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Technical Safety Requirements for the Hot Cell Facility (HCF)

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TECHNICAL SAFETY REQUIREMENTS FOR THE HOT CELL FACILITY (HCF)

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September 2000

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ABSTRACT

The Technical Safety Requirements (TSR) document is prepared and issued in compliance with DOE Order 5480.22, Technical Safety Requirements. The bases for the TSR are established in the HCF Safety Analysis Report issued in compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports. The TSR identifies the operational conditions, boundaries, and administrative controls for the safe operation of the facility.

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TECHNICAL SAFETY REQUIREMENTS

for the HOT CELL FACILITY (HCF)

INTRODUCTION

This document provides the Technical Safety Requirements (TSR) for the Sandia National Laboratories Hot Cell Facility (HCF). The TSR is a compilation of requirements that define the conditions, the safe boundaries, and the administrative controls necessary to ensure the safe operation of a nuclear facility and to reduce the potential risk to the public and facility workers from uncontrolled releases of radioactive or other hazardous materials. These requirements constitute an agreement between DOE and Sandia National Laboratories management regarding the safe operation of the Hot Cell Facility.

This document is consistent with the guidance provided in Attachment 1 of DOE Order 5480.22 and the DOE Defense Programs Document of Example Technical Safety Requirements. Section 1, "Use and Application," contains basic information and instructions for using and applying the TSR. Section 2, "Safety Limits," addresses applicable limits on important process variables. (Note that there are no safety limits and hence, no limiting control settings applicable to HCF operations.) Section 3/4, "Operational Limits and Surveillance Requirements," addresses applicable Limiting Control Settings and Limiting Conditions for Operation, as well as applicable Modes, Action Statements, and Surveillance Requirements associated with each limit. Section 5, "Administrative Controls," addresses the programmatic and other commitments that are necessary to 1) ensure the underlying assumptions in the TSR Bases are valid, 2) provide for worker safety/defense in depth, and 3) effectively manage operational safety. Appendix A, "Bases for the Technical Safety Requirements," provides the rationale underlying the various TSR controls. Finally, Appendix B, "Design Features," provides a listing of the design features that either preclude or reduce the potential consequences of design basis accidents.

SECTION 1

USE AND APPLICATION

1 USE AND APPLICATION

1.1 DEFINITIONS AND ACRONYMS

The defined terms of this section appear in capitalized type and are applicable throughout these Technical Safety Requirements and bases.

<u>Term</u>	<u>Definition</u>
ACTION(S)	An ACTION(S) SHALL be that part of a Technical Safety Requirement (TSR) that prescribes required actions to be taken under designated conditions within specified completion times.
AND	The logical connector AND requires that two or more conditions be met.
CALIBRATE	A quantitative verification and/or adjustment of a channel such that its output corresponds with acceptable accuracy to known values of the parameter which the channel measures.
CHANNEL FUNCTIONAL TEST	<p>A CHANNEL FUNCTIONAL TEST SHALL be the injection of a simulated or actual signal into the channel as close to the sensor as practicable, to verify channel OPERABILITY, including required alarms, interlocks, actuation/trip functions, and channel failure trips.</p> <p>The CHANNEL FUNCTIONAL TEST may be performed by any series of sequential, overlapping, or total channel steps, such that the entire channel is tested.</p>
CONFINEMENT INTEGRITY	<p>CONFINEMENT INTEGRITY SHALL exist when all ventilation Zone 1, Zone 2A, and stack exhaust filter plenums (Figure 1.1-1) are either OPERABLE or isolated and the following design features are in place:</p> <ol style="list-style-type: none">1) steel confinement boxes;2) Zone 2A confinement structures;3) ventilation hot exhaust ductwork up to and including the HEPA filter plenums at the HCF stack; and4) Zone 2A airlock doors.
ENSURE	To ENSURE is to confirm and substantiate that an activity or condition has been implemented in conformance with specified requirements. Manipulation of equipment or instrumentation to conform with the specified requirement <u>is</u> permitted. Methods other than direct observation may be used.
HAZARDOUS MATERIAL	HAZARDOUS MATERIAL means any solid, liquid, or gaseous material that is toxic, explosive, flammable, corrosive, or otherwise physically or biologically threatening to health. Hydraulic fluid, mineral oil, and vacuum pump oils are excluded from this definition.

1 USE AND APPLICATION

IMMEDIATELY	IMMEDIATELY is used as a completion time when a condition cannot be permitted to continue and the required action must be initiated without delay and continued until it is completed.
IN-SERVICE	A system, subsystem, train, component, or device SHALL be IN-SERVICE when it is in place <u>and</u> performing its specified function(s).
ISOTOPE EXTRACTION PROCESSING	Radiochemical processing activities that include extraction of halogens or noble gases from liquid solutions containing mixed fission products. These activities can be conducted in steel confinement boxes (SCB) 2, 3, 4, and 5.
MODE	A MODE SHALL correspond to any combination of facility condition, pressure, temperature, etc., specified in Table 1.1-1.
OPERABLE/ OPERABILITY	A system, subsystem, train, component, or device SHALL be OPERABLE or have OPERABILITY when it is capable of performing its intended function(s), and support equipment required for the system, subsystem, train, component, or device to perform its safety function is also capable of performing its intended function(s).
OPERATING	A system, subsystem, train, component, or device is OPERATING when it is performing its intended function(s).
OR	The logical connector OR requires that only one of two or more conditions be met.
RADIOACTIVE MATERIAL	Any material that undergoes radioactive decay.
RADIOLOGICAL MATERIAL PROCESSING	Any radiological and/or radiochemical processing activities that do not involve significant quantities of halogens and noble gases in liquid solutions of mixed fission products. These activities can be conducted in SCBs 2 through 11. (Operation of the SCB water wash-down system SHALL also be covered by this definition.)
SHALL	Denotes a requirement.
VERIFY	To VERIFY is to confirm and substantiate that an activity or condition has been implemented in conformance with the specified requirements. Manipulation of equipment or instrumentation to conform with the specified requirement is <u>not</u> permitted. Methods other than direct observation may be used.

Acronym

AC	Administrative Controls
ALARA	As Low As Reasonably Achievable
CAM	Continuous Air Monitor
CSA	Criticality Safety Assessment
DOE	Department of Energy
ES&H	Environment, Safety & Health
HEPA	High Efficiency Particulate Air
HCF	Hot Cell Facility
LCO	Limiting Condition for Operation
LCS	Limiting Control Setting
LEL	Lower Explosive Limit
MIP	Maintenance Implementation Plan
NFSC	Nuclear Facilities Safety Committee
RAM	Radiation Area Monitor
RCSC	Radiological & Criticality Safety Committee
SCB	Steel Confinement Box
SL	Safety Limit
SNCSC	Sandia Nuclear Criticality Safety Committee
SNM	Special Nuclear Material
SOP	Standard Operating Procedure
SR	Surveillance Requirement
STB	Steel Transfer Box
TA-V	Technical Area V
TES	Target Entrance System
TSR	Technical Safety Requirements

Figure 1.1-1 Zone 1, Zone 2A, and Stack Ventilation Exhaust Systems
(Indicated flow rates are nominal values.)

Table 1.1-1 Modes^(a)

MODE	TITLE	DESCRIPTION
1	PROCESSING OPERATION ^{(b)(c)}	Normal activities are being performed, including ISOTOPE EXTRACTION PROCESSING, RADIOLOGICAL MATERIAL PROCESSING, and movement and handling of radiological materials. Essential ventilation system equipment is IN-SERVICE.
2	NON-PROCESSING OPERATION ^(c)	ISOTOPE EXTRACTION PROCESSING and RADIOLOGICAL MATERIAL PROCESSING activities are <u>not</u> permitted; movement and handling of solid radiological materials is permitted. Essential ventilation system equipment is OPERABLE.
3	MAINTENANCE ^(c)	ISOTOPE EXTRACTION PROCESSING, RADIOLOGICAL MATERIAL PROCESSING, and movement of radiological materials are not permitted.
4	SHUTDOWN	No operations activities are permitted in the facility. Radiological and HAZARDOUS MATERIALS have been removed from areas with unrestricted access.

NOTES

- (a) These modes are defined specifically for Zone 1, Zone 2A, and Zone 2 operations in the basement of Building 6580. They do not apply to remote radioactive material storage area operations as addressed in the HCF Safety Analysis Report.
- (b) Applies only to ISOTOPE EXTRACTION and RADIOLOGICAL MATERIAL PROCESSING activities within SCBs.
- (c) These modes are applicable to each SCB individually.

1 USE AND APPLICATION

1.2 FREQUENCIES

PURPOSE The purpose of this section is to define the proper use and application of frequency requirements. Each surveillance requirement (SR) has a specified frequency that must be met in order to meet the associated LCO.

FREQUENCY NOTATION The frequency notations, as used in the surveillances and elsewhere in this document, are defined as follows.

