

Tank 241-Z-361 Technical Safety Requirements

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

CH2MHILL
Plateau Remediation Company

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**Technical Safety Requirements
for the
Tank 241-Z-361 Facility**

Prepared by:

CH2M HILL Plateau Remediation Company
Richland, Washington

September 2018

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List of Abbreviations, Acronyms, and Symbols

AC	administrative control
CFR	Code of Federal Regulations
CPRM	Central Plateau Risk Management
CPS	Criticality Prevention Specifications
CSER	Criticality Safety Evaluation Report
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
LCO	Limiting Condition for Operation
LCS	limiting control setting
MAR	material at risk
PFP	Plutonium Finishing Plant
RL	U.S. Department of Energy, Richland Operations Office
S&M	surveillance and maintenance
SAC	specific administrative control
SC	safety class
SL	safety limit
SMP	safety management program
SR	surveillance requirement
SS	safety significant
SSC	structures, systems, and components
TSR	Technical Safety Requirement
USQ	Unreviewed Safety Question

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Section 1

Use and Application

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1.0 Use and Application

Title 10, *Code of Federal Regulations*, Part 830.205 (10 CFR 830) “Nuclear Safety Management,” requires U.S. Department of Energy (DOE) Contractors, responsible for Hazard Category 1, 2, and 3 DOE nuclear facilities, to develop Technical Safety Requirements (TSRs). TSRs identify controls for operating a nuclear facility as determined by the Documented Safety Analysis (DSA).

This document contains the TSRs for Tank 241-Z-361 Facility surveillance and maintenance (S&M) activities.

This TSR document was prepared in accordance with DOE G 423.1-1B, *Implementation Guide for Use In Developing Technical Safety Requirements*, and DOE-STD-1186-2016, *Specific Administrative Controls*, applying a graded approach for changes to existing TSR requirements. Specific administrative controls (SACs) have been designated for those administrative controls (ACs) whose preventive or mitigative functions, credited in the safety analysis, would rise to the level of safety class (SC) or safety significant (SS) if the functions were performed by the structures, systems, and components (SSCs). Compliance with all TSR ACs is expected, and training on this TSR document and SAC designation will provide the desired heightened assurance of effectiveness and reliability of the credited functional requirements in the SACs. The controls designated as SACs are clearly labeled as such in Section 5.6 of this TSR.

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1.1 Definitions

NOTE: Defined terms in this list appear in uppercase type throughout this TSR.

Term	Definition
ACTIONS	ACTIONS are that part of a Limiting Condition for Operation (LCO) (or an LCO formatted Specific Administrative Control [SAC]) that prescribes required action be taken under designated conditions within specified Completion Times.
ACTIVITIES	An ACTIVITY is the term representing the collection of tasks or steps commonly associated with a process.
AFFECTED AREA	The portion of Tank 241-Z-361 that is affected by an activity, condition, or deficiency.
AND	See Section 1.4, "Logical Connectors."
BASES	BASES contain pertinent information and details supporting TSR elements and specific values or characteristics.
DESIGN FEATURES	DESIGN FEATURES are those design characteristics, primarily passive in nature, that are of a special importance to maintaining adequate control, shielding, or containment of radiological or toxicological material and for which indiscriminate changes are to be prevented.
DISCOVERY/ DISCOVERED	For TSR compliance, the point in time when the Shift Supervisor/Manager responsible for Tank 241-Z-361 makes the determination that a TSR is not being met or that an unplanned condition has been entered and required actions must be implemented. Note: The definitions listed above apply to TSR compliance and should not be confused with DSA inadequacy discovery issues.
IMMEDIATE(LY)	Term used as a Completion Time for ACTIONS when a step is to be initiated as soon as possibly achievable after discovery without creating a less stable condition and continuously and aggressively pursued until complete.
LIMITING CONDITION FOR OPERATION (LCO)	The limits that represent the lowest functional capability or performance level of safety structures, systems, and components required for safe operation.

Term	Definition
MATERIAL AT RISK (MAR)	The amount of radioactive material available to be acted on by a given physical stress. For facilities, processes, and activities, the MAR is a value representing some maximum quantity of radioactive material present or reasonably anticipated for the process or structure being analyzed.
MODE	MODES are used (1) to determine Safety Limit (SL), Limiting Control Setting (LCS), LCO, and Administrative Control (AC) Program applicabilities, (2) to distinguish facility operational conditions, and (3) to determine minimum staffing requirements. See also Section 1.2, MODES.
OPERABLE/ OPERABILITY	A system, subsystem, train, component, or device SHALL be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s), and: a) setpoints are within limits, b) operating parameters necessary for OPERABILITY are within limits, and c) when all necessary attendant instrumentation, controls, electrical power, cooling or seal water, lubrication, or other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its safety function(s) are also capable of performing their related safety support function(s).
<u>OR</u>	See Section 1.4, "Logical Connectors."
<u>SAFE CONFIGURATION</u>	Condition resulting from the minimization of risk in on going processes commensurate with the chemical and/or physical form of material and/or arrangement of material and/or equipment.
SPECIFIC ADMINISTRATIVE CONTROL	An AC that provides a specific preventive and mitigative function for accident scenarios identified in the DSA where the safety function has importance similar to, or the same as, the safety function of a safety system, structure and component (SSC).
SHALL	Denotes a mandatory requirement that must be complied with to maintain the requirements, assumptions, or conditions of the facility safety basis.
SURVEILLANCE REQUIREMENTS (SR)	The testing, monitoring, inspecting, servicing, and/or auditing that is performed to ensure and maintain the necessary quality and OPERABILITY of systems and components,
TANK 241-Z-361 FACILITY BOUNDARY	The TANK 241-Z-361 FACILITY BOUNDARY is the area surrounding the tank spanning a distance of at least 22 ft from the tank's edge.

