filter to meet the safety requirements of this system. To ensure the fans' ability to perform as designed, a 6-Month surveillance of total fan flow shall be completed. This surveillance shall consist of total fan flow measurement under numerous fan combinations with the inlet vane dampers fully open, to enable determination of individual fan performance. The instrument uncertainty must be accounted for to insure individual fans perform as designed. This determination will prove, by comparison of baseline data, adequacy of the fans to perform their function. Failure to meet this SR may require entering condition A, G, or H of this LCO.

REFERENCES

1. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U). WSRC-SA-6.
2. Instrumentation Uncertainties Evaluation Loops: S391-PT-5755 and S391-PT-5756 Sand Filter Inlet Plenum Pressure (U). J-CLC-S-00104.
3. Deleted.

B 3/4.8 EFFLUENT MONITORING

BASES

The following LCOs have been deleted:

3.8.1 Zone 1 Exhaust System Radiation Monitoring

3.8.2 LPPP Exhaust System Radiation Monitoring

3.8.3 LWF Exhaust System Radiation Monitoring

B 3/4.9 ELECTRICAL POWER

B 3.9.1 Standby Electrical Power

BASES

BACKGROUND SUMMARY

Standby electrical generation capabilities are provided to maintain power to safety loads and essential process loads and services when normal power is not available. The standby power facilities include two systems (Reference 3). Each system is equipped with a diesel generator unit and auxiliary equipment, including instrumentation, controls, indication, annunciation and distribution. The fuel oil storage and transfer system consists of dual storage tanks each with a transfer pump capable of pumping to either day tank.

There are two Diesel Generators (DGs) each rated at 2,000 kW with air-driven starting motors and dual redundant voltage regulators. The two DGs provide a standby source of 480 VAC power to secondary substation load centers B9 and B10.

On a loss of normal 13.8 kV power, undervoltage relays start the DGs. The DG output breakers close after achieving acceptable speed and voltage. DG #1 (DG100) normally feeds Load Center B9 and DG #2 (DG200) normally feeds Load Center B10. All the safety loads are powered from B9 or B10 including the Zone 1 exhaust fans. Chapter 4 of the FSAR provides a list of the safety loads on the DG buses. B9 and B10 are also tied to non-safety buses (B8 and B7 respectively), which provide essential process loads power. The non-safety loads are loaded on the DG buses by DCS to support recovery from a loss of offsite power event.

The 125 VDC distribution system provides power to the required DC electrical loads. These loads include breaker control power for load centers B9 and B10 and diesel generator logic circuitry. The 125 VDC battery charger, which is fed from a DG bus, normally provides power to the distribution cabinet, which supplies the distribution panel. The battery charger also supplies a trickle charge to the battery bank, which is also connected to the distribution cabinet. When power to the battery charger is lost, the battery bank automatically supplies power to the distribution cabinet. Battery banks D41 and D51 provide control power to the DGs and provide power to open and close the 480 VAC breakers in the distribution system.

(continued)

BASES

BACKGROUND SUMMARY (continued)	Fuel oil for the diesel engines is supplied from two 15,000-gallon underground storage tanks. Each underground storage tank has a fuel oil pump to deliver fuel to the diesel engine day tanks. Each diesel engine has a 450-gallon day tank with automatic refilling from either storage tank. The Local Control Station (LCS-210) that controls automatic refilling of the day tank is powered from Diesel Generator #2 (via B10/MCC B111/Y95) during loss of normal power conditions. Therefore, local switches are installed for manual control of day tank level if LCS-210 is inoperable.
APPLICATION TO SAFETY ANALYSIS	The capability to supply standby power is required to support OPERABILITY of the Zone 1 Ventilation Exhaust system, which mitigates the consequences of accidents within the Zone 1 area. The FSAR (Reference 1) assumes that most accidents in Building 221-S are processed by the sand filter prior to release to the atmosphere. OPERABILITY of the sand filter is dependent on the proper operation of the Zone 1 exhaust fans, which are located in the fan house. The standby power supply system ensures that power is supplied to the Zone 1 ventilation exhaust system fan(s) at all times.
LCO	Each of the two DGs must be capable of automatically starting, accelerating to acceptable speed and voltage, and connecting to its respective standby bus on detection of bus undervoltage. Each DG must also be capable of accepting required safety loads and continuing to operate until offsite power can be restored to the associated bus B9 or B10. Support systems required by this LCO that are related to the DGs include minimum fuel requirements in the fuel oil storage tanks, automatic fuel oil makeup capability to the day tanks, minimum air start receiver pressures, D41 and D51 battery banks, associated charging and DC distribution systems, and lube oil systems. Additional details regarding the required support systems are contained in the surveillance requirements and are identified in Table 3.9.1-2. Battery banks D41 and D51 are required to be OPERABLE to support the diesel generator system. Battery banks D41 and D51 provide control power to the DGs and provide power to open and close the 480 VAC breakers in the distribution system.

(continued)

BASES

LCO (continued)

The Safety Analysis requires the OPERABLE DGs to be supported by air receiver pressure of greater than or equal to 170 psig which is implemented as 177 psig to account for instrument uncertainties (Ref. 12).

The DG fuel oil and lube oil inventory are required to be sufficient to allow the DGs to operate for a minimum of 96 hours. The DG fuel oil storage tank limits of 9,787 gallons and 7,327 gallons provides enough fuel to operate one DG at 50% capacity (1,000 kW) for 96 hours and 72 hours, respectively (Ref. 15). The diesel fuel oil limit account for uncertainty by not including the inventory of the day tank, which supplies approximately 2.5 hours of DG operation at 100% capacity. LCS-210 is required to provide automatic makeup to the day tank. If LCS-210 is inoperable, manual control to provide makeup to the day tanks is available. Four days operation of a DG at 100% capacity requires 81.6 gallons of lube oil (Ref. 15). This is implemented as a standby full dipstick indication for the DG sump and 25% full lube oil storage (makeup) tank. The combined inventory has sufficient margin (over 5.5 days of DG operation at 100% capacity) to not include a detailed uncertainty analysis.