<u>Notation</u>	<u>Symbol</u>	<u>Minimum Frequency</u>
Each shift	S	At least once every 12 hours
Daily	D	At least once every 24 hours
Weekly	W	At least once every 7 days
Semi-annually	SA	At least once every 184 days
Annually	A	At least once every 365 days

Note: Application of generic surveillance requirement SR 4.02 (see Section 4.0) SHALL be in accordance with these definitions.

SECTION 2

SAFETY LIMITS

2 SAFETY LIMITS

2.0 SAFETY LIMITS (SL)

This section is not applicable to Hot Cell Facility operations.

SECTION 3/4

OPERATIONAL LIMITS AND SURVEILLANCE REQUIREMENTS

3/4 OPERATIONAL LIMITS AND SURVEILLANCE REQUIREMENTS

3.0 GENERIC LIMITING CONDITIONS FOR OPERATION (LCO)

- 3.0.1 LCOs SHALL be met during the MODES or other specified conditions in the applicability statement, except as provided in LCO 3.0.2.
- 3.0.2 Upon discovery of a failure to meet an LCO, the associated ACTION(S) SHALL be met. If the LCO is restored before the specified completion time(s) expires, completion of the ACTION(S) is not required, unless otherwise stated.
- 3.0.3 When an LCO is not met, and the associated ACTION(S) are not met or an associated ACTION(S) is not provided, the facility SHALL be placed in MODE 2, or another specified condition. This requirement SHALL be initiated within one (1) hour, and completed within the next 2 hours.

Where corrective measures are completed that permit operation in accordance with the LCO or ACTION(S), completion of the ACTION(S) required by LCO 3.0.3 is not required.

LCO 3.0.3 is applicable to all MODES. Exceptions to LCO 3.0.3 may be stated in the individual LCOs.

- 3.0.4 When an LCO is not met, a MODE or other specified condition in the applicability statement SHALL not be entered, except when the associated ACTION(S) to be entered permit continued operation in the MODE or other specified condition in the applicability statement for an unlimited period of time. LCO 3.0.4 SHALL not prevent changes in MODES or other specified conditions in the applicability statement that are required to comply with ACTION(S).

Exceptions to LCO 3.0.4 are stated in the individual LCOs. When an individual LCO states that LCO 3.0.4 does not apply, then it allows entry into MODES or other specified conditions in the applicability statement when the associated ACTION(S) to be entered permit operation in the MODE or other specified condition for only a limited time.

- 3.0.5 Equipment removed from service or declared inoperable to comply with ACTION(S) may be returned to service under administrative control solely to perform testing required to demonstrate its OPERABILITY or the OPERABILITY of other equipment. This is an exception to LCO 3.0.2 for the system 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 TSRs, the supported system is not required to be declared inoperable due solely to support system inoperability. Only the support system's ACTION(S) are required to be entered. This is a clarification of the definition of OPERABILITY. LCO 3.0.2 is still applicable to the supported system.

- 3.0.7 Entry into a MODE or other specified condition in the applicability statement for which a LCO is not met SHALL be permitted for the sole purpose of satisfying a Surveillance Requirement, but only with the use of administrative controls for which appropriate compensatory actions are specified. This provision is an exception to LCOs 3.0.1 and 3.0.4.

4.0 GENERIC SURVEILLANCE REQUIREMENTS (SR)

- 4.0.1 SRs SHALL be met during the MODES or other specified conditions in the applicability statement for individual LCOs unless otherwise stated in the SR. Failure to meet a surveillance (whether such failure is experienced during the performance of the surveillance or between performances of the surveillance) SHALL constitute failure to meet the LCO statement. Failure to perform a surveillance within the specified frequency SHALL constitute failure to meet the LCO statement, except as provided in SR 4.0.3. Surveillances do not have to be performed on inoperable equipment.
- 4.0.2 The specified frequency for each SR is met if the surveillance is performed within 1.25 times the interval specified in the frequency, as measured from the previous performance or as measured from the time a specified condition of the frequency is met.
- For frequencies specified as "once," the above interval extension does not apply.
- If a completion time requires periodic performance of "once every", the above frequency extension applies to each performance after the initial performance.
- 4.0.3 If it is discovered that a surveillance was not performed within its specified frequency, compliance with the requirement to declare the LCO statement not met may be delayed from the time of discovery up to 24 hours or up to the limit of the specified frequency, whichever is less. This delay period is permitted to allow performance of the surveillance.
- If the surveillance is not performed within the delay period, the LCO statement SHALL IMMEDIATELY be declared not met, and the applicable ACTION(S) SHALL be entered. The completion times of the ACTION(S) begin IMMEDIATELY on expiration of the delay period. When the surveillance is performed within the delay period and the surveillance is not met, the LCO SHALL IMMEDIATELY be declared not met, and the applicable ACTION(S) SHALL be entered. The completion times of the ACTION(S) begin IMMEDIATELY on the failure to meet the surveillance.
- 4.0.4 Entry into a MODE or other specified condition in the applicability statement of an LCO SHALL not be made unless the LCO's surveillances have been met within their specified frequency. This provision SHALL not prevent passage through or to MODES or other specified conditions in compliance with ACTION(S).
- 4.0.5 If a SR cannot be performed except by entry into a MODE or other specified condition in the applicability statement of an LCO for which satisfaction of the SR is required, then entry into the MODE SHALL be permitted for the sole purpose of performing the SR, but only with the use of administrative controls for

3/4 OPERATIONAL LIMITS AND SURVEILLANCE REQUIREMENTS

which appropriate compensatory actions are specified. This provision is an enhancement to SRs 4.0.1, 4.0.3, and 4.0.4.

3/4 OPERATIONAL LIMITS AND SURVEILLANCE REQUIREMENTS

3/4.1 LIMITING CONTROL SETTINGS (LCS)

This section is not applicable to Hot Cell Facility operations since there are no safety limits.

3/4 OPERATIONAL LIMITS AND SURVEILLANCE REQUIREMENTS

3/4.2 LIMITING CONDITIONS FOR OPERATION (LCO)

3/4.2.1 Ventilation System (OPERATING)

LCO: The HCF ventilation system SHALL consist of the following equipment/conditions:

1. Zone 1 ventilation exhaust subsystem:
Zone 1 filter plenum A (2 charcoal filters) **OR** Zone 1 filter plenum B (2 charcoal filters) SHALL be IN-SERVICE,

AND

exhaust fan EF-6 **OR** exhaust fan EF-7 SHALL be OPERATING,

AND

the non-operating filter plenum and exhaust fan SHALL be OPERABLE;

AND

2. Zone 2A ventilation exhaust subsystem:
Zone 2A filter plenum A (1 charcoal filter) **AND** Zone 2A filter plenum B (1 charcoal filter) SHALL be IN-SERVICE,

AND

exhaust fan EF-8 **OR** exhaust fan EF-9 SHALL be OPERATING,

AND

the non-operating exhaust fan SHALL be OPERABLE;

AND

3. Ventilation system hot exhaust subsystem:
Stack filter plenum A (1 HEPA filter bank) SHALL be IN-SERVICE **AND** exhaust fan EF-4 SHALL be OPERATING,

OR

Stack filter plenum B (1 HEPA filter bank) SHALL be IN-SERVICE **AND** exhaust fan EF-5 SHALL be OPERATING,

AND

the non-operating filter plenum and exhaust fan SHALL be OPERABLE;

3/4 OPERATIONAL LIMITS AND SURVEILLANCE REQUIREMENTS

AND

4. SCB-to-Zone 2A ΔP SHALL be ≤ -0.76 mm (-0.03 in) WG for SCBs involved in ISOTOPE EXTRACTION or RADIOLOGICAL MATERIAL PROCESSING operations;

AND

5. Zone 2A-to-Zone 2 ΔP SHALL be ≤ -0.76 mm (-0.03 in) WG.

APPLICABILITY: MODE 1

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

For Required Action D.1, a separate entry condition is allowed for each SCB.