Term	Definition
TIME OF DECLARATION	The actual time when the facility manager or designee declares that an LCO, SAC, or AC element is not met. As soon as possible upon notification of a problem, the problem should be evaluated and a declaration made by the facility manager or designee if it is determined that an LCO, SAC, or AC element is not met.
VERIFY (ING, IED, IES)/ VERIFICATION	An auditable assessment to confirm or substantiate that specific conditions exist. This may include collecting sample data or quantitative data; taking instrument readings; recording data and information on logs, data sheets, or electronic media; and evaluating data and information according to administrative procedures.
VIOLATION	See Section 5.8, Reporting Requirements.

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1.2 Modes

The purpose of this section is to explain the use and application of MODES for the Tank 241-Z-361 Facility. The use of the decontamination and decommissioning (D&D) MODE is currently not authorized, and has no activities associated with it. It is only included to provide an explanation as to how switching between MODES work, and has been retained as it is expected to be used when D&D activities are eventually included in the scope of the DSA.

The LCOs are applicable to MODES specified in MODE Applicability. When a facility is in D&D MODE and a situation occurs that causes noncompliance with an LCO statement, and when other appropriate compensatory ACTIONS that allow conditional compliance with the LCO under D&D MODE have been exhausted, these TSRs may specify entry into S&M MODE.

These MODES are defined below. Authorized ACTIVITIES are shown in Table 1-1. Two MODES, ranging from highest to lowest levels of activity, are D&D and S&M. D&D currently has no activities associated with it. S&M is the MODE in general use throughout the workweek to conduct S&M activities, and the MODE the facility is in upon initial implementation of this safety basis.

MODE 1 – D&D:

- Use of D&D MODE is not authorized or within scope of this revision, and is provided to establish the framework required to accommodate potential future activities.

MODE 2 – S&M:

- ACTIVITIES needed to achieve S&M from D&D MODE may be conducted.
- To achieve S&M, the facility area or ACTIVITY must be in a SAFE CONFIGURATION.
- Work process are controlled by approved work packages, procedures, or other hazard controls appropriate to the specific tasks to ensure that no new hazards or accident initiators are introduced into the affected area.

Table 1-1 identifies which ACTIVITIES can be conducted at Tank 241-Z-361 for a given MODE.

Table 1-1. Tank 241-Z-361 Facility ACTIVITIES by MODE

Activity	Ch 2 DSA Ref. Location	S&M	D&D
Storage of the Tank Contents	2.1	X	
Performing Atmospheric Sampling	2.1	X	
Local Waste Disturbing Activities	2.1	X	
Measuring the Height of Tank Waste	2.1	X	
Characterization of the Tanks Contents Through Nondestructive Analysis	2.1	X	
Performing Structural Evaluations	2.1	X	
Maintenance Activities	2.1	X	

1.3 Frequency

PURPOSE	The purpose of this section is to explain the application and use of FREQUENCY notation.
BACKGROUND	Each SR has a specified FREQUENCY in which the surveillance SHALL be performed.
FREQUENCY NOTATION	The FREQUENCY notations used in this TSR document are defined in Table 1-2.
USE OF FREQUENCY	<p>Failure to complete LCO SRs within the required FREQUENCY SHALL constitute failure to meet the LCO per the SR. For LCO SRs, SAC SRs, and fire protection AC surveillances and assessments, the FREQUENCY requirement is extended to 1.25 times the specified interval, based on the generic SR. This extension applies only to the FREQUENCY specification for LCO SRs, SAC surveillances, and fire protection AC surveillances and assessments; it <u>does not</u> apply to the COMPLETION TIME requirement for ACTION Statements. The time extension is intended to provide operational flexibility for completion of LCO SRs, SAC surveillances, and fire protection AC surveillances and assessments. It should not be relied upon as a routine extension of the specified interval.</p> <p>Completion of LCO and SAC SURVEILLANCES SHALL be documented. Failure to complete the LCO or SAC SR within the specified FREQUENCY (including the 25 percent extension - see Table 1-2, Columns 2 and 3), as qualified in the table notes, SHALL constitute a TSR VIOLATION. Failure to complete the fire protection AC surveillances and assessments within the specified FREQUENCY (including the 25 percent extension - see Table 1-2, Columns 2 and 3), as qualified in the table notes, SHALL constitute an AC element not met.</p>

Table 1-2. Frequency Notation

Notation^a	FREQUENCY	With 25% Extension^b
SHIFTLY ^c	At least once during the regularly scheduled shift	10 hours
DAILY ^c	At least once during the calendar day	30 hours
WEEKLY ^d	At least once during the calendar week	9 days
BI-WEEKLY	At least once per 14 days	18 days
MONTHLY ^e	At least once during the calendar month	39 days
QUARTERLY ^f	At least once during the calendar quarter	115 days
SEMI-ANNUALLY ^f	At least once during the six calendar month period	230 days
ANNUALLY ^f	At least once during the calendar year	456 days
BIENNIAL ^f	At least once during the two calendar year period	912 days

Notes:

^aThe completion of SR will be recorded with dates (and times for frequencies with extensions specified in hours) that the surveillances are completed. Times of completion are required to be recorded only for SHIFTLY and DAILY requirements.