The capability of powering of non-safety loads, although a function of the standby diesels, is not required for the DG to be OPERABLE. These loads are not required by the Safety Analysis and are for operating convenience and not FACILITY safety.

Each of the DGs is equipped with redundant voltage regulators and bus undervoltage relays that enhance the reliability of DGs or provide operational flexibility. The Safety Analysis does not require this redundancy; thus, both of the redundant components are not required to establish the OPERABILITY of a DG.

MODE APPLICABILITY

Two DG systems are required to be OPERABLE during OPERATION, LIMITED PROCESSING, STANDBY, and SHUTDOWN to ensure that the capability to mitigate abnormal events is maintained.

PROCESS AREA APPLICABILITY

The limitations of this LCO apply to those areas in the FACILITY where the FSAR assumed Zone 1 Ventilation. These areas include the SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter.

(continued)

BASES

ACTIONS

Several Required Actions contain a NOTE stating LCO 3.0.4 is not applicable with specified restrictions. This NOTE allows the FACILITY to change MODES while in an LCO Condition provided adequate compensatory measures are in place.

A NOTE preceding Condition A alerts the operator that Required Action A.2 must be completed if Condition A is entered.

A second NOTE preceding Condition A alerts the operator that if Diesel Generator #2 (DG200) is inoperable, then DG Fuel Oil Transfer System controls (LCS-210) are also inoperable and Condition E shall also be entered.

A.1

Condition A is entered when one DG system is discovered to be inoperable.

Required Action A.1 requires verification that at least one of the Zone 1 Exhaust Fans is OPERABLE and on the OPERABLE DG bus.

If a DG is inoperable, the Zone 1 Exhaust Fans on the inoperable DG bus will not run on loss of offsite power because the DG is not available to restore power. LCO 3.0.6 provides an exception to entering the LCO of a supported system (in this case, the Zone 1 Ventilation system) when the inability of the supported system to perform its intended function is due solely to the supporting system's (i.e., DG system) inoperability, and an LCO for that supporting system is specified in the TSR. For that reason, a Zone 1 Exhaust Fan(s) can be considered OPERABLE, even if the fan(s) is aligned to an electrical bus supported by an inoperable DG. In the case of a DG discovered to be inoperable, only the DG LCO 3.9.1 Conditions are required to be entered. These Required Actions and Completion Times establish the necessary safe plant conditions, even though it is recognized that the associated fans will not operate in the event of a loss of normal power. The fans still provide their credited safety function for other analyzed events. An inoperable DG would require entry into LCO 3.9.1 Condition A (one DG system inoperable) while entering LCO 3.7.1 Condition A (two Zone 1 Exhaust Fans inoperable) would not be required if the inability of the Zone 1 Exhaust Fans to perform their intended function is due solely to the inoperability of the associated DG. If no OPERABLE Zone 1 Exhaust Fan(s) is aligned to the OPERABLE DG bus, then no Zone 1 Exhaust Fans will run on recovery from a loss of

(continued)

BASES

ACTIONS (continued)

A.1 (continued)

offsite power event when a DG unit is the only available power supply. Therefore, verification is required to determine if there is an OPERABLE Zone 1 Exhaust Fan aligned to the OPERABLE DG bus. This Required Action is completed IMMEDIATELY.

If an OPERABLE Zone 1 Exhaust Fan cannot be verified to be on an OPERABLE DG bus, the Required Action is not met, and Condition G shall be entered.

A Completion Time of IMMEDIATELY is specified to minimize the potential for a release of radioactive material while the Zone 1 Exhaust system OPERABILITY is degraded.

A.2 (A.2.1 or A.2.2)

Required Action A.2 is completed by completing either A.2.1 or A.2.2. Required Action A.2.1 requires SR 4.9.1.11 or SR 4.9.1.13 be performed on the OPERABLE DG system. Required Action A.2.2 determines if a common cause failure potential exists that would render the OPERABLE DG inoperable. The intent is that all DG inoperabilities must be investigated for common-cause failures regardless of how long DG inoperability persists.

Required Action A.2.1 uses the performance of SR 4.9.1.11 or SR 4.9.1.13 to confirm the OPERABILITY of the OPERABLE DG.

The NOTE before Required Action A.2.1 allows Required Action A.2.1 to be considered completed if SR 4.9.1.11 or 4.9.1.13 has been performed on the OPERABLE DG within the previous 24 Hours. This allowance does not apply to the required Monthly performance of the surveillance requirement, but allows for pre-planning before a maintenance outage. The Completion Time of 24 Hours is based on Reference 2.

Required Action A.2.2 provides an allowance to avoid unnecessary testing of OPERABLE DG(s). If it can be determined that the cause of the inoperable DG does not exist on the OPERABLE DG, SR 4.9.1.11 or 4.9.1.13 does not have to be performed.

If the cause of inoperability exists on the other DG, the other DG would be

(continued)

BASES

ACTIONS (continued)

A.2 (continued)

declared inoperable upon discovery and Condition G would be entered. Once the failure is repaired, the common cause failure no longer exists and Required Action A.2.2 is satisfied. If the cause of the initial inoperable DG cannot be confirmed to not exist on the remaining DG, performance of SR 4.9.1.11 or 4.9.1.13 suffices to provide assurance of continued OPERABILITY of that DG. The Completion Time of 24 Hours is based on Reference 2.

A.3

If a DG is inoperable the corresponding DG fuel oil storage tank transfer pump will not receive power during a loss of offsite power event. To ensure that an OPERABLE DG has sufficient fuel oil to operate for 96 Hours at 50% capacity (1,000 kW), its storage tank shall have at least 9,787 gallons (Ref 15). DG #1 powers storage tank #1 transfer pump, and DG #2 powers storage tank #2 transfer pump and LCS-210. The Completion Time of 24 Hours is based on Reference 2.