ACTIONS:

Condition	Required Action	Completion Time
A. Zone 1 ventilation exhaust subsystem inoperable	A.1.1 ENSURE that a Zone 1 filter plenum is IN-SERVICE	1 hour
	<u>AND</u>	
	A.1.2 ENSURE that exhaust fan EF-6 <u>OR</u> EF-7 is OPERATING	1 hour
	<u>AND</u>	
	A.1.3 Isolate inoperable plenum	1 hour
	<u>AND</u>	
	A.2 Restore inoperable plenum/fan to OPERABLE	7 days

ACTIONS:

Condition	Required Action	Completion Time
B. Zone 2A ventilation exhaust subsystem inoperable	B.1.1 ENSURE that Zone 2A filter plenum A <u>OR</u> B is IN-SERVICE	1 hour
	<u>AND</u>	
	B.1.2 ENSURE that exhaust fan EF-8 <u>OR</u> EF-9 is OPERATING	1 hour
	<u>AND</u>	
C. Hot exhaust subsystem inoperable	B.2 Isolate inoperable plenum, restore plenum to OPERABLE, and place IN-SERVICE	8 hours
	<u>AND</u>	
	B.3 Restore inoperable fan to OPERABLE	7 days
C. Hot exhaust subsystem inoperable	C.1.1 ENSURE that stack filter plenum A <u>AND</u> exhaust fan EF-4 are OPERATING, <u>OR</u> stack filter plenum B <u>AND</u> exhaust fan EF-5 are OPERATING	1 hour
	<u>AND</u>	
	C.1.2 Isolate inoperable plenum/fan	8 hours
	<u>AND</u>	
	C.2 Restore inoperable plenum/fan to OPERABLE	7 days

ACTIONS:

Condition	Required Action	Completion Time
D. SCB-to-Zone 2A $\Delta P > -0.76$ mm (-0.03 in) WG or Magnehelic inoperable for SCBs involved in ISOTOPE EXTRACTION or RADIOLOGICAL MATERIAL PROCESSING operations	D.1 Restore ΔP or restore Magnehelic to OPERABLE	2 hours
E. Zone 2A-to-Zone 2 $\Delta P > -0.76$ mm (-0.03 in) WG or Magnehelic inoperable	E.1 Restore ΔP or restore Magnehelic to OPERABLE	2 hours
F. Fan sequencing interlock inoperable	F.1 Restore interlock to OPERABLE	1 hour
G. Required actions and associated completion times of condition A, B, C, E, or F not met	G.1 Place the facility in MODE 3	2 hours
H. Required action and associated completion time of condition D not met	H.1 Place the SCB in MODE 3	2 hours

SURVEILLANCE REQUIREMENTS:

SR#	Surveillance	Frequency
4.2.1.1	VERIFY SCB-to-Zone 2A ΔP is ≤ -0.76 mm (-0.03 in) WG for each SCB involved in ISOTOPE EXTRACTION or RADIOLOGICAL MATERIAL PROCESSING (Note)	Each Shift
4.2.1.2	VERIFY Zone 2A-to-Zone 2 ΔP is ≤ -0.76 mm (-0.03 in) WG	Each Shift
4.2.1.3	Perform a CHANNEL FUNCTIONAL TEST on SCB-to-Zone 2A differential pressure measurement channels for each SCB involved in ISOTOPE EXTRACTION or RADIOLOGICAL MATERIAL PROCESSING (Note)	Weekly
4.2.1.4	Perform a CHANNEL FUNCTIONAL TEST on Zone 2A-to-Zone 2 differential pressure measurement channel	Weekly
4.2.1.5	CALIBRATE SCB-to-Zone 2A differential pressure measurement channels for each SCB involved in ISOTOPE EXTRACTION or RADIOLOGICAL MATERIAL PROCESSING (Note)	Annually
4.2.1.6	CALIBRATE Zone 2A-to-Zone 2 differential pressure measurement channel	Annually
4.2.1.7	VERIFY that applicable Zone 1 and Zone 2A charcoal adsorber banks are IN-SERVICE by observing a measurable ΔP	Daily

3/4 OPERATIONAL LIMITS AND SURVEILLANCE REQUIREMENTS

SR#	Surveillance	Frequency
4.2.1.8	VERIFY that each individual charcoal adsorber has not been IN-SERVICE for a period exceeding 5 years	Semi-annually
4.2.1.9	VERIFY across each stage of the hot exhaust HEPA filter plenum that is IN-SERVICE, $\Delta P < 12.7$ mm (0.5 in) WG	Daily
4.2.1.10	VERIFY the in-place efficiency of each individual hot exhaust HEPA filter is $\geq 99\%$	18 months <u>AND</u> After any structural maintenance in the filter housing <u>AND</u> Upon installation of new HEPA filter(s)
4.2.1.11	VERIFY fan sequencing interlock OPERABILITY	Annually <u>AND</u> After any maintenance on Zone 1, Zone 2A, or stack exhaust fans or fan controls

Note: A separate surveillance requirement is associated with each SCB. Therefore, a failed surveillance applies only to the associated SCB.

3/4 OPERATIONAL LIMITS AND SURVEILLANCE REQUIREMENTS

3/4.2.2 Ventilation System (OPERABLE)

LCO: The HCF ventilation system SHALL be OPERABLE and consist of the following equipment/conditions:

1. Zone 1 ventilation exhaust subsystem:

Zone 1 filter plenum A (2 charcoal filters) AND Zone 1 filter plenum B (2 charcoal filters) are in place,

AND

exhaust fan EF-6 AND exhaust fan EF-7 are OPERABLE;

AND

2. Zone 2A ventilation exhaust subsystem:

Zone 2A filter plenum A (1 charcoal filter) AND Zone 2A filter plenum B (1 charcoal filter) are in place,

AND

exhaust fan EF-8 AND exhaust fan EF-9 are OPERABLE;

AND

3. Ventilation system hot exhaust subsystem:

Stack filter plenum A (1 HEPA filter) AND stack filter plenum B (1 HEPA filter) are in place,

AND

exhaust fan EF-4 AND exhaust fan EF-5 are OPERABLE;

APPLICABILITY: MODE 2

ACTIONS:

Condition	Required Action	Completion Time
A. Zone 1 ventilation exhaust subsystem inoperable	A.1.1 VERIFY Zone 1 filter plenum A OR B is OPERABLE	1 hour
	AND	
	A.1.2 VERIFY exhaust fan EF-6 OR exhaust fan EF-7 is OPERABLE	1 hour
B. Zone 2A ventilation exhaust subsystem inoperable	AND	
	A.2 Restore inoperable plenum/fan to OPERABLE	7 days
B. Zone 2A ventilation exhaust subsystem inoperable	B.1.1 VERIFY Zone 2A filter plenum A OR B is OPERABLE	1 hour
	AND	
	B.1.2 VERIFY exhaust fan EF-8 OR exhaust fan EF-9 is OPERABLE	1 hour
	AND	
	B.2 Restore inoperable plenum/fan to OPERABLE	7 days

3/4 OPERATIONAL LIMITS AND SURVEILLANCE REQUIREMENTS

ACTIONS:

Condition	Required Action	Completion Time
C. Hot exhaust subsystem inoperable	C.1 VERIFY that stack filter plenum A <u>AND</u> exhaust fan EF-4, <u>OR</u> filter plenum B <u>AND</u> exhaust fan EF-5 is OPERABLE	1 hour
	<u>AND</u> C.2 Restore inoperable plenum/fan to OPERABLE	7 days
D. Fan sequencing interlock inoperable	D.1 Restore interlock to OPERABLE	1 hour
E. Required actions and associated completion times of condition A, B, C, or D not met	E.1 Place the facility in MODE 3	2 hours

SURVEILLANCE REQUIREMENTS:

SR#	Surveillance	Frequency
4.2.2.1	VERIFY that each individual charcoal adsorber has not been IN-SERVICE for a period exceeding 5 years	Semi-annually
4.2.2.2	VERIFY the in-place efficiency of each individual hot exhaust HEPA filter is $\geq 99\%$	18 months <u>AND</u> After any structural maintenance in the filter housing <u>AND</u> Upon installation of new HEPA filter(s)
4.2.2.3	VERIFY fan sequencing interlock OPERABILITY	Annually <u>AND</u> After any maintenance on Zone 1, Zone 2A, or stack exhaust fans or fan controls

3/4 OPERATIONAL LIMITS AND SURVEILLANCE REQUIREMENTS

3/4.2.3 Target Entrance System Mechanical Interlock

LCO: The Target Entrance System (TES) mechanical interlock SHALL be OPERABLE.

APPLICABILITY: MODE 2

ACTIONS:

Condition	Required Action	Completion Time
A. TES mechanical interlock inoperable (no irradiated target in TES)	A.1 Terminate irradiated target transfers	IMMEDIATELY
	<u>AND</u> A.2 Restore interlock to OPERABLE	Before resuming irradiated target transfers
B. TES mechanical interlock inoperable with irradiated target in TES	B.1.1 Remove target from shield cask to STB	IMMEDIATELY
	<u>AND</u> B.1.2 Transfer target from STB to SCB conveyor system	2 hours
	<u>OR</u> B.2.1 VERIFY shield cask lid is in place	IMMEDIATELY
	<u>AND</u> B.2.2 Remove cask from TES	2 hours
	<u>AND</u> B.3 Restore interlock to OPERABLE	Before resuming irradiated target transfers

SURVEILLANCE REQUIREMENTS:

SR#	Surveillance	Frequency
4.2.3.1	VERIFY TES mechanical interlock OPERABILITY	Before the first use in each week in which the TES is to be used for introducing irradiated targets into STB

SECTION 5

ADMINISTRATIVE CONTROLS

5 ADMINISTRATIVE CONTROLS

5.1 PURPOSE

The purpose of the administrative controls (AC) is to delineate the provisions relating to organization and management, procedures, record keeping, review and audit, reporting, and safety-control programs necessary to ensure safe operation of the Hot Cell Facility so that it complies with the Technical Safety Requirements (TSR).