^bThis column represents 1.25 times the specified interval and applies from the beginning of the applicable period. This extension applies only to the FREQUENCY specification for LCO and SAC surveillances/assessments. It is intended to provide operational flexibility for the completion of LCO and SAC surveillances/assessments. It should not be relied upon as a routine extension of the specified interval. Use of the extension does not reset the frequency interval.

^cSHIFT specific and DAILY surveillances are only required when OPERATING the affected system under the applicable LCO. Regularly scheduled shifts are assumed to be 8 hours. If shifts in excess of 8 hours are worked, the frequency SHALL be the length of the shift. The extension period will be 25 percent of the shift duration rounded down to the nearest hour. Daily is further defined to mean at least once in a calendar day (24-hour period) when required.

^dWEEKLY Surveillances are required to be performed any time during the calendar week (Monday through Sunday). A 25 percent extension period is applicable to this work and begins the first day of the following week.

^eMONTHLY surveillances and inspections are required to be performed any time during the calendar month (e.g., January, March, December) versus once every 31 calendar days. A 25 percent extension period is applicable to this work and begins on the first day of the following month. Use of the extension does not reset the frequency interval. It is recognized that the 39-day duration (with the extension) may exceed 25 percent for months with less than 31 days.

^fApplies to LCO and SAC surveillances/assessments with a frequency greater than 31 days.

- Specific calendar dates (e.g., August 12) are not to be used for determining the next scheduled due date, nor late date.
- Surveillance/Assessments with frequencies longer than a month SHALL be scheduled to occur during the last month of the frequency periodicity specified for the given ACTIVITY. The ACTIVITY SHALL not be considered delinquent until the first day of the month following the scheduled month. For example, if an ANNUAL ACTIVITY is originally to be performed in January it SHALL next be scheduled for performance during January of the following year and SHALL comply with these criteria if performed on or before January 31.
- The allowance for performance of a surveillance/assessment by the end of a calendar month does not apply to the 25 percent extension. Surveillances/Assessments SHALL be performed within the maximum time allotted by the

Table 1-2. Frequency Notation

extension. Surveillance/Assessments that are performed late, whether delinquent or as permitted by the 25 percent extension period, SHALL continue to be scheduled using the original by-month sequence. For example, an ANNUAL ACTIVITY scheduled for March but actually performed in June SHALL next be scheduled for performance the following March. Likewise, an ANNUAL ACTIVITY scheduled for performance in August but performed in July due to resource availability or operational restraints would continue to be scheduled for performance during August of subsequent years with a 25 percent extension being applicable after August 31. Frequency due dates that are QUARTERLY or longer may be pulled forward permanently and a new performance month established. For example, a QUARTERLY SR that is scheduled to be performed in May 2018 (permanently pulled forward due to resource limitations) must be performed no later than June 23, 2018, (115 days from the start of the calendar quarter [March 1-May 31]). It cannot be extended/deferred to the end of June.

- As noted in the examples provided above, a calendar quarter consists of any three calendar months (e.g., January through March, February through April, July, through September). A semi-annual frequency consists of any six calendar months (e.g., February through July, April through October). A calendar year consists of any 12 calendar months (e.g., February through January, July through June).

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1.4 Logical Connectors

PURPOSE	The purpose of this section is to explain the use and application of logical connectors.
BACKGROUND	Logical connectors are used in TSRs to discriminate between (and yet connect) discrete conditions, ACTIONS, COMPLETION TIMES, SRs, and FREQUENCIES. The logical connectors include the “AND” and “OR.” The physical arrangement of this connector on a page constitutes a specific meaning in accordance with the convention established in DOE G 423.1-1B.
USE OF LOGICAL CONNECTORS	<p>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 ACTION. The first level of logic is identified by the first digit of the number assigned to an ACTION and the placement of the logical connector in the first level of nesting (e.g., left-justified with the number of the ACTION). The successive levels of logic are identified by additional digits of the ACTION number and by successive indenting of the logical connectors.</p> <p>When logical connectors are used to state a condition, usually only the first level of logic is used and the logical connector is left justified with the condition statement. For cases where successive levels of logic are used the lower level is identified solely by indenting the logical connector because subparts of a condition statement are not numbered separately.</p>
DEFINITION OF LOGIC TERMS	The defined terms of this section appear in capitalized type, bolded, and underlined through-out the TSR document. ACTION statements are read top to bottom (e.g., a, b, c, d, etc.). A more detailed definition for logic connector interpretations for each TSR can be found in the BASES.
APPLICATION	See Table 1-3 on the following page for an example of the application of logical connectors used in this TSR document.

Table 1-3. Use and Application of Logical Connectors

CONDITION	ACTION	COMPLETION TIME
Situation that does not meet LCO statement	A.1 Terminate A, <u>AND</u>	IMMEDIATELY
	A.2 Perform BC, <u>AND</u>	1 hour
	A.3.1 Restore V, <u>OR</u>	1 hour
	A.3.2.1 Initiate S, <u>AND</u>	2 hours
	A.3.2.2 Place the facility in MODES.	4 hours

The logic shown in Table 1-3, allows only two approved outcomes upon occurrence of the specified situation that does not meet the LCO:

1. A.1 (Terminate A), and A.2 (Perform BC), and A.3.1 (Restore V), or
2. A.1 (Terminate A), and A.2 (Perform BC), and A.3.2.1 (Initiate S), and A.3.2.2 (Place the facility in MODES).