These actions prove the minimum configuration of the exhaust fans, diesel generators and diesel fuel oil system are OPERABLE. Therefore, the FSAR concludes that the FACILITY is safe to process material.

A NOTE states LCO 3.0.4 is not applicable if Required Actions A.1, A.2, and A.3 have been completed.

A.4

The inoperable DG System shall be restored to OPERABLE status within 14 Days. The affected PROCESS AREA(s) may remain in OPERATION for up to 14 Days while repairs are conducted on the inoperable DG System.

The completion time of 14 Days focuses attention on restoration of the inoperable DG System while recognizing that the other DG system is OPERABLE and can therefore perform its intended function.

If Required Actions A.1, A.2, or A.3 or their associated Completion Times are not met, Condition G shall be entered. If Required Action A.4 or its associated Completion Time is not met, Condition I shall be entered.

B.1 and B.2

If new fuel oil was added to a fuel oil storage tank or day tank having properties outside of the requirements of SR 4.9.1.24 or SR 4.9.1.25, the tank(s) shall be verified to be or restored to within specifications within 1 Month. Since fuel oil outside of specifications does not mean a definite failure of the fuel oil to burn properly in the diesel engine, and most fuel

(continued)

BASES

ACTIONS (continued)

B.1 and B.2 (continued)

oil properties do not change significantly between SR frequency intervals, and proper engine performance has been recently demonstrated, it is prudent to allow a brief period prior to declaring the DG inoperable. One Month allows time for verifying acceptable conditions or implementing compensatory measures to restore the fuel oil parameters within specifications. The 1-Month Completion Time is consistent with the guidance provided in Reference 2. If the fuel oil remains out of specification after 1 Month, the fuel shall not be used to satisfy the DG fuel oil inventory requirement in the fuel oil storage tanks. At that time, Condition A or G shall be entered depending on the remaining available fuel oil.

A NOTE states LCO 3.0.4 is not applicable.

C.1

Condition C is specified in order to permit a 48-Hour restoration period for replenishment of fuel oil and/or lube oil inventory. The 48-Hour Completion Time is specified to avoid declaring a DG inoperable and requiring IMMEDIATE entrance into Condition A or G, while requiring restoration of the required parameter(s). If the required inventory is not restored within limit(s) within 48 Hours, Condition A or G is entered via Condition H.

A period of 48 hours is permitted to complete restoration of the required inventory prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 3 days fuel oil for DG operating at 50% capacity and > 2 days operating at 100% capacity for lube oil), the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this period.

A NOTE states LCO 3.0.4 is not applicable.

D.1, D.2, D.3 and D.4

Condition D takes a graded approach to the restoration of a battery with cell parameter(s) not within limits for a battery bank. Required Action D.1 verifies within one Hour that the pilot cell(s) electrolyte level and float voltage are within the Table 3.9.1-1 Category C values. This check will provide a quick indication of the status of the remainder of the battery cells. Required Action D.2 verifies within 24 Hours that the battery cell parameters are within Table 3.9.1-1 Category C values. This confirms the condition of the battery. The continued monitoring every Seven Days thereafter gives assurance that the battery is not continuing to

(continued)

BASES

ACTIONS (continued)

D.1, D.2, D.3, and D.4 (continued)

degrade. Seven Days is based on the manufacturer's suggested equalize/float duration when the battery is in this degraded state (Reference 10). The 25% extension normally allowed by LCO 3.0.2 is not applicable to the Completion Time of Required Action D.2. Three Months, per Required Action D.3, are allowed to restore the battery cell out of limits parameters to meet Table 3.9.1-1 Category B values (Ref. 4). Required Action D.4 allows Three Months to restore the terminal voltage as defined in SR 4.9.1.5 and the float current as defined in SR 4.9.1.34. These actions avoid declaring a DG inoperable which requires immediate entrance into Condition A or G, while allowing restoration of the required parameter(s). In this condition, there is a high likelihood that the DG can start and operate since the batteries are oversized for the application. Therefore, it is overly restrictive to immediately declare the DG inoperable.

A NOTE states LCO 3.0.4 is not applicable if Required Actions D.1 and D.2 have been completed. These Required Actions prove the battery can perform it function as required by the Safety Analysis. If Required Actions cannot be met, Condition A or G shall be entered via Condition H.

E.1 and E.2

A NOTE permits MODE changes while in this Condition while attempting to comply with Required Action E.2.

Condition E is entered if LCS-210 is determined to be inoperable, including if DG #2 is inoperable, thus requiring operator action to control fuel oil level in the running DG day tank. Required Action E.1 initiates this action by dispatching a qualified operator to the fan house IMMEDIATELY upon start of the DG, who then remains in the fan house continuously until the DG is stopped. This action is to be completed for each start of the DG until Required Action E.2 is met. The Completion Time of IMMEDIATELY is conservative due to the capacity of the DG day tank. By remaining in the fan house continuously and maintaining adequate day tank level while the DG is running, the operator fulfills the required function of LCS-210.

Required Action E.2 initiates action to restore LCS-210 to OPERABLE status. Since LCS-210 is powered from only one DG (i.e., DG #2), the Completion Time will support the maximum outage period for DG #2. The 3-Month Completion Time is based on a qualified operator being stationed in the fan house while a DG is operating.

(continued)

BASES

ACTIONS (continued)

F.1

This Condition is entered when one air receiver pressure indicator (PI-8600X or PI-8601X) or (PI-8580X or PI-8581X) on either or both DGs is inoperable. A Completion Time of 14 days is sufficient due to the reliability of the remaining OPERABLE pressure indicator (at least one per DG). If the equipment cannot be restored within 14 days, Condition A or G shall be entered via Condition H.

A NOTE states LCO 3.0.4 is not applicable.

G.1, G.2, and G.3

With both DG Systems inoperable a loss of offsite AC sources will impair the ability to mitigate potential releases through the Zone 1 ventilation system.