5.2 TECHNICAL SAFETY REQUIREMENTS

5.2.1 General Requirements

The TSRs SHALL be approved by the Department of Energy (DOE) Program Secretarial Officer (PSO) and administratively controlled. Proposed changes to the TSRs SHALL be prepared with a submittal package that includes a description of, and justification for, the change together with any supporting analyses. Following internal review and approval, proposed changes SHALL be approved by the DOE prior to implementation.

5.2.2 Compliance

The Hot Cell Facility Manager is responsible for ensuring that the requirements of the TSRs for the HCF are met, and SHALL demonstrate compliance by

- establishing, implementing, and maintaining the required LCOs and Administrative Controls (AC), and
- maintaining required design features.

5.2.3 TSR Violations

Violations of the TSRs occur as the result of

- entry into a LCO and failure to comply with the applicable Action Statement(s) within the required completion time;
- failure to perform a Surveillance Requirement (SR) within the required time limit; or
- failure to comply with an AC statement.

Failure to comply with an AC statement is a TSR violation only when an AC requirement is directly violated (e.g., not meeting a minimum staffing requirement) or the intent of a cited program is not fulfilled (e.g., a significant program deficiency). As long as a cited program is functional and the intent of the program is being fulfilled, violation of specific program details does not constitute a TSR violation.

5.2.4 Response to a TSR Violation

If a violation occurs, the following actions SHALL be taken:

- notify the DOE, and

5 ADMINISTRATIVE CONTROLS

- prepare an occurrence report.

5.2.5 Conditions Outside TSRs

Actions may be taken that depart from a requirement in the TSR provided that

- an emergency situation exists and is so declared;
- these actions are needed immediately to protect the public health and safety;
- no action consistent with the TSRs can provide adequate or equivalent protection;
- action is approved by a qualified operator or on-duty supervisor;
- verbal notification to DOE/KAO occurs within 2 hours; and
- a written report is made to the PSO within 24 hours.

Actions in response to immediate hazards take precedence over actions in response to potential hazards.

5.3 MANAGEMENT ORGANIZATION

The general management structure for Hot Cell Facility operations is addressed in Section 17.3.2 of the SAR. Operation of the HCF is the responsibility of SNL's Energy, Information, and Infrastructure Surety Division. Operational authority for the HCF is delegated by the Division Vice-president to the Center Director, Nuclear and Risk Technologies and to the HCF Manager. Line management is responsible for the health and safety of facility personnel.

5.4 MANAGEMENT RESPONSIBILITIES

Organizational responsibilities for operation of the Hot Cell Facility are discussed in detail in Section 17.3.3 of the SAR.

5.5 PROCEDURES

Procedures/instructions SHALL be established, controlled, implemented, and maintained for all activities in support of the TSRs. Such activities may include

- operations governed by defined modes of facility operation;
- responses to facility alarms and emergency conditions;
- surveillances;
- technical activities in support of operational programs defined herein; and
- administrative activities governing aspects of facility operation.

A system SHALL be developed to control all procedures/instructions used in support of the TSRs. This system SHALL include document review, approval, revision, and control elements. Temporary changes to procedures/instructions SHALL be made in accordance with the Unreviewed Safety Question process.

5 ADMINISTRATIVE CONTROLS

5.6 PROGRAMS

The programs addressed in this section SHALL be established, implemented, and maintained. These programs SHALL, as a minimum, meet the requirements specified in the subsections that follow.

5.6.1 Radiation Protection Program

Roles, responsibilities, and requirements for radiation protection of HCF personnel are described in ES&H Manual Supplement MN471016, *Radiological Protection and Procedures Manual*. The Integrated Safety & Security (ISS) Center has primary responsibility for the SNL radiation protection program and provides the HCF with Radiological Control Technicians (RCTs) dedicated to HCF operations, and personnel to staff the counting lab in TA-V that supports HCF operations. The radiological control program is described in Chapter 7 of the SAR.

5.6.2 Industrial Safety, Industrial Hygiene, and Fire Protection Programs

Industrial safety, industrial hygiene, and fire protection at the HCF SHALL be implemented by means of SNL ES&H Manual (MN471001), Chapters 4, 6, and 5, respectively. The requirements contained in these chapters are supplemented by requirements contained in the following ES&H Manual Supplements:

- GN470037 - *Lockout/Tagout Procedure for the Control of Hazardous Energy*
- GN470040 - *Operating Forklifts and Motorized Hand Trucks*
- MN471000 - *Pressure Safety Manual*
- MN471004 - *Electrical Safety Manual*
- MN471007 - *SNL Hoisting & Rigging Manual*
- PG470019 - *SNL/NM Industrial Hygiene Program*

Chapter 5 of the ES&H Manual satisfies the fire protection requirements contained in DOE O 420.1.

5.6.3 Conduct of Operations Program

Conduct of operations at the HCF SHALL be implemented by means of the *Conduct of Operations Manual for Technical Area V (TA-V) Nuclear Facilities*. The broad principles and objective of this manual are that all work be managed with a consistent and auditable set of requirements, standards, and responsibilities that result in improved quality, reliability, and safety of operations. The procedures and instructions contained in this manual address each of the eighteen sections of DOE Order 5480.19, which are addressed in Chapter 11 of the HCF SAR.

5.6.4 Maintenance Program

Maintenance at the HCF SHALL be implemented by means of the SNL Nuclear Facility *Maintenance Implementation Plan (MIP)*. This plan encompasses the requirements of Chapter II

5 ADMINISTRATIVE CONTROLS

of DOE Order 4330.4B that are applicable to nuclear facilities. It addresses administrative, organizational, and implementation requirements, as well as the key functional interfaces with other site organizations that must be established and maintained.

The objective of the MIP is to achieve a balance combination of written guidance, personnel skills and supervision to establish and maintain a quality maintenance program to optimize critical system and equipment performance. The major elements of the program are addressed in Chapter 10 of the HCF SAR.

5.6.5 Configuration Management Program

Changes to the HCF configuration SHALL be implemented by means of the *Conduct of Operations Manual for Technical Area V (TA-V) Nuclear Facilities* and GN470080, *Implementing the Unreviewed Safety Question (USQ) Process for Nuclear Facilities*. The Conduct of Operations Manual specifies the roles, responsibilities, and procedures for ensuring that any changes to the HCF configuration receive appropriate safety and compliance reviews and proper management authorization. The SNL USQ process (GN470080) ensures that proposed configuration changes satisfy the requirements of DOE Order 5480.21.

5.6.6 Criticality Safety Program

The nuclear criticality safety program at the HCF SHALL be implemented in accordance with ES&H Manual Supplement GN470072, *Nuclear Criticality Safety*. This ES&H Manual supplement satisfies the nuclear criticality safety requirements of DOE O 420.1, which in turn incorporates the requirements of the ANSI/ANS nuclear criticality safety standards. The criticality safety program is addressed in Chapter 6 of the HCF SAR.

5.6.7 Emergency Preparedness Program

Emergency preparedness at the HCF SHALL be assured by implementation of the *TA-V Emergency Preparedness Plan* and the *SNL Emergency Preparedness Plan* (PN471011). The TA-V plan is an initial response plan that performs an initial assessment of the nuclear facilities. The integrated command of the *SNL Emergency Preparedness Plan* provides overall response to an incident. The emergency preparedness program is addressed in Chapter 15 of the HCF SAR.

5.6.8 Quality Assurance Program

Quality assurance at the HCF SHALL be implemented by means of the *Sandia Research Reactor and Experimental Programs (RREP) Quality Assurance Program Plan (QAPP)*. The RREP-QAPP addresses the quality assurance program requirements of DOE O 414.1A and 10 CFR 830.120. The RREP is discussed in Chapter 14 of the SAR.

5.7 MINIMUM OPERATIONS SHIFT COMPLEMENT

The minimum staffing for each shift of operations SHALL include the following:

- one HCF-qualified supervisor;

5 ADMINISTRATIVE CONTROLS

- one HCF-qualified operator;
- a SNL-qualified radiological control technician.

Facility staffing and limitations on overtime for HCF personnel SHALL be managed in accordance with the TA-V Conduct of Operations Manual, which is addressed in Chapter 11 of the HCF SAR.

5.8 OPERATING SUPPORT

During isotope processing operations, the operations staff will generally be supplemented by additional technical personnel. A list of operations personnel with their work and home telephone numbers SHALL be posted in the HCF operations center.

5.9 STAFF QUALIFICATIONS AND TRAINING

Entry-level requirements for Hot Cell Facility operating personnel are intended to assure that these personnel have the knowledge, skills, and abilities to operate and maintain the Hot Cell Facility. This includes operating and maintaining related support systems and process equipment in a safe and reliable manner under all conditions. The minimum education and experience requirements for Manager, Facility Supervisor, Hot Cell Operator, technical support staff and technicians are provided in the *Training Implementation Matrix for the Technical Area V Nuclear Facilities*.