Table 1-4. Use and Application of Logical Connectors for SAC Surveillances

CONDITION	ACTION	COMPLETION TIME
SAC Surveillance Requirement	a. Provide Procedure Number, <u>AND</u>	ANNUALLY
	b. 1. List package identification number (PIN), <u>AND</u> 2. List Abatement Date, <u>AND</u> 3. List Release Date, <u>OR</u> c. Provide a Statement.	

The logic shown in Table 1-4 allows only two approved outcomes for completion of the SAC SR:

1. a) (Provide Procedure Number), and b.1) (List PIN), and b.2) (List Abatement Date), and b.3) (List Release Date).
or
2. a) (Provide Procedure Number) and c) (Provide a Statement).

Table 1-5. Use and Application of Logical Connectors for SAC Surveillances

CONDITION	ACTION	COMPLETION TIME
SAC Surveillance Requirement	a. Provide Procedure Number, <u>AND</u>	ANNUALLY
	b. 1. Month of Facility Log, <u>AND</u> 2 Results of Log Review, <u>AND</u> c. 1. Document Management Approval, <u>OR</u> 2 Provide Statement <u>AND</u> d. Provide Results of Field Verification.	

The logic shown in Table 1-5 allows only two approved outcomes for completion of the SAC SR:

1. a) (Provide Procedure Number), and b.1) (Month of Facility Log), and b.2) (Results of Log Review), and c.1) (Document Management Approval), and d) (Provide Results of Field Verification).
 or
2. a) (Provide Procedure Number), and b.1) (Month of Facility Log), and b.2) (Results of Log Review), and c.2) (Provide Statement), and d) (Provide Results of Field Verification).

Table 1-6. Use and Application of Logical Connectors for SAC Surveillances

CONDITION	ACTION	COMPLETION TIME
SAC Surveillance Requirement	a. 1. Provide Documentation of Staged Waste Inventory Field Verification, <u>AND</u> 2. Perform a Physical Reconciliation of MAR Inventory <u>OR</u> a. Provide Statement Indicating that No Containers Were Staged Outside in the Past Year	ANNUALLY

The logic shown in Table 1-6 allows only two approved outcomes for completion of the SAC SR:

1. a.1) (Provide Documentation of Staged Waste Inventory Field Verification) and a.2) (Perform a Physical Reconciliation of MAR Inventory).
 or
2. b) (Provide Statement Indicating No Containers Were Staged Outside in the Past Year).

1.5 Completion Time

PURPOSE

The purpose of this section is to explain the use application of COMPLETION TIMES.

BACKGROUND

The LCO specifies the lowest functional capabilities or performance levels that are required to ensure safe operation of the facility. The LCO identifies conditions for which these functional or performance requirements are not met, and the LCO states ACTION(s) that may be taken within a limited time (the COMPLETION TIME) or within a specified periodicity under these conditions. The ACTION Statements provide interim remedial ACTION(s) or compensatory protection for the same safety concerns as the LCO while attempting to restore the functional capabilities or performance levels required by the LCO. Failure to complete the ACTION(s) within the COMPLETION TIME results in a VIOLATION of the LCO (see definition of “VIOLATION” in Section 1.2).

USE OF COMPLETION TIME

The COMPLETION TIME is the amount of time allowed to complete an ACTION. It is referenced to the TIME OF DECLARATION.

If situations require entry into more than one condition within a single LCO or SAC ACTION (multiple conditions), the ACTION(s) for each condition SHALL be performed within the associated COMPLETION TIMES. When in multiple conditions, separate COMPLETION TIMES are tracked for each condition, starting from the TIME OF DECLARATION of the situation that required entry into the condition.

Once a condition has been entered, subsequent discovery of subsystems, components, or variables that are inoperable or not within limits as a result of cascading effects from entering the condition SHALL NOT result in separate entry into the condition. The ACTION(s) of the condition continue to apply to each additional failure, and COMPLETION TIMES are based on initial entry into the condition.

Entry into an LCO or SAC ACTION and LCO or SAC ACTION COMPLETION TIMES SHALL be documented.

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Section 2

Safety Limits

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2.0 Safety Limits

Safety Limits are limits on process variables (e.g., temperature, pressure) associated with those physical barriers (e.g., tanks, piping), generally passive, that are necessary for the intended facility function. Exceeding SLs could directly cause the failure of one or more of the barriers that prevent the uncontrolled release of radioactive material. The limits are stated in measurable units such as degrees Celsius and are placed on primary barriers closest to the material source. Safety Limits, if absolutely necessary, are reserved for a small set of safety requirements to which the facility is committed to protect the integrity of the primary barriers. There are no SLs identified for Tank 241-Z-361.

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2.1 Limiting Control Settings

Limiting Control Settings are setpoints on safety systems that control process variables to prevent exceeding SLs. The specific setpoints are chosen such that, if exceeded, sufficient time is available to automatically or manually correct the condition before exceeding SLs. Because there are no SLs for Tank 241-Z-361, there are no LCSs.

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Section 3/4

**Limiting Conditions for Operation
and Surveillance Requirements**

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3/4.0 Limiting Conditions for Operation and Surveillance Requirements

Limiting Conditions for Operation are the lowest functional capability or performance level of safety-related SSCs, and the support systems required for normal safe operation.

Limiting Conditions for Operation shall be based on maintaining the SSCs as OPERABLE or conditions within the specified limits that are required for the protection of the offsite public from unacceptable consequences.

There are no LCOs for Tank 241-Z-361.