Additionally, this Condition is entered if Required Actions A.1, A.2, or A.3 and/or their associated Completion Times are not met. Therefore, transfers from the SEFT and the PRFT into the SRAT are stopped, steam is isolated from the affected PROCESS AREAS and continued operation in this Condition is limited to 2 Hours. This is a sufficiently short period of time to limit continued operation in a degraded condition but provides time to restore a diesel generator or the fuel oil inventory before the affected PROCESS AREA(S) must be placed in STANDBY. By isolating the steam IMMEDIATELY, the vessels are no longer being heated so cooling starts immediately. The 2-Hour Completion Time for restoration is based on Reference 2.

If the Required Actions or their Completion Times are not met, Condition J shall be entered.

(continued)

BASES

ACTIONS (continued)

H.1

Condition H shall be entered for the following situations. If the Required Action(s) and/or associated Completion Time(s) of Conditions C, D, or F are not met, or Battery D41 or D51 is inoperable for reason(s) other than Condition D, the associated support system(s) has degraded sufficiently to declare the associated diesel generator inoperable. Also, if the available fuel oil inventory in one or both DG fuel oil storage tank(s) is less than 7,327 gallons, the associated DG unit is rendered inoperable because the unit could not run for the required 72 hours. If the lube oil in one or both DG lube oil storage (makeup) tank(s) is not visible in the sight glass, the associated DG is rendered inoperable. An evaluation should be completed to determine if the conditions require both DGs to be inoperable or not. Condition A or G shall be entered depending on the support system(s) that is inoperable.

I.1 and I.2

If the Required Action A.4 and/or associated Completion Time is not met or the Required Action E.2 and/or associated Completion Time is not met, actions to place the FACILITY in a safe condition shall be implemented IMMEDIATELY. To minimize the risk with the FACILITY in this degraded condition, it is necessary to stop all transfers in the affected PROCESS AREAS and isolate steam. These actions reduce the production of flammable vapors from the PROCESS AREAS. If this Condition is entered from Condition E, an operator is already stationed in 292-S, to manually transfer fuel oil if required while a DG is operating.

The following are not considered transfers into the affected PROCESS AREA for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, laboratory drains, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

(continued)

BASES

ACTIONS (continued)

I.3

The SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter shall be placed in STANDBY within 24 Hours. If the affected process vessel is in SHUTDOWN it is not required to go to STANDBY since SHUTDOWN is conservative to STANDBY. A 24-Hour Completion Time allows adequate time to cool heated vessels and to safely transition to STANDBY, and recognizes that actions to place the CPC vessels and Melter in STANDBY are underway. (If Process Cooling Water is available, it may be used to cool the vessels.)

J.1, J.2, and J.3

If the Required Actions and/or associated Completion Times of Condition G are not met, actions to stop processing shall be implemented IMMEDIATELY. To minimize the risk with the FACILITY in this degraded condition, it is necessary to stop all transfers in the affected PROCESS AREAS, isolate steam, and verify purge flows. These actions reduce the production of flammable vapors from the PROCESS AREAS and ensure the availability of required purge flows.

The following are not considered transfers into the affected PROCESS AREA for compliance with this Required Action: Water additions from: trickle flow, bubbler blow-down, maintaining minimum liquid level above agitator interlock, filling jumper seal pots, laboratory drains, and make up for evaporation losses (i.e., may restore the process vessel level to the approximate level at the time of LCO entry). These additions are typically of small volumes, involve activities necessary to prevent equipment degradation, or involve activities necessary for equipment performance during extended restoration periods.

J.4

Actions to restore inoperable equipment (at least one DG system), to OPERABLE status shall be implemented IMMEDIATELY, including restoring at least one of the DG systems and its associated fuel oil inventory to greater than 9,787 gallons.

(continued)

BASES

ACTIONS (continued)

J.5

The SEFT, PRFT, SRAT, SME, MFT, RCT, DWTT, and Melter shall be placed in STANDBY within 24 Hours. If the affected process vessel is in SHUTDOWN it is not required to go to STANDBY since SHUTDOWN is conservative to STANDBY. A 24-Hour Completion Time allows adequate time to cool heated vessels and to safely transition to STANDBY, and recognizes that actions to place the CPC vessels and Melter in STANDBY are underway. (If Process Cooling Water is available, it may be used to cool the vessels.)

SURVEILLANCE REQUIREMENTS

SR 4.9.1.1

The air start receiver for the DG(s) is typically pressurized to allow DG(s) starting. The DG(s) shall be verified to be supported by an air start receiver at a pressure of greater than or equal to 177 psig. This SR ensures the Safety Analysis value of 170 psig is met and accounts for instrument uncertainties (Ref. 12). This SR ensures that, without the aid of the refill compressor, sufficient air start capacity for the DG(s) is available. Sufficient air start capacity is defined as the ability to supply two start cycles and a successful engine start. The 24-Hour frequency is adequate to ensure that sufficient air capacity is available on a continuous basis. To maintain adequate air capacity levels following a DG start, the level shall be verified within 24 Hours after each shutdown of a DG. Failure to meet this SR for the DG requires entering Condition A or G of this LCO (Ref. 2).

SR 4.9.1.2

This SR requires verification that the DG(s) day tank has a fuel oil sight-glass level of greater than or equal to 5/8. This verification ensures the level of fuel oil in the day tank is at or above the level at which the fuel oil is automatically added. The 7-Day surveillance frequency is adequate to ensure that the fuel oil transfer system is available on a continuous basis. To maintain an adequate level of fuel oil in the day tank following a DG(s) run, the level shall be verified within 24 Hours after each shutdown of the DG(s). Failure to meet this SR requires entering Condition A or G of this LCO. The failure of the SR may also be due to failure of LCS-210. This situation would require entering Condition E of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.3

This SR requires verification that the level in the DG(s) lubricating oil sump is greater than or equal to the standby full dipstick indication. This verification ensures that the proper lubricating oil inventory is available. This inventory combined with the required inventory of the lube oil makeup storage tank will support at least 96 Hours of operation for each DG. A 7-Day frequency is adequate to ensure that a sufficient lubricating oil supply is available to maintain adequate lubricating oil levels following DG(s) run. To maintain an adequate level of lubricating oil following the DG(s) run, the level shall be verified within 24 Hours after each shutdown of the DG(s). Failure to meet this SR for the DG requires entering Condition A or G of this LCO.