The Facility Supervisor and Hot Cell Operators are certified positions requiring successful completion of a formal training program before an individual is allowed to operate specific HCF equipment and/or controls unsupervised. Proficiency for the certified positions is demonstrated by minimum acceptable scores on written tests and by observation of the individual's operating skill with manipulators, process equipment, and plant safety equipment and safety systems. Certification also requires demonstrated adherence to conduct of operations principles, ability to follow procedures, and commitment to cultivating an environment of teamwork and continuous improvement.

5.10 TSR BASES CONTROL

Changes to the TSR Bases SHALL NOT be made without prior DOE approval if the changes involve any of the following:

- a change in the TSR;
- a change to the SAR that involves an Unreviewed Safety Question as defined in DOE Order 5480.21; or
- a change to the way that OPERABILITY or the TSR could be met, applied, or interpreted.

5.11 REVIEW/AUDITS

Primary responsibility for review of day-to-day activities SHALL be with the HCF Supervisor and the HCF Department Manager. Procedures written by the HCF organization and approved by line management implement the conduct of operations review principles as prescribed in the

5 ADMINISTRATIVE CONTROLS

Conduct of Operations Manual for Technical Area V (TA-V) Nuclear Facilities. These procedures address all aspects of safe operation, configuration control, review and approvals, assignment and transfer of responsibilities, and performance assessment by management.

The Sandia Independent Review and Appraisal System (SIRAS) has been established to provide enhanced safety in nuclear facility operations and to ensure compliance with DOE orders. As part of the SIRAS, three safety committees – the Nuclear Facilities Safety Committee (NFSC), the Sandia Nuclear Criticality Safety Committee (SNCSC), and the TA-V Radiological and Criticality Safety Committee (RCSC) – are established and maintained for the purpose of advising line management on safety matters relating to operational activities at the HCF.

The NFSC is chartered by and directly responsible to the Vice-president with line responsibility for the TA-V nuclear facilities (Organization 6000 - Energy, Information, and Infrastructure Surety). The NFSC acts in an advisory capacity to the line director responsible for the nuclear facilities. The RCSC is authorized to make recommendations to line management regarding the safety of matters that satisfy general criteria that have been reviewed by the NFSC and are delineated in the RCSC charter.

The SNCSC, chartered by the director of Organization 7100, is a management advisory committee representing multiple technical disciplines. It acts in a direct advisory capacity to the Energy, Information, and Infrastructure Surety Vice-president and to the facility-operating organization on questions related to the effect of HCF activities on criticality safety as defined in the applicable safety documents. The scope of SNCSC responsibilities includes oversight of the use of nuclear material with criticality safety concerns at SNL/NM and review of operations involving such materials. The SNCSC does not have approval authority, but makes recommendations to line management.

The RCSC is the basic internal safety review committee for HCF activities, providing an independent safety review of proposed activities and facility modifications. The committee acts in an advisory capacity to line management and performs the following activities as set forth in an operational committee charter approved by the chairman of the NFSC whose members are appointed by the SNL Group Manager, Nuclear Facility Operations:

- reviews proposed modifications to the facility and its procedures;
- conducts detailed technical reviews of safety analysis documents and Unreviewed Safety Question safety evaluations; and
- performs an annual review of HCF operations involving radiological and criticality safety.

RCSC reviews help to ensure that HCF operations are based on sound engineering principles and are maintained within the approved TSR.

5.12 REPORTING REQUIREMENTS

Abnormal events/occurrences SHALL be investigated, reported, and corrective action taken in accordance with Chapter 18 of the SNL ES&H Manual.

5 ADMINISTRATIVE CONTROLS

5.13 OTHER WORKER SAFETY CONTROLS

5.13.1 Radiation Monitoring System

Operation of the radiation monitoring system is assured via compliance with the Radiological Protection Procedures Manual and implementation of the SNL Radiation Protection Program. In accordance with this program, at least one remote area monitor (RAM) SHALL be OPERATING in any area of the HCF where significant quantities of radioactive material are processed or otherwise handled by workers. In addition, at least one continuous air monitor (CAM) SHALL be OPERATING in the facility. This equipment SHALL be operating at all times, except for short periods of routine maintenance. RAMs and CAMs SHALL be checked periodically to verify operability and calibrated (not less than annually) to ensure set points are maintained.

5.13.2 Radioactive and Fissile Material Limits

The total radioactive material processing inventory (i.e., within the SCBs in non-solidified form) SHALL be limited to the equivalent of six maximally irradiated targets (approximately 120,000 Ci total) to ensure that a dose of 1.8 rem at 3000 meters is not exceeded in the most bounding radiological accident scenario --- an unmitigated fire. The amounts of radioactive material permitted in operable glove boxes and fume hoods SHALL be administratively controlled to be consistent with prudent Health Physics practices. Furthermore, significant amounts (i.e., amounts of radioactive material resulting in dose rates, airborne contamination levels, or potential removable contamination levels that require an ALARA review per Chapter 7, Section 5.5, of SNL's Radiation Protection Procedures Manual) SHALL be addressed in detailed procedures that are reviewed and approved by the RCSC.

In order to meet DOT requirements for off-site shipment of radioactive waste, the mass of fissile material (U-235) per waste container stored in Room 109 SHALL be limited to no more than 350 grams. Furthermore, the total fissile limit for Room 109 SHALL be less than 50 kg in order to maintain quantities of SNM below DOE specifications for security Category IIID material. These quantities of U-235 are more restrictive than those based on criticality safety arguments alone, as presented in the HCF Criticality Safety Assessment (CSA), and have been shown to remain subcritical in any credible configuration, although some reliance on the spacing of waste barrels is inherent in the analyses.

Based on criticality safety arguments presented in the CSA, storage of unirradiated, enriched Mo-99 targets in storage safes SHALL be limited to the more restrictive of 69 targets per safe drawer or 276 targets per safe. This imposes a U-235 mass limit of less than 2.1 kg. per drawer or 8.4 kg. per safe. However, a more restrictive limit of 6 kg. U-235 per storage safe (or storage location) SHALL be administratively observed in order to maintain quantities of SNM below DOE specifications for security Category IIIC material.

In addition, to preclude inadvertent accumulations of fissile material, a generic limit of 350 grams U-235 SHALL be observed for any SCB and any unposted, unanalyzed location in the

5 ADMINISTRATIVE CONTROLS

HCF. This limit is based on guidance provided in SNL ES&H Manual Supplement GN470072, *Nuclear Criticality Safety*.

Radioactive material inventories in each remote radioactive material storage area (i.e., Building 6596 east highbay/Chapel, Building 6597, and the monorail storage holes) SHALL be limited to less than the Hazard Category 2 threshold values in accordance with DOE-STD-1027.

5.13.3 Combustible and Flammable Material Limits

The maximum quantity of any flammable chemical permitted to be in use in the HCF is dependent on the location in which the chemicals are being used and the radiological conditions that are present in that location as follows:

In each SCB - 50 ml when radiological materials are present in the SCB (excluding residual contamination); 1 liter at other times

In Zone 2A - 1 liter when radiological materials are actively in process in any SCB; 4 liters at other times

In Zone 2 - 1 liter per room when radiological materials are in process within the room (e.g., 107, 111, 112, 113, 113A, 114); 10 liters at other times

The maximum quantity of any flammable solvent that can be used in a SCB SHALL be 50 ml (1.7 fl. oz.) to prevent the lower explosive limit (LEL) of the most volatile solvent (acetone) from being reached under any circumstances. Maximum quantities in other areas of the HCF SHALL be established as a good practice to minimize the likelihood and/or severity of a fire or explosion and to keep worker exposure to chemicals ALARA. Chapter 2 of the TA-V Conduct of Operations Manual addresses the specific activities to be conducted in conjunction with operator inspection tours of TA-V nuclear facilities. These activities SHALL include inspection of all facility areas for fire hazards. SOPs SHALL be used for handling and storing combustible and flammable materials.

Note: The above limits for Zone 2A and Zone 2 do not apply to oil associated with an oil-filled shield window leak. This constitutes an abnormal occurrence for which chemical cleanup procedures SHALL be initiated.

5.13.4 Hydraulic Shield Door Controls

Operation of the hydraulic shield doors SHALL be administratively controlled with keys to prevent the following door operations when significant quantities of radioactive waste are stored in Room 109:

- concurrent lowering of door 2A (Room 108/Room 109 door) and door 1 (Room 101/Room 108 door), and
- lowering of door 3A (Room 109/Zone 2A door) with workers in Zone 2A, the Zone 2A airlock, or the north end of Room 112.

5 ADMINISTRATIVE CONTROLS

5.13.5 Zone 2A Airlock Access Control

The Zone 2A airlock doors SHALL be locked and administratively controlled to restrict personnel access to Zone 2A during isotope processing or waste operations.

5.13.6 Shield Cask Integrity Control

Operations involving the shield cask SHALL be administratively controlled to ensure that the cask lid is bolted in place prior to cask movement following insertion of an irradiated target.