Surveillance Requirements are requirements relating to testing, calibration, or inspection to ensure that the necessary OPERABILITY and quality of safety-related SSCs, their support systems, and specified conditions required for safe operation of the facility are maintained.

There are no SRs for Tank 241-Z-361 because there are no SLs, LCSs, or LCOs.

3/4.0 Limiting Conditions for Operation and Surveillance Requirements

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Section 5

Administrative Controls

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5.0 Administrative Controls

5.1 Responsibility

The Facility Manager is responsible for the overall surveillance and maintenance of Tank 241-Z-361 Facility. During any unavailability of the Facility Manager, a qualified individual SHALL be designated to assume the management function as defined in PRC-PRO-EM-40360, *Building Emergency Plans and Facility Response Plans*. Supervisors or other operations personnel may perform the facility management function, provided they are trained and qualified to an Operations supervisory position, familiar with current facility operations, and management approval is obtained. The Facility Manager or designee SHALL ensure that the requirements of the Tank 241-Z-361 TSRs are met.

5.2 Organization

Lines of authority, responsibility, and communication SHALL be established and defined for all facility management levels, to the highest responsible authority. These relationships shall be documented and updated as appropriate, in the form of organization charts, functional descriptions of departmental responsibilities, and relationships, or in equivalent forms of documentation.

The individuals who train the operating staff and those who carry out safety and quality assurance functions may report to the Facility Manager. However, they SHALL have sufficient organizational freedom to ensure their independence from operating pressures.

The operating contractor is responsible for providing independent overview of TSR activities by an oversight organization to ensure the operation is in compliance with the Tank 241-Z-361 TSRs.

5.3 Facility Staff

5.3.1 Minimum Operations Shift Compliment

The number of qualified supervisors and operators available SHALL be adequate to operate and support Tank 241-Z-361 activities safely. Abnormal conditions SHALL be considered in determining operator assignments. The specific actions that the minimum staff performs in abnormal conditions include stopping all work activities and placing the affected area in a SAFE CONFIGURATION. Management SHALL provide additional personnel, as necessary, to support other activities, which include less frequent surveillances such as system calibrations, functional tests, and other specific administrative requirements that are planned and scheduled to ensure TSR compliance. The minimum operations shift complement per shift for Tank 241-Z-361 SHALL be as specified in Table 5-1. The supervisor availability will be described in facility procedures.

The minimum complement can be one less than the required number for a period of time not to exceed 2 hours to accommodate unexpected absences, provided IMMEDIATE ACTION is taken to restore the shift complement to within the minimum shift requirements. Engineers, supervisors, or other exempt personnel may perform any duties for which they are trained and qualified where required, to an equivalent or greater level than the personnel they are replacing.

5.3.2 Support Organizations

Organizations provide support functions and personnel necessary for Tank 241-Z-361 operations as described in HNF-11724, *CH2M HILL Plateau Remediation Company Safety Management Program*, Chapter 17. The noted reference provides the information specified by the guidance in DOE G 423.1-1B.

Table 5-1. Tank 241-Z-361 Facility Minimum Staffing

Tank 241-Z-361 MODE	Personnel	
D&D	Supervisor ^b	As Required
	Operators ^c	As Required
	Health Physics Technician ^{a, c}	As Required
S&M	Supervisor ^b	0
	Operators ^c	0
	Health Physics Technician ^c	0

^a Minimum staffing for Health Physics Technician personnel is specified by radiological work permit for specific activities being performed.

^b Supervisor – A qualified person designated by Tank 241-Z-361 Management to direct activities of personnel. Substitute titles may be utilized for positions of equivalent functions.

^c Engineers, supervisors, or other exempt personnel may perform any duties (e.g., Operators or Health Physics Technicians) for which they are trained and qualified where required, to an equivalent or greater level than the personnel being replaced.

5.4 TSR Control

Proposed changes to the TSR SHALL be reviewed and approved by RL prior to implementation.

Changes to the TSR Bases could be made without RL approval provided they are as follows:

- a. Editorial in nature, and,
- b. Do not make significant changes. Significant changes are those changes that alter the intent, scope, limitations, functional requirements, or application of a TSR.

All other changes must be approved by RL.

5.5 Safety Management Programs

This section contains commitments to safety management programs (SMPs). These SMPs may not be specifically credited in the accident analysis, but all are an important part of defense-in-depth. Key elements of credited SMPs are included in specific TSR ACs. In addition to worker safety, the cumulative effect of the programmatic details is important to facility safety and is an integral part of safe operations.

5.5.1 Safety Management Programs

- a. The following SMPs, as described in HNF-11724, *CH2M HILL Plateau Remediation Company Safety Management Programs*, SHALL be established, implemented, and maintained as applicable to each nuclear facility, unless otherwise noted in the Tank 241-Z-361 DSA.
 - Prevention of Inadvertent Criticality* - as applicable per HNF-7098, *Criticality Safety Program*, (Chapter 6)
 - Radiation Protection* (Chapter 7)
 - Hazardous Material Protection* (Chapter 8)
 - Radioactive and Hazardous Waste Management* (Chapter 9)
 - Initial Testing, In-Service Surveillance, and Maintenance (Chapter 10)
 - Operational Safety* (Conduct of Operations/Fire Protection/Hoisting and Rigging) (Chapter 11)
 - Procedures and Training (Chapter 12)
 - Human Factors – as applicable to major modifications of existing facilities (Chapter 13)
 - Quality Assurance* (Chapter 14)
 - Emergency Preparedness Program* (Chapter 15)
 - Provisions for Decontamination and Decommissioning (Chapter 16)
 - Management, Organization, and Institutional Safety Provisions (Chapter 17)

Note: Program key element c, below, only applies to those SMPs identified above by an asterisk (*).