SR 4.9.1.4

This SR requires verification that the level in the DG(s) fuel oil storage tank associated with the DG(s) is greater than or equal to 9,787 gallons. This verification ensures that the level of fuel oil in the fuel oil storage tank is sufficient to supply the DG(s) at 50% capacity for 96 Hours. The 7-Day frequency is adequate to ensure that sufficient fuel oil is available, since the operators would be aware of any large uses of fuel during this period. To maintain an adequate level in the DG(s) fuel oil storage tanks following the DG(s) run, the level shall be verified within 24 Hours after each shutdown of the DG(s). Failure to meet this SR for the DG(s) requires entering Condition C, or H of this LCO depending on the quantity of DG(s) fuel available.

SR 4.9.1.5

Verifying battery terminal voltage while the batteries are on float or equalize charge ensures the effectiveness of the charging system and the ability of the batteries to perform their intended function. The voltage requirements are based on the nominal design voltage of the battery and manufacturer's recommendations (Ref. 10). The 1-Month surveillance frequency is considered to be adequate to maintain periodic oversight of the required battery bank based on Reference 4. Failure to meet this SR for the battery bank supporting the DG(s) requires entering Condition D of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.6

This SR verifies that the float voltage for each designated pilot cell in the battery associated with the DG(s) is ≥ 2.13 VDC. This value is based on the recommendations of Reference 4 and the manufacturer (Ref. 10), which state that prolonged operation of cells < 2.13 VDC can reduce the life expectancy of cells. The cells selected as pilot cells are those whose temperature and voltage approximate the state of charge of the entire battery.

The 1-Month surveillance frequency of the SR is consistent with Reference 4, which recommends regular battery inspections at least monthly, including voltage of the pilot cell(s). Since Table 3.9.1-1 Category B float voltage limit is the same, SR 4.9.1.7 may be performed in lieu of this SR.

Failure to meet this SR requires entering Condition D of this LCO.

SR 4.9.1.7

Table 3.9.1-1 delineates the limits on float voltage for two different categories. The meaning of each category is discussed below.

Category B defines the normal float voltage limit for each connected cell in the battery associated with the DG(s). The term "connected cell" excludes any battery cell that may be jumpered out because of a degraded condition or for any other reason.

The Category B limit specified for float voltage is ≥ 2.13 VDC per cell. This value is based on the recommendations of Reference 4 and the manufacturer (Ref. 10), which state that prolonged operation of cells < 2.13 VDC can reduce the life expectancy of cells.

The Category C values, although reduced, provide assurance that sufficient capacity exists to perform the intended function and maintain a margin of safety. When any battery float voltage is outside the allowable value, the assurance of sufficient capacity described above no longer exists and the battery must be declared inoperable.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.7 (continued)

The allowable value for float voltage is based on Reference 4 and manufacturer's recommendations (Ref. 10), which state that a cell voltage of 2.07 VDC or below, under float conditions and not caused by elevated temperature of the cell, indicates internal cell problems and may require cell replacement.

The 3-Month surveillance frequency of the voltage is consistent with Reference 4. In addition, per Reference 2, within 24 Hours after a battery discharge < 110 VDC (based on float voltage limits), or 24 Hours after a battery overcharge > 150 VDC, the battery must be demonstrated to meet Table 3.9.1-1 Category B Limits. The steps to follow in case one or more battery cell parameters are not within limits are described above in SR 4.9.1.6. Failure to meet this SR requires entering Condition D of this LCO.

SR 4.9.1.8

A battery-service test is a special test of the battery's capability, "as-found" to satisfy the design requirements (battery duty cycle) per Reference 8 of the DC electrical power system. The discharge rate and test length should correspond to the design duty cycle requirements. The Safety Analysis provides load requirements for DC electrical power subsystems. The 18-Month surveillance frequency is based on Reference 2. Failure to meet this SR requires entering Condition A or G via Condition H of this LCO.

SR 4.9.1.9 Deleted.

SR 4.9.1.10

This SR demonstrates that the required fuel oil transfer pump operates and transfers fuel oil from its associated storage tank to the required day tank. This is required to support the 96-Hour continuous operation of the standby electrical source. This SR provides assurance that the fuel oil transfer pump is OPERABLE, the fuel oil piping is intact and unobstructed, and the control systems for automatic fuel transfer are OPERABLE. The 6-Month surveillance frequency is based on the reliability of the fuel oil transfer system and the routine verification by the completion of SR 4.9.1.2. Failure of this SR requires entering Condition E of this LCO.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.11

This DG test helps to ensure the availability of the DG(s) to mitigate the consequences of operational events and to support placing the FACILITY in a safe condition.

To minimize the wear on moving parts that are not lubricated when the engine is not running, this SR is modified by a NOTE to indicate that all DG(s) starts for this SR may be preceded by an engine pre-lube period. A second NOTE permits starting the DG(s) in idle to allow proper engine lubrication before accelerating to rated speed.

For the purposes of this SR, the DG(s) is started from standby conditions. Standby conditions for a DG mean that the diesel engine lubricating oil is heated by the jacket water and continuously circulated through a portion of the system. Engine jacket water is heated and circulates through the system by natural convection. This SR verifies steady-state conditions are achieved including voltage between 432 VAC and 528 VAC, and frequency between 58.8 Hz and 61.2 Hz per References 2 and 7. SR 4.9.1.13 requires that, on a 6-Month frequency, the DG(s) starts from standby conditions without operating at idle speed. It is more restrictive than SR 4.9.1.11 and it may be performed in lieu of SR 4.9.1.11.

The 1-Month surveillance frequency is based on Reference 2. This frequency provides adequate assurance of DG(s) OPERABILITY, while minimizing degradation resulting from testing. Failure to meet this SR requires entering Condition A or G of this LCO.