APPENDIX A

BASES

3.0 GENERIC LIMITING CONDITIONS FOR OPERATION (LCOs)

LCOs 3.0.1 through 3.0.7 establish the general requirements applicable to all LCOs at all times, unless otherwise stated.

LCO 3.0.1 LCO 3.0.1 establishes the MODE applicability statement within each LCO as the requirement for conformance to the LCO for safe operation of the facility. The ACTIONS establish the remedial measures that must be taken within specified completion times when the requirements of an LCO are not met as required by LCO 3.0.2.

LCO 3.0.2 LCO 3.0.2 establishes that, on discovery of a failure to meet an LCO, the associated ACTIONS SHALL be met. The completion time of each ACTION is applicable from the time that a condition is entered. The ACTIONS establish those remedial measures that SHALL be taken within specified completion times when the requirements of an LCO are not met.

This LCO establishes that

- completion of the ACTIONS within the specified completion time constitutes compliance with an LCO, and
- completion of the ACTIONS is not required when an LCO is met within the specified completion time, unless otherwise specified.

Whether stated as an ACTION or not, restoration of inoperable equipment or a condition back to within limits is an action that may always be considered on entering ACTIONS.

The completion times of the ACTIONS are also applicable when a system or component is intentionally removed from service.

When a change in MODE or other specified condition is required to comply with ACTIONS, the facility may enter a MODE or other specified condition in which a new LCO becomes applicable. In this case, the completion times of the associated ACTIONS would apply from the point in time that the new LCO becomes applicable, and the condition(s) is entered.

LCO 3.0.3 LCO 3.0.3 establishes the ACTIONS that SHALL be implemented when an LCO is not met.

1. Associated ACTIONS and completion times are not met and no other condition applies.
2. The condition of the facility is not specifically addressed by the associated ACTIONS.

This LCO delineates a time of 1 hour for initiating ACTIONS to place the facility in a safe MODE or other specified condition when operations cannot be maintained within the limits for safe operation, as defined by the LCO and its ACTIONS.

Upon entry into LCO 3.0.3, 1 hour is allowed to prepare for an orderly change in facility operation.

LCO 3.0.4 LCO 3.0.4 establishes limitations on changes in MODES or other specified conditions in the applicability statement when an LCO is not met. It precludes placing the facility in a different MODE or other specified condition when the following exists:

1. the requirements of an LCO in the MODE or other specified condition to be entered are not met, or
2. continued non-compliance with these requirements would result in requiring that the facility be placed in a MODE or other specified condition in which the LCO does not apply to comply with the ACTIONS.

Compliance with ACTIONS that permit continued operation of the facility for an unlimited period of time in an applicable MODE or other specified condition provides an adequate level of safety for continued operation.

The provisions of LCO 3.0.4 SHALL not prevent changes in MODES or other specified conditions in the applicability statement that are required to comply with ACTIONS. When changing MODES or other specified conditions while in a 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.

Surveillances do not have to be performed on the associated inoperable equipment, as permitted by SR 4.0.1. Therefore, a change in MODE or other specified conditions in this situation does not violate SR 4.0.1 or 4.0.4 for those surveillances that do not have to be performed because of the associated inoperable equipment. However, SRs SHALL be met to demonstrate OPERABILITY before declaring the associated equipment OPERABLE and restoring compliance with the affected LCO.

LCO 3.0.5 LCO 3.0.5 establishes the allowance of restoring equipment to service under ACs when it has been removed from service or declared inoperable to comply with ACTIONS. The sole purpose of this LCO is to provide an exception to LCO 3.0.2 to allow the performance of SRs to demonstrate the following:

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

The ACs 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 SR. This LCO does not provide time to perform any other preventive or corrective maintenance.

LCO 3.0.6 LCO 3.0.6 establishes an exception to LCO 3.0.2 for support systems that have an LCO specified in the TSRs. This exception is necessary because LCO 3.0.2 would require that the conditions and ACTIONS of the associated inoperable supported system LCO be entered solely from the inoperability of the support system.

When a support system is inoperable and there is an LCO specified for it in the TSRs, the supported system(s) is not required to be declared inoperable as a result of the support system inoperability.

When a support system is inoperable and there is no LCO specified for it, the impact of the degradation of the support-system function on the OPERABILITY of its supported system SHALL be evaluated. The degradation of the support system may or may not affect the OPERABILITY of the supported system. OPERABILITY of the supported system SHALL depend on the intended function of the supported system and the level of support that the supported system provides.

LCO 3.0.7 LCO 3.0.7 provides for operations required to complete one or more Surveillance Requirements (SR) for the specific cases of initial commencement of operations or commencement of operations following extended shutdowns. In both cases, operation may be required to enable measurement of the operating parameters necessary to establish compliance with the SRs. During these specific cases, the operation is performed under administrative controls (plans and procedures) that direct the operations and provide for appropriate compensatory actions for any unsatisfied SRs. The compensatory actions may include (as applicable):

- a prediction of LCO compliance using numeric calculation, measurements from previous identical operations, or extrapolations from similar conditions;
- a process to establish compliance with the SR in a safe, methodical approach as soon as conditions exist for measuring the appropriate parameters;
- reliance on instrumentation that is known to be in calibration or has been compensated to provide conservative indications;
- additional instrumentation to provide supporting measurements of affected LCS/LCOs; and
- adjustments of instrumentation trip settings to conservative values to account for additional uncertainty in measured parameters.

4.0 GENERIC SURVEILLANCE REQUIREMENTS (SR)

SRs 4.0.1 through 4.0.5 establish the general requirements applicable to all SRs and apply at all times, unless otherwise stated.

SR 4.0.1 SR 4.0.1 establishes the requirement that SRs SHALL be met during the MODES or other specified conditions in the applicability statement for which the requirements of the LCO apply, unless otherwise specified in the individual SRs. This SR ensures that surveillances are performed to verify the OPERABILITY of systems and components and that variables are within specified limits. Failure to meet a surveillance within the specified frequency, in accordance with SR 4.0.2 constitutes a failure to meet an LCO.

Systems and components are assumed to be OPERABLE when the associated SRs have been met. Nothing in this SR, however, is to be construed as implying that systems or components are OPERABLE when

1. the systems or components are known to be inoperable, although still meeting the SRs, or
2. the requirements of the surveillance(s) are known not to be met between required surveillance performances.

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

Surveillances, including surveillances invoked by ACTIONS, do not have to be performed on inoperable equipment because the ACTIONS define the remedial measures that apply. SRs have to be met in accordance with SR 4.0.2 before returning equipment to OPERABLE status.

Upon completion of maintenance, appropriate post-maintenance testing is required to declare equipment OPERABLE. Post-maintenance testing may not be possible in the current MODE or other specified conditions in the applicability statement because the necessary facility parameters were not established. In these situations, the equipment may be considered OPERABLE, provided that testing has been satisfactorily completed to the extent possible and that the equipment is not otherwise believed to be incapable of performing its function. This SHALL allow operation to proceed to a MODE or other specified condition where other necessary post-maintenance tests can be completed.

SR 4.0.2 SR 4.0.2 establishes the requirements for meeting the specified frequency for surveillances and any ACTION with a completion time that requires the periodic performance of the ACTION on a "once every ..." interval.

SR 4.0.2 permits a 25% extension of the interval specified in the frequency. This facilitates surveillance scheduling and considers facility operating conditions that may not be suitable for conducting the surveillance. The 25% extension does not significantly degrade the reliability that results from performing the surveillance at its specified frequency.

The provisions of SR 4.0.2 are not intended to be used repeatedly as an operational convenience to extend surveillance intervals or periodic completion time intervals beyond those specified.

SR 4.0.3 SR 4.0.3 establishes the flexibility to defer declaring affected equipment inoperable when a surveillance has not been completed within the specified frequency. A delay period of up to 24 hours applies from the time it is discovered that the surveillance has not been performed, in accordance with SR 4.0.2, and not at the time the specified frequency was not met.

This delay period provides an adequate time limit to complete missed surveillances. This delay period permits the completion of a surveillance before compliance with ACTIONS or other remedial measures would be required that may preclude completion of the surveillance.

When a surveillance with a frequency, based not on time intervals but on specified facility conditions or operational situations, is discovered not to have been performed when specified, SR 4.0.3 allows the full 24-hour delay period in which to perform the surveillance.

The provisions of SR 4.0.3 also provide a time limit for completion of surveillances that become applicable as a consequence of MODE changes imposed by ACTIONS.

If a surveillance is not completed within the allowed delay period, the equipment is considered inoperable. The completion times of the ACTIONS for the applicable conditions begin IMMEDIATELY on expiration of the delay period. If a surveillance is failed within the delay period, the equipment is inoperable. The completion times of the ACTIONS for the applicable conditions begin IMMEDIATELY on the failure of the surveillance.