- b. Tank 241-Z-361 Management SHALL ensure the overall safety function of an SMP is maintained through implementation of all applicable program key attributes identified in HNF-11724, as modified by the Tank 241-Z-361 DSA. Tank 241-Z-361 Management SHALL ensure facility level assessments are performed as required by the continuous improvement process of the Integrated Safety Management System.
- c. For those SMPs identified above by an asterisk, the resulting facility-level assessment data will be provided to the appropriate program manager for tracking and trending, and corrective action management required by PRC-PRO-QA-052, *Issues Management*, or successor document.

5.6 Specific Administrative Controls/Plans and Programs

This section contains the SACs required with the issuance of DOE-STD-1186-2016, to provide increased attention and heightened assurance of effectiveness and reliability of the safety functions performed by the ACs designated as SACs.

The SACs identified in this section were designated based on their roles in the accident analyses in Section 3.4 of the Tank 241-Z-361 DSA (HNF-20503) as being relied on in preventing and mitigating postulated accident scenarios. These SACs, along with the other programmatic ACs, SHALL be established, implemented, and maintained. Designation of SACs does not reduce the requirement for compliance with the other ACs in this TSR.

TSR control implementing procedures are traceable by procedure number to specific Safety Basis requirements through the Central Plateau Risk Management (CPRM) Safety Basis Compliance Matrix. Development and maintenance of the CPRM Safety Basis Compliance Matrix is a required function for Tank 241-Z-361 operations.

5.6.1 Material Management (SAC)

This Directive Action SAC provides controls to ensure that the radioactive inventories assumed in the accident analysis will not be exceeded, which would place the facility in formally unanalyzed space. This SAC also provides controls to ensure that the interior of Tank 241-Z-361 remains disconnected from piped systems and isolated from potential sources of liquid.

MODE Applicability: This SAC is applicable during all MODES.

Location Applicability: This SAC is applicable anywhere within the TANK 241-Z-361 FACILITY BOUNDARY.

Critical Safety Function:

The Material Management control is the initial underlying assumption for the accident analysis performed in Section 3.4 of the Tank 241-Z-361 DSA, HNF-20503. The material-at-risk (MAR) limit protects accident assumptions and ensures that the consequences determined in the accident scenario are not invalidated, thereby, placing the facility in unanalyzed space. The tank isolation control ensures against possible tank overflow and precludes introducing a new potential leak path.

Control Description:

- a. Inventory Control: The MAR within the TANK 241-Z-361 FACILITY BOUNDARY SHALL remain the same or decrease; introduction of outside radiological waste material is prohibited.
- b. Tank Isolation: The interior of Tank 241-Z-361 SHALL remain disconnected and isolated from all historical PFP production piped systems.

5.7 Administrative Controls/Plans and Programs

This section contains ACs generally credited in the Safety Basis with preventive or mitigative actions.

The ACs identified in this section SHALL be established, implemented, and maintained. Designation of SACs does not reduce the requirement for compliance with the other ACs in this TSR.

If an AC element is discovered not to have been performed or not to have been followed, this would not necessarily result in a TSR AC VIOLATION. If failure to meet an AC element does not result in a TSR VIOLATION based on the criteria in Section 5.8.2, this would be reported as a noncompliance with a hazard control.

If the non-compliant condition is not managed in accordance with applicable TSR AC elements within specified limitations, the TSR AC elements will be declared “not met” and the applicable notifications and corrective actions will be pursued.

5.7.1 Nuclear Criticality Safety (AC)

This AC establishes a Criticality Safety Program and provides measures that ensure Criticality Safety Program key elements are in place to prevent an accidental criticality at Tank 241-Z-361.

MODE Applicability: This AC is applicable during all MODES.

Location Applicability: This AC is applicable where non-exempt quantities of fissionable material are present.

This AC includes the following elements:

- a. Limits and Controls - Criticality limits and controls SHALL be derived in Criticality Safety Evaluation Reports (CSER) and implemented in Criticality Prevention Specifications (CPS) and/or procedures.
- b. Engineered Safety Features - Engineered safety features important to criticality safety will be evaluated for safety significance and this TSR updated where needed as specified by the Criticality Safety Program (HNF-7098).
- c. Notification - A process SHALL be in place to provide notification, determine cause, and provide corrective action in the event a Criticality Safety Program (HNF-7098) requirement is not met.

Nonconformances - Criticality Safety Nonconformances that involve a Programmatic Noncompliance (i.e., one of the above key elements is not met) SHALL be reported as TSR AC elements not met. More serious nonconformances or infractions that indicate a programmatic breakdown that renders the DSA summary invalid SHALL be reported as TSR VIOLATIONS in accordance with Section 5.8.2.

5.7.2 Vehicle Access Control (AC)

This AC defines measures, restrictions, and actions to prevent or minimize the occurrence of vehicle or other heavy equipment impact-related accidents at Tank 241-Z-361.

MODE Applicability: This AC is applicable during all MODES.

Location Applicability: This AC is applicable anywhere within the TANK 241-Z-361 FACILITY BOUNDARY.