SR 4.9.1.12

This SR verifies that the DG is capable of being synchronized to the offsite electrical system and accepting load. The minimum DG(s) loading required to successfully meet this SR is 50% of the continuous load rating. A 50% minimum loading requirement is specified to recognize that the operating load in S Area is not always of a magnitude which would allow running a DG at 100% capacity. A load between 1000 kW and 2000 kW has been specified. A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the DG(s) is connected to the offsite source.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.12 (continued)

This SR is modified by three NOTES. NOTE 1 indicates that diesel engine runs for this SR may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engines are minimized. NOTE 2 states that momentary transients, because of changing bus loads, do not invalidate this test. NOTE 3 indicates that this surveillance should be conducted on only one DG at a time to avoid common-cause failures that might result from offsite circuit or grid perturbations.

The 1-Month surveillance frequency is based on Reference 2. Failure to meet this SR requires entering Condition A or G of this LCO.

SR 4.9.1.13

This DG test helps to ensure the availability of the DG to mitigate the consequences of operational events and to support placing the FACILITY in a safe condition.

To minimize the wear on moving parts that are not lubricated when the engine is not running, this SR is modified by a NOTE to indicate that all DG starts for this SR may be preceded by an engine pre-lube period.

For the purposes of this SR, the DG is started from standby conditions. Standby conditions for a DG mean that the diesel engine lubricating oil is heated by the jacket water and continuously circulated through a portion of the system. Engine jacket water is heated and circulates through the system by natural convection. This SR verifies steady-state conditions are achieved within 30 seconds including voltage between 432 VAC and 528 VAC, and frequency between 58.8 Hz and 61.2 Hz per References 2 and 7. The time requirement of 30 seconds is not imposed by the Safety Analysis but was selected to provide a reasonable time to start the DG(s).

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.13 (continued)

SR 4.9.1.13 requires that, on a 6-Month frequency, the DG(s) starts from standby conditions without operating at idle speed. It is more restrictive than SR 4.9.1.11 and it may be performed in lieu of SR 4.9.1.11.

The 6-Month surveillance frequency is based on References 2 and 7. This frequency provides adequate assurance of DG(s) OPERABILITY, while minimizing degradation resulting from testing. Failure to meet this SR requires entering Condition A or G of this LCO.

SR 4.9.1.14

References 2, 7, and 18 require that the DG(s) runs for 8 hours on a 2-Year surveillance frequency. This test demonstrates that the DG(s) will be able to run at full load capacity for an interval not less than 8 hours, 6 hours of which is at a load equivalent to the continuous rating of the DG(s) (≥ 1800 kW and ≤ 2000 kW) and 2 Hours of which is equivalent to the 2-Hour rating of the DG(s) (≥ 2100kW and ≤ 2200 kW). The provisions for starting, discussed in SR 4.9.1.11, and for gradual loading, discussed in SR 4.9.1.12, are applicable to this SR. NOTES have been added stating that momentary transients due to changing bus loads do not invalidate this test. The load bands are provided to prevent routine overloading of the DG(s). This SR is also modified by a NOTE which acknowledges that credit may be taken for unplanned events that satisfy this SR.

The 2-Year surveillance frequency is based on the infrequent testing requirements in References 2, 7, and 18. Failure to meet this SR requires entering Condition A or G of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.15

This SR demonstrates the DG(s) capability to reject a full load (≥1800 kW and ≤ 2000 kW) without tripping on overspeed or exceeding predetermined voltage limits. This SR uses plant loads so that the DG(s) power factor is representative of actual operations. The DG(s) full load rejection may occur because of a system fault or inadvertent breaker tripping. The DG(s) shall be running with operating temperature stabilized and under its full rated load within its required frequency and voltage range per Reference 2. Upon a complete load reject, the DG(s) shall not trip on overspeed and output voltage shall be maintained ≤ 576 VAC. These acceptance criteria are based on References 2 and 7 which provide for DG(s) damage protection. While the DG(s) is not expected to experience this transient during an event and continue to be available, this response will assure the DG(s) is not degraded for future application including reconnection to the bus if the trip initiator can be corrected or isolated.

The 2-Year surveillance frequency is based on infrequent testing requirements in References 2, 7, and 18. A NOTE has been added which acknowledges that credit may be taken for unplanned events which satisfy this SR. Failure to meet this SR requires entering Condition A or G of this LCO.

SR 4.9.1.16 Deleted.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.17

This SR demonstrates the as-designed operation of the standby power sources during actual or simulated loss of the offsite source. The DG(s) shall be tested once every 2 Years. This test verifies all actions encountered from the loss of offsite power, including shedding of non-essential loads and energization of the emergency bus and respective safety loads. It further demonstrates the capability of the DG(s) to automatically achieve required voltage and frequency and that the DG(s) breaker(s) will not close until the DG(s) is at the required voltage and frequency. This surveillance test shall verify that the DG(s) will energize the associated emergency bus within 30 seconds from loss of power and that the DG(s) will accept the safety loads. The time requirement of 30 seconds is not imposed by the Safety Analysis but was selected to provide a reasonable time to start the DG(s) and provide power to the respective emergency bus. Once the emergency bus is energized the associated Zone 1 Exhaust Fan(s) is capable of being started. The surveillance test requires that the actual loads be carried by the DG(s) and does not allow the use of a load bank. This test shall also verify that the generator achieves a design steady-state voltage between 432 VAC and 528 VAC, and a design steady state frequency between 58.8 Hz and 61.2 Hz, under loaded conditions (Refs. 2 and 7).

The load must be maintained for at least 5 minutes after the loads have been sequenced onto the diesel. A minimum run time of 5 minutes is required to demonstrate that all starting transients have decayed and stability is achieved.

The SR is modified by two NOTES. The first NOTE acknowledges that credit may be taken for unplanned events that satisfy this SR. It is recognized that, if credit is taken for an unplanned event, that normal measuring and testing equipment may not be installed to record each individual parameter. Independent measurement of each parameter is not necessary if the DG(s) performs its intended function during the unplanned event. The second NOTE indicates all DG(s) starts for this SR may be preceded by an engine pre-lube period to minimize wear on moving parts.