Completion of the surveillance within the delay period allowed by this SR or within the completion time of the ACTIONS restores compliance with SR 4.0.1.

SR 4.0.4 SR 4.0.4 establishes the requirement that all applicable SRs SHALL be met before entry into a MODE or other specified condition in the applicability statement.

The provisions of SR 4.0.4 SHALL not prevent changes in MODES or other specified conditions in the applicability statement that are required to comply with ACTIONS.

The precise requirements for performance of SRs are specified such that exceptions to SR 4.0.4 are not necessary. The specific time frames and conditions necessary for meeting the SRs in accordance with the requirements of SR 4.0.4 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 statement of the associated LCO before the performance or completion of a surveillance. A surveillance (which 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.

SR 4.0.5 SR 4.0.5 provides for operations required to complete one or more SRs for the specific cases of initial commencement of operations or commencement of operations following extended shutdowns. During these specific cases, the operation is performed under administrative controls (plans and procedures) that direct the operations and provide for appropriate compensatory actions for any unsatisfied SRs.

3/4.2.1 Ventilation System (OPERATING)

BACKGROUND The HCF ventilation system provides a safety-significant defense in depth function by preventing the uncontrolled release of airborne radioactive material. During normal operations, the ventilation system functions actively to maintain air flow from areas of lesser radioactive contamination to areas of greater contamination. Ventilation system exhaust air is filtered to remove radioiodine and particulate matter greater than approximately 0.3 μm in diameter prior to release to the atmosphere. Although they are not required to stay below Evaluation Guidelines, the ventilation system charcoal filters minimize potential off-site radiological doses under normal and abnormal conditions.

Fan motor control circuits are designed to provide sequential startup of ventilation system fans so that Zone 1 is never at a positive pressure with respect to Zone 2A, Zone 2A is never positive with respect to Zone 2, and Zone 2 is never positive with respect to ambient (Zone 3). If any fan should fail during operation, an electrical interlock system shuts down the appropriate fans to avoid adverse pressure differentials.

Chapter 2 of the SAR gives a detailed description of the HCF ventilation system.

APPLICABLE SAFETY ANALYSES

Detailed descriptions of radioactive material release accidents are included in Chapter 3 of the SAR.

LCO This LCO requires the HCF ventilation system to be operating and ensures proper airflow directions in MODE 1.

APPLICABILITY The HCF ventilation system is required to be in service and operating in MODE 1 to provide proper airflow for contamination control (worker safety) and filtration of the ventilation exhaust prior to discharge to the atmosphere (defense in depth).

ACTIONS A.1.1/A.1.2/A.1.3/A.2

The requirement to ensure an OPERABLE Zone 1 ventilation exhaust charcoal filter plenum is IN-SERVICE within 1 hour ensures that Zone 1 ventilation exhaust is being filtered prior to release to the environment. The requirement to isolate the inoperable plenum within 1 hour ensures that CONFINEMENT INTEGRITY is being maintained. The requirement to verify that either exhaust fan EF-6 or EF-7 is operating within 1 hour ensures that enhanced Zone 1 confinement performance is achieved. If A.1.1, A.1.2, and A.1.3 cannot be completed satisfactorily, the required

action is to place the facility in MODE 3. This action begins restoration of the Zone 1 ventilation subsystem to OPERABLE.

Action A.2 requires the redundant portion of the Zone 1 ventilation subsystem to be OPERABLE within 7 days. This allows adequate time to trouble-shoot and perform required repairs.

B.1.1/B.1.2/B.2/B.3

The requirement to ensure that a Zone 2A ventilation exhaust charcoal filter plenum is IN-SERVICE within 1 hour ensures that Zone 2A ventilation exhaust is being filtered prior to release to the environment. The requirement to isolate and restore the inoperable plenum to OPERABLE and place in service within 8 hours ensures that CONFINEMENT INTEGRITY is being maintained. The requirement to verify that either exhaust fan EF-8 or EF-9 is operating within 1 hour ensures that enhanced Zone 2A confinement performance is achieved. If B.1.1, B.1.2, and B.2 cannot be completed satisfactorily, the required action is to place the facility in MODE 3. This action begins restoration of the Zone 2A ventilation subsystem to OPERABLE.

Action B.3 requires the redundant fan of the Zone 2A ventilation subsystem to be OPERABLE within 7 days. This allows adequate time to trouble-shoot and perform required repairs.

C.1.1/C.1.2/C.2

The requirements to ensure an operating hot exhaust HEPA filter plenum and associated fan within 1 hour ensure that the ventilation system hot exhaust is being adequately filtered prior to release to the environment. The requirement to isolate the inoperable plenum/fan combination within 8 hours ensures that CONFINEMENT INTEGRITY is being maintained. If C.1.1 and C.1.2 cannot be completed satisfactorily, the required action is to place the facility in MODE 3. This action begins restoration of the ventilation hot exhaust subsystem to OPERABLE.

Action C.2 requires the redundant portion of the hot exhaust subsystem to be OPERABLE within 7 days. This allows adequate time to trouble-shoot and perform required repairs.

D.1

The requirement to maintain negative differential pressures between ISOTOPE EXTRACTION and RADIOLOGICAL MATERIAL PROCESSING SCBs and Zone 2A ensures that the ventilation system is maintaining airflow in the correct direction, and that the flow rate is sufficient to prevent diffusion of volatile radioisotopes from the SCBs to Zone 2A. The specified minimum pressure differential is based on a value that is readily measurable and observable by facility operators and is several times greater than that necessary to preclude diffusion processes. Upon loss of negative pressure differential between a SCB and Zone 2A, the required action for the affected SCB is to restore the differential pressure or restore the inoperable instrument to OPERABLE. The time of 2 hours allows for 1) recovery from temporary upset conditions in ventilation system operation or from loss of electrical power, or 2) repair or replacement of an inoperable Δp instrument. It also allows time to secure process materials prior to initiating a transition from MODE 1 to MODE 3 in the event of a sustained ventilation system outage or loss of differential pressure. If condition D is the result of Zone 1 or hot exhaust equipment inoperability, then condition H governs the transition to MODE 3.

E.1

The requirement to maintain negative differential pressures between Zone 2A and Zone 2 ensures that the ventilation system is maintaining airflow in the correct direction, and that the flow rate is sufficient to prevent diffusion of volatile radioisotopes from Zone 2A to Zone 2. The specified minimum pressure differential is based on a value that is readily measurable and observable by facility operators and is several times greater than that necessary to preclude diffusion processes. Upon loss of negative pressure differential between Zone 2A and Zone 2, the required action is to restore the differential pressure or restore the inoperable instrument to OPERABLE. The time of 2 hours allows for 1) recovery from temporary upset conditions in ventilation system operation or from loss of electrical power, or 2) repair or replacement of an inoperable Δp instrument. If condition E is the result of Zone 2A or hot exhaust equipment inoperability, then condition G governs the transition to MODE 3.

F.1

The fan interlock functions to maintain the proper building airflow patterns by means of the following controls:

- No cold exhaust fan (Fan EF-1 or EF-2) may operate unless a hot exhaust fan (Fan EF-4 or EF-5) is operating.
- No supply fan may operate unless at least one exhaust fan is operating.
- Failure of the operating fan of a redundant pair automatically starts the standby fan.
- Failure of the Zone 2 exhaust fan causes shutdown of Zone 2 recirculating and supply fans.

The requirement to restore the fan sequencing interlock to OPERABLE within one hour minimizes the potential for a loss of desired directional airflow control across ventilation exhaust system boundaries as a result of hot exhaust fan failures. If F.1 cannot be completed satisfactorily, then condition G governs the transition to MODE 3.

G.1

The requirement to be in MODE 3 is a safe condition and is, in itself, implementation of LCO 3.03. A completion time of 2 hours is adequate to safely make the mode transition.

H.1

The requirement to be in MODE 3 is a safe condition and is, in itself, implementation of LCO 3.03. A completion time of 2 hours is adequate to safely make the mode transition.

SURVEILLANCE REQUIREMENTS

SR 4.2.1.1

This surveillance verifies that SCB confinement performance is enhanced for SCBs involved in ISOTOPE EXTRACTION and RADIOLOGICAL MATERIAL PROCESSING, and satisfies the performance requirement for maintaining a negative SCB-to-Zone 2A pressure differential.

SR 4.2.1.2

This surveillance verifies that Zone 2A confinement performance is enhanced and satisfies the performance requirement for maintaining a negative Zone 2A-to-Zone 2 pressure differential.

SR 4.2.1.3

This surveillance verifies the OPERABILITY of each differential pressure measurement channel (including alarms) used to perform surveillance SR 4.2.1.1.

SR 4.2.1.4

This surveillance verifies the OPERABILITY of the differential pressure measurement channel (including alarm) used to perform surveillance SR 4.2.1.2.

SR 4.2.1.5

CALIBRATION of each differential pressure measurement channel used to perform surveillances SR 4.2.1.1 is required to ensure that the channel output corresponds with acceptable accuracy to the actual differential pressure being measured.