This AC includes the following elements:

- a. Physical Barriers: A physical barrier that spatially separates the tank from heavy equipment or vehicles SHALL be maintained to prevent loads due to vehicle traffic from travelling over the tank. The boundary SHALL surround the tank at a distance no closer than 22 ft to the tank.
- b. Vehicle Access: - Vehicles specifically permitted by facility management may access inside the TANK 241-Z-361 FACILITY BOUNDARY. Spotters SHALL be present while the vehicle is within the TANK 241-Z-361 FACILITY BOUNDARY and vehicle setback distances from the tank's edge SHALL be implemented based on engineering analysis. Engineering analysis will be formally released into a Hanford document control system.
- c. Vehicle Speed Limit: Vehicle speeds within the TANK 241-Z-361 FACILITY BOUNDARY SHALL be limited to 5 mph.
- d. Tank Load Limit: Vehicles and heavy equipment SHALL be prohibited from being driven or placed directly on top of the tank. Personnel access to the area directly above the tank SHALL be limited to activities specifically permitted by facility management and when sufficient safety controls are in place as determined by a job hazards analysis.
- e. Critical Lift Limit: Any lift over Tank 241-Z-361 SHALL be considered a critical lift and SHALL be performed in accordance with a critical lift plan per DOE/RL-92-36.

5.7.3 Excavation & Sampling (AC)

This AC defines measures, restrictions, and actions to prevent the occurrence of a tank leak.

MODE Applicability: This AC is applicable during all MODES.

Location Applicability: This AC is applicable anywhere within the TANK 241-Z-361 FACILITY BOUNDARY.

This AC includes the following elements:

- a. Excavation Limit: Only hand digging or use of the dirt vacuum extraction system ("guzzler") SHALL be permitted for dirt excavation within the TANK 241-Z-361 FACILITY BOUNDARY.
- b. Sampling Limit: Tank content sampling systems (or similar equipment) SHALL be limited to those systems and equipment that are incapable of creating a hole through the tank bottom (e.g., no core drilling, direct push mode core samples).

5.8 Reporting Requirements

5.8.1 General Requirements

Written reports and oral notifications SHALL be provided and submitted in accordance with DOE regulations regarding reporting requirements. These reports and notifications SHALL be prepared in accordance with approved procedures and SHALL be reviewed and approved by line management prior to submittal.

5.8.2 TSR Violations

A TSR VIOLATION occurs as the result of any of the following circumstances:

ACTIONS are not taken within the required time limits following:

- Failure to meet an LCO or SAC, or
- Failure to successfully perform an SR.

The following ACTION(s) SHALL be taken in the event that a LCO or SAC VIOLATION occurs:

1. Terminate ACTIVITIES IMMEDIATELY in the affected facility area except as necessary to achieve a SAFE CONFIGURATION.
2. Enter LCO for ACTION Not Met or Action Not Provided, and continue to pursue completion of required Actions.
3. Make appropriate entries documenting the violation in the facility record, indicating any operational areas affected and restrictions imposed. Maintain the status of restrictions and operational areas affected in the facility record as recovery progresses.
4. Notify RL of the VIOLATION in accordance with DOE occurrence reporting requirements.
5. Prepare an Occurrence Report. Implement the corrective action management process.

Failure to perform a Surveillance within the required time limit:

The following ACTION(s) SHALL be taken in the event of a failure to perform a SR within the required time limit:

1. Enter SR for FREQUENCY Extension and Exceptions, and perform the SR within the GRACE PERIOD or continue to pursue completion of required Actions.
2. Make appropriate entries documenting the violation in the facility record, indicating any operational areas affected and restrictions imposed. Maintain the status of restrictions and operational areas affected in the facility record as recovery progresses.
3. Notify RL of the VIOLATION in accordance with DOE occurrence reporting requirements.
4. Prepare an Occurrence Report. Implement the corrective action management process.

Failure to comply with a directive action SAC requirement:

The following ACTION(s) SHALL be taken in the event that a directive action SAC VIOLATION occurs:

1. Terminate ACTIVITIES IMMEDIATELY in the affected facility area except as necessary to achieve a SAFE CONFIGURATION.

2. Make appropriate entries documenting the violation in the facility record, indicating any operational areas affected and restrictions imposed. Maintain the status of restrictions and operational areas affected in the facility record as recovery progresses.
3. Perform and document a technical evaluation of the VIOLATION, if appropriate, to determine if any damage occurred.
4. Notify RL of the VIOLATION in accordance with DOE occurrence reporting requirements.
5. Prepare an Occurrence Report. Implement the corrective action management process.

An AC element is not met because:

- A required program has not been established.
- The program has been established but the facility has not attempted to implement the program.
- Time periods or ACTIONS specified upon failure to meet an AC key program element are not met.
- Failure to comply with the program requirements specified in this document results in multiple recurrences of a specific key element not being met indicating a programmatic breakdown.

The following ACTION(s) SHALL be taken in the event that TSR AC VIOLATION occurs:

1. Make appropriate entries documenting the VIOLATION in the facility record, indicating any operational areas affected and restrictions imposed. Maintain the status of restrictions and operational areas affected in the facility record as recovery progresses.
2. Perform and document a technical evaluation of the VIOLATION, if appropriate, to determine if any damage occurred.
3. Notify RL of the VIOLATION in accordance with DOE occurrence reporting requirements.
4. Prepare an Occurrence Report. Implement the corrective action management process.

5.8.3 AC Elements Not Met

If an AC element is discovered not to have been performed or not to have been followed, this would not necessarily result in a TSR AC VIOLATION. If failure to meet an AC element does not result in a TSR VIOLATION based on the criteria in Section 5.8.2, this would not be reported as a noncompliance with a hazard control.