The DG(s) shall be declared inoperable if it cannot achieve the design steady state voltage and frequency or the loads are attempted to be loaded prior to reaching the required voltage and frequency. The 2-Year surveillance frequency is based on References 2, 7, and 18. Failure to meet this SR requires entering Condition A or G of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.18

Each DG(s) is provided with an engine overspeed trip set at 115% of nominal speed to prevent damage to the engine. Recovery from a transient caused by the loss of a large load could cause the DG(s) to overspeed and, if excessive, might result in the trip of the engine.

This SR demonstrates the capability of the DG(s) to reject a load of greater than or equal to its largest single operating load (kW) per Reference 9 while maintaining engine speed less than or equal to nominal speed plus 75% of the difference between nominal speed and overspeed trip setpoint. This SR shall use plant loads so that the DG(s) power factor is representative of actual operations. This test will ensure that a load reject will not cause damage or mis-operation of the safety equipment that is still being powered by the DG(s). This test can be run concurrently with the Loss of Offsite Power test, SR 4.9.1.17. The 3-second staged recovery values are based on Reference 2. The 2-Year surveillance frequency is based on References 2, 7, and 18. Failure to meet this SR requires entering Condition A or G of this LCO.

SR 4.9.1.19

This SR demonstrates the capability of the DG(s) to accommodate parallel operation with the grid for the purpose of live bus transfer of loads. While carrying safety loads, the DG(s) will be able to synchronize and transfer these loads back to offsite power. Upon completion of this transfer the DG(s) should not trip and should be in a ready-to-load status. Ready-to-load status is when the DG(s) is at rated speed and voltage and the output breaker is open. This test can be run at the conclusion of the Loss of Offsite Power test, SR 4.9.1.17. The 2-Year surveillance frequency is based on References 2, 7, and 18. Failure to meet this SR requires entering Condition A or G of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.20

This SR demonstrates that the DG(s) non-critical protective function, high jacket water temperature, is bypassed on a loss of power signal. It also demonstrates that critical protective functions (engine overspeed, generator differential current, low lube oil pressure, high crankcase pressure, negative sequence current, anti-motoring, voltage controlled overcurrent, and loss of excitation) trip the DG(s) to avoid damage to the DG(s) unit. The DG(s) availability to support accident mitigation is more critical than protecting the engine against minor problems that are not immediately detrimental to the emergency operation of the DG(s). The 2-Year frequency is based on References 2, 7, and 18. Failure to meet this SR requires entering Condition A or G of this LCO.

SR 4.9.1.21 Deleted.

SR 4.9.1.22

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment to survive. Bottom sediments can cause fouling of the fuel oil system and degrade engine performance. Removal of water from the day tanks and storage tanks once every month eliminates the necessary environment for bacteria. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG(s) operation. Water may come from any of several sources including condensation, ground water, rainwater, contaminated fuel oil, and from breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The presence of water does not necessarily represent a failure of the SR, provided all but trace amounts of the accumulated water are removed during performance of this surveillance. This SR is for preventive maintenance.

The 1-Month surveillance frequency is based on References 2 and 6. Failure to meet this SR requires entering Condition H of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.23

Fuel oil degradation during long-term storage shows up as an increase in particulates, due mostly to oxidation. The presence of particulates does not mean the fuel oil will not burn properly in a diesel engine. However, the particulates can cause fouling of filters and fuel oil injection equipment.

The DG(s) fuel oil day tank and fuel oil storage tank shall be sampled for particulate contamination every 3 Months. Particulate content of a tank representative sample of fuel oil shall not exceed 20 mg/l. If the fuel oil particulate content exceeds 20 mg/l, the fuel shall not be used to satisfy the DG(s) fuel oil inventory requirement. Failure to meet this SR requires entering Condition H of this LCO depending on the remaining volume of fuel oil.

This SR is based on the recommendations documented in Reference 6 and takes into consideration fuel oil degradation trends that indicate particulate concentration is unlikely to change significantly between frequency intervals.

SR 4.9.1.24

The tests listed below are a means of determining whether new fuel oil is of the appropriate grade and has not been contaminated with substances that would have a detrimental impact on diesel engine combustion. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tanks without concern for contaminating the entire volume of fuel oil in the storage tanks. These tests are to be conducted prior to adding the new fuel oil to the storage tank(s). The tests, limits, and applicable ASTM standards are as follows:

a. Sample the new fuel oil in accordance with ASTM D4057 or ASTM-270;
b. Verify in accordance with the tests specified in ASTM D975 that the sample has an API gravity of ≥ 30 and ≤ 42 API, a kinematic viscosity of ≥ 1.9 and ≤ 4.1 centistokes, a sediment in water concentration of ≤ 0.05%, a flash point of ≥ 125°F, and visual appearance is clear and bright.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.24 (continued)

Failure to meet any of the above limits is cause for rejecting the new fuel, but does not represent a failure to meet the LCO, since the fuel oil is not added to the storage tank(s). Failure to perform this SR requires entry into Condition B of this LCO (Ref. 6.)

SR 4.9.1.25

Within 31 Days following the initial fuel oil sample, the fuel oil is analyzed to verify the following properties in accordance with ASTM D975 and Ref. 14: the cloud point ≤ 30°F, the cetane index ≥ 40, and the particulate contamination ≤ 10 mg/l. The 31-Day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on DG(s) operation. A Cloud Point of 30°F or less is acceptable because the fuel oil storage tanks are located underground and the day tanks are inside a building. This SR ensures the availability of high-quality fuel oil for the DG(s). Failure to meet this SR requires entry in Condition B of this LCO.