SR 4.2.1.6

CALIBRATION of the differential pressure measurement channel used to perform surveillance SR 4.2.1.2 is required to ensure that the channel output corresponds with acceptable accuracy to the actual differential pressure being measured

SR 4.2.1.7

This surveillance verifies that a charcoal adsorber bank is in the operating exhaust fan flow path to remove radioactive iodine from the Zone 1 and Zone 2A ventilation exhaust streams.

SR 4.2.1.8

This surveillance verifies that the hot exhaust charcoal adsorbers are capable of removing radioactive iodine from the Zone 1 and Zone 2A ventilation exhaust streams.

SR 4.2.1.9

This surveillance verifies OPERABILITY of the hot exhaust HEPA filters (i.e., the filters are not plugged and are capable of performing their design function, the filtration of radioactive particulates from the ventilation system hot exhaust).

SR 4.2.1.10

This surveillance satisfies the requirement specified in ANSI N510-1989 for nuclear facility HEPA filters. The surveillance frequency is in accordance with ANSI N510-1989 and the efficiency criterion of 99% is consistent with the assumptions used in the SAR accident analysis for a filtered radioactive material release.

SR4.2.1.11

This surveillance is required to verify that failure of a fan in the redundant section of the ventilation system will result in automatic startup of the redundant fan. This ensures that appropriate radioactive material confinement boundary differential pressures are maintained in the event of a single fan failure.

3/4.2.2 Ventilation System (OPERABLE)

BACKGROUND When the ventilation system is not operating, ISOTOPE EXTRACTION and RADIOLOGICAL MATERIAL PROCESSING activities are not permitted. Movement and handling of solid radiological materials is permitted.

LCO This LCO requires the HCF ventilation system to be OPERABLE.

APPLICABILITY This LCO applies to MODE 2, which constitutes a standby readiness condition for entering MODE 1.

ACTIONS A.1.1/A.1.2/A.2

The requirement to verify that Zone 1 filter plenum A or B is OPERABLE within 1 hour ensures that the necessary equipment for filtering Zone 1 ventilation exhaust is available. The requirement to verify that exhaust fan EF-6 or EF-7 is OPERABLE within 1 hour ensures that the necessary equipment for enhancing Zone 1 confinement performance is available. If A.1.1 and A.1.2 cannot be completed satisfactorily, the required action is to place the facility in MODE 3. This action begins restoration of the Zone 1 ventilation subsystem to OPERABLE.

Action A.2 requires the inoperable Zone 1 plenum/fan to be restored to OPERABLE within 7 days. Seven days allows adequate time to trouble-shoot and perform required repairs before having to transition to MODE 3.

B.1.1/B.1.2/B.2

The requirement to verify that Zone 2A filter plenum A or B is OPERABLE within 1 hour ensures that the necessary equipment for filtering Zone 2A ventilation exhaust is available. The requirement to verify that exhaust fan EF-8 or EF-9 is OPERABLE within 1 hour ensures that the necessary equipment for enhancing Zone 2A confinement performance is available. If B.1.1 and B.1.2 cannot be completed satisfactorily, the required action is to place the facility in MODE 3. This action begins restoration of the Zone 2A ventilation subsystem to OPERABLE.

Action B.2 requires the inoperable Zone 2A plenum/fan to be restored to OPERABLE within 7 days. Seven days allows adequate time to trouble-shoot and perform required repairs before having to transition to MODE 3.

C.1./C.2

The requirement to verify that either stack filter plenum A and exhaust fan EF-4 or filter plenum B and exhaust fan EF-5 are OPERABLE within 1 hour ensures that the necessary ventilation hot exhaust equipment for filtering ventilation system hot exhaust is available. If C.1.1 and C.1.2 cannot be completed satisfactorily, the required action is to place the facility in MODE 3. This action begins restoration of the ventilation hot exhaust subsystem to OPERABLE.

Action C.2 requires the inoperable hot exhaust plenum/fan to be restored to OPERABLE within 7 days. Seven days allows adequate time to troubleshoot and perform required repairs before having to transition to MODE 3.

D.1

The requirement to restore the fan sequencing interlock to OPERABLE within one hour minimizes the possibility that desired directional airflow control across ventilation exhaust system boundaries can be compromised as a result of hot exhaust fan failures following entry into MODE 1. If D.1 cannot be completed satisfactorily, then condition E governs the transition to MODE 3.

E.1

The requirement to be in MODE 3 is a safe condition and is, in itself, implementation of LCO 3.03. A completion time of 2 hours is adequate to safely make the mode transition.

SURVEILLANCE REQUIREMENTS

SR 4.2.2.1

This surveillance verifies that the hot exhaust charcoal adsorbers are capable of removing radioactive iodine from the Zone 1 and Zone 2A ventilation exhaust streams, thereby ensuring a valid entry into MODE 1 (SR 4.0.4).

SR 4.2.2.2

This surveillance satisfies the requirement specified in ANSI N510-1989 for nuclear facility HEPA filters, thereby ensuring a valid entry into MODE 1 (SR 4.0.4). The surveillance frequency is in accordance with ANSI N510-1989 and the efficiency criterion of 99% is consistent with the assumptions used in the SAR accident analysis for a filtered radioactive material release.

SR 4.2.2.3

This surveillance is required to verify that failure of a fan in the redundant section of the ventilation system will result in automatic startup of the redundant fan, thereby ensuring a valid entry into MODE 1 (SR 4.0.4).

3/4.2.3 Target Entrance System Mechanical Interlock

BACKGROUND	<p>The target entrance system (TES) is used to bring irradiated targets into the shielded processing area of the HCF. The shield cask provides the necessary shielding for protection of workers during irradiated target movement. Normally, the irradiated target will be removed from the shield cask in the STB for processing and the empty cask brought back into Zone 2. Under unusual circumstances there may be a need to remove an irradiated target from the TES. The TES mechanical interlock provides a worker safety function by precluding inadvertent removal of the shield cask containing an irradiated target without a properly installed shield cask lid.</p>
LCO	<p>This LCO requires the TES mechanical interlock to be OPERABLE.</p>
APPLICABILITY	<p>The TES mechanical interlock is required to be OPERABLE in MODE 2, which is the facility mode in which irradiated targets will be introduced to the TES.</p>
ACTIONS	<p>A.1/A.2</p> <p>Action A.1 is based on the identification of an inoperable interlock during normal surveillance testing (i.e., without the shield cask containing an irradiated target in the TES). The requirement to terminate irradiated target transfers immediately ensures that the shield cask containing an irradiated target cannot be introduced into the TES while the interlock is inoperable. Action A.2 ensures that the interlock is restored to OPERABLE prior to resuming such transfers.</p> <p>B.1.1/B.1.2/B.2.1/B.2.2/B.3</p> <p>Actions B.1.1, B.1.2, B.2.1, and B.2.2 are based on the identification of an inoperable interlock while the shield cask containing an irradiated target is in the TES. In such an event, the operator must take immediate action, but has a choice of actions to take. In the first option, Action B.1.1 requires that the target be IMMEDIATELY removed from the shield cask to the STB, while Action B.1.2 requires subsequent removal of the target from the STB to the SCB conveyor system. In the second option, Action B.2.1 allows the operator to IMMEDIATELY verify that the shield cask lid is in place prior to removing the cask from the TES (Action B.2.2). Actions B.1.2 and B.2.2, which are required to be completed within two hours, ensure that movement of the shield cask cannot expose an unshielded target. This allows adequate time to take any other compensatory actions prior to moving the target and shield cask in preparation for initiating repairs on the mechanical interlock.</p>

Following completion of either Actions B.1.1 and B.1.2, or B.2.1 and B.2.2, the interlock must be restored to OPERABLE. Action B.3 ensures that the interlock is restored to OPERABLE prior to resuming irradiated target transfers.

SURVEILLANCE REQUIREMENTS

SR 4.2.3.1

This surveillance verifies the OPERABILITY of the TES mechanical interlock. The frequency ensures that mechanical problems will be identified in a timely manner while not interfering with normal isotope processing activities.

APPENDIX B

DESIGN FEATURES

APPENDIX B. DESIGN FEATURES

The Hot Cell Facility relies on the design features listed below to either preclude or reduce the potential consequences of design basis accidents.

- Reinforced concrete fire barriers
- Zone 2A canyon and Room 109 radiation shielding
- Steel confinement boxes (SCB)
- Shielding windows
- Ventilation system hot exhaust ductwork up to and including HEPA filter plenums at the HCF stack
- Confinement barrier penetration seals
- Zone 2A canyon confinement structures
- Zone 2A canyon airlock doors
- Shield cask
- TA-V stack height
- Distance to the exclusion boundary

These features are described in detail in the Hot Cell Facility Safety Analysis Report and therefore will not be elaborated on here other than to note that they SHALL NOT be modified without a thorough review by the manager and the facility safety committee to determine that their overall effectiveness will not be degraded by any proposed changes.

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