Note that, if during implementation of the required program a procedural element is discovered not to have been performed or not to have been followed, then a procedural noncompliance would result, but not necessarily a TSR AC VIOLATION unless the noncompliance demonstrates a programmatic breakdown of a key element of an AC (i.e., multiple recurrences of a specific key element not being met).

The following ACTION(s) SHALL be taken in the event a TSR AC element is not met:

1. Make appropriate entries documenting the failure to meet the AC element in the facility record, indicating any operational areas affected and restrictions imposed. Maintain the status of restrictions and operational areas affected in the facility record as recovery progresses.
2. Notify RL in accordance with DOE occurrence reporting requirements.
3. Prepare an Occurrence Report and implement the corrective action management process, as required.

5.8.4 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 ACTION(s) to correct or mitigate the situation.

Site personnel may take ACTION(s) that depart from a requirement in the TSRs provided that:

1. No ACTION consistent with the TSR can provide adequate or equivalent protection,
2. These ACTION(s) are needed IMMEDIATELY to protect the health and safety of workers,
3. These ACTION(s) are needed IMMEDIATELY to protect the health and safety of the public, and/or
4. These ACTION(s) are needed IMMEDIATELY to protect the environment.

Such ACTION must be approved, at a minimum, by a qualified Operator or Supervisor. If emergency ACTION is taken, RL Facility Representative SHALL be notified per applicable company directives and procedures.

5.8.5 Occurrence Reporting Program

Occurrence reporting is completed as specified by the key attributes of Chapter 7.8 and 7.11 of the Tank 241-Z-361 DSA (HNF-20503). The noted reference provides the information specified by the guidance in DOE G 423.1-1B.

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Section 6

Design Features

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6.0 Design Features

There are no DESIGN FEATURES identified for Tank 241-Z-361. The Tank 241-Z-361 tank structure is not identified as SC or SS and no credit is taken for reduction of accident consequences in the accident analyses performed in Section 3.4 of the Tank 241-Z-361 DSA (HNF-20503). However, the Tank 241-Z-361 Boundary (including the tank roof, walls, and passive ventilation) is identified as providing defense-in-depth. All excavations, changes, or modifications to the Tank 241-Z-361 Facility or vehicle barriers are subjected to the USQ Process and not subject to change by operations personnel.

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Section 7

References

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7.0 References

- 10 CFR 830, “Nuclear Safety Management,” *Code of Federal Regulations*, Part 120, Subpart B, “Safety Basis Requirements,” as amended.
- DOE G 423.1-1, *Implementation Guide for Use in Developing Technical Safety Requirements*, U.S. Department of Energy, Washington, D.C.
- DOE-STD-1186-2016, 2016, *Specific Administrative Controls*, U.S. Department of Energy, Washington, D.C.
- HNF-11724, 2016, *CH2M HILL Plateau Remediation Company Safety Management Programs*, Rev. 14, CH2M HILL Plateau Remediation Company, Richland, Washington.
- HNF-20503, 2018, *Tank 241-Z-361 Documented Safety Analysis*, Rev. 3, CH2M HILL Plateau Remediation Company, Richland, Washington.
- PRC-PRO-EM-40360, *Building Emergency Plans and Facility Response Plans*, CH2M HILL Plateau Remediation Company, Richland, Washington, as amended.
- PRC PRO-NS-700, *Safety Basis Development*, CH2M HILL Plateau Remediation Company, Richland, Washington, as amended.
- PRC-PRO-QA-052, *Issues Management*, CH2M HILL Plateau Remediation Company, Richland, Washington, as amended.

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Appendix A

Bases

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Appendix A Bases

A5.6.1 Basis for TSR SAC 5.6.1 – Material Management

Background Summary The Material Management SAC 5.6.1 mitigates release consequences by bounding the MAR at the Tank 241-Z-361 Facility. The functional requirement of this SAC is to protect the analytical assumptions on MAR used in the accident analyses in Chapter 3 of the Tank 241-Z-361 DSA. The discussions below provide the bases for the MAR limit imposed by this SAC, and the actions to be taken if conditions are discovered that do not comply with this SAC.

Application to Safety Analysis This SAC is applicable to all accidents at Tank 241-Z-361. Source term limits serve to preserve accident analysis assumptions, and the SAC is credited with bounding potential dose consequences. Criticality Safety CSERs use the assumptions protected by this control, as well.

SAC 5.6.1 This control provides the following elements:
SAC 5.6.1.a This control prohibits the introduction of outside radiological waste material.
Inventory Control This control maintains the Tank 241-Z-361 Facility radiological inventory as defined in the DSA, and does not apply to non-waste items such as detector calibration and check sources required to conduct operations.
Restoration of the SAC element would include the notification to management of a procedure violation, and the verification that outside radiological waste has been removed to an approved location, in its entirety.

SAC 5.6.1.b This control prohibits the intrusion of liquids or waste into the tank.
Tank Isolation This control maintains that the Tank 241-Z-361 Facility is not reconnected to any historical piped systems and remains isolated from potential sources of liquid. This control maintains that the Tank 241-Z-361 Facility will not be returned to service but may be connected to systems for stabilization purposes.
Restoration of the SAC element would include the notification to management of a procedure violation, and the verification that the tank has been isolated and all piping systems disconnected.

MODE AND LOCATION APPLICABILITY This SAC is applicable during all MODES. This SAC is applicable everywhere within the facility boundary.

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