SR 4.9.1.26

Draining the fuel oil stored in the underground storage tanks, removal of the accumulated sediment, and tank cleaning are required at 10-Year intervals by Regulatory Guide 1.137. This SR is for preventive maintenance. The presence of sediment does not necessarily represent a failure of this SR provided that accumulated sediment is removed during the performance of the SR. Failure to meet the requirements of this SR would require that the fuel be considered contaminated and would require entering Condition H of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.27

The DG(s) air receiver pressure indicator INSTRUMENT LOOP shall be CALIBRATED at least once every 1 Year. The INSTRUMENT LOOP CALIBRATION will verify that the pressure instrument is sensing and indicating the correct pressure. This annual frequency will provide the necessary assurance that the pressure instrumentation functions as needed to ensure that pressure verifications are made from instrumentation that is OPERABLE. Failure to meet the requirements of this SR requires entering Condition A, F, or G of this LCO.

SR 4.9.1.28

The Diesel Generator fuel oil pump for the DG(s) shall be started every 3 Months by use of the local start/stop key switch. This test ensures that the switch is capable of performing the design function. Successful completion of this SR shall require an actual demonstration of the switch functions. The 3-Month frequency of the SR is based on the failure frequency of the interlock functions.

When the start/stop key switch associated with the DG(s) is found to be inoperable the respective fuel oil pump shall be considered inoperable, and Condition A or G of this LCO shall be entered.

SR 4.9.1.29 Deleted.

SR 4.9.1.30 Deleted.

SR 4.9.1.31 Deleted.

SR 4.9.1.32

This SR requires verification that the DG(s) lube oil storage (makeup) tank associated with the DG(s) has a lube oil inventory of greater than or equal to 25%. This verification ensures the level of lube oil in the storage (makeup) tank combined with that in the sump is above the level which is required to ensure the DG(s) has four days of supply. The 7-Day frequency is adequate to ensure that the lube oil is available on a continuous basis. To maintain an adequate level of lube oil in the storage tank following a lube oil transfer, the level shall be verified within 24 Hours. Failure of this SR requires entering Condition C or H of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.33

Table 3.9.1-1 delineates the limits on electrolyte level for two different categories. The meaning of each category is discussed below.

The Category B (Limits) column defines the normal parameter limits for each connected cell. The term "connected cell" excludes any battery cell that may be jumpered out because of a degraded condition or for any other reason.

The Category C values, although reduced, provide assurance that sufficient capacity exists to perform the intended function and maintain a margin of safety. When any connected cell electrolyte level is outside the allowable value, the assurance of sufficient capacity described above no longer exists and the battery must be declared inoperable.

The allowable values specified for electrolyte level (above the top of the plates and not overflowing) ensure that the plates suffer no physical damage and maintain adequate electron transfer capability.

The SR to verify the cell electrolyte level is consistent with Reference 4, which recommends regular battery inspections (at least once per month). In addition, per Reference 2, within 24 Hours after a battery discharge < 110 VDC (based on float voltage limits) or within 24 Hours after a battery overcharge > 150 VDC, the battery must be demonstrated to meet Table 3.9.1-1 Category B Limits.

Failure to meet this SR requires entering Condition D of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 4.9.1.34

Verifying battery float current while on float charge is used to determine the state of charge of the battery. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a charged state. The float current requirements are based on the float current indicative of a charged battery. Use of float current to determine the state of charge of the battery is consistent with IEEE-450 (Ref. 4).

This SR is modified by a NOTE that states the float current requirement is not required to be met when battery terminal voltage is less than the minimum established voltage of SR 4.9.1.5. When the float voltage is not maintained the Required Actions for Condition D are being taken, which provide the necessary and appropriate verifications of the battery condition. Furthermore, the float current limit of 2.0 amps is established based on the nominal float voltage value and is not directly applicable when this voltage is not maintained.

Performing the SR monthly is considered to be adequate to maintain periodic oversight of the required battery bank based on Reference 4. In addition, per Reference 2, within 24 Hours after a battery discharge < 110 VDC (based on float voltage limits) or within 24 Hours after a battery overcharge > 150 VDC, the battery must be demonstrated to meet float current requirements. Failure to meet this SR requires entering Condition D of this LCO.

REFERENCES

1. S-Area Defense Waste Processing Facility, S-Area DWPF Final Safety Analysis Report (U). WSRC-SA-6.
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3. Defense Waste Processing Facility System Design Description. G-SYD-S-00023, Backup Power System, SU-17.
4. Recommended Practice for Maintenance, Testing and Replacement of Large Stationary Type Power Plant and Substation Lead Storage Batteries. IEEE-450, 2002.

(continued)

BASES

REFERENCES (continued)

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6. Savannah River Site Requirements for Diesel Fuel Quality. 15591-01-R.

7. Backup Power Sources for DOE Facilities. DOE-STD-3003-2000.

8. Battery & Charger Sizing. Calculation E-11 (E-CLC-S-00034).

9. Emergency Load List and Summary Diesel-Generators G100 & G200. DS-E-1928.

10. GNB Stationary Battery Installation and Operating Instructions. WSRC-TM-95-G185-0010.

11. Deleted.

12. Instrumentation Uncertainties Evaluation Loop: S956-PI-8600X, S956-PI-8601X, S956-PI-8580X, S956-PI-8581X; Diesel Generator Air Receiver Pressure Gauge (U). J-CLC-S-00018.

13. Recommended Practice for Electrical Equipment Maintenance, NFPA-70B. 1994.

14. BPWG Best Practices Handbook for Maintenance and Operation of Engine Generators, Volume 1, DOE Backup Power Working Group. WSRC-TR-96-0393.

15. Calculations for Required Inventory of Diesel Generator Lube Oil and Fuel Oil. M-CLC-S-00585.

16. Deleted.

17. DWPF – Engineering Technical Report: Electrolyte Stratification in Battery Banks (U). E-ESR-S-00183.

18. IEEE Standard Criteria for Diesel Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations. IEEE Std 387-1995.

19. Deleted.

B 3/4.10 INTERAREA TRANSFER LINES

BASES

B 3.10.1 Interarea Transfer Lines

This LCO has been deleted.