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FINAL REPORT

FOR THE RESTART OF THE

WASTE CHARACTERIZATION, REDUCTION AND REPACKAGING FACILITY (WCRRF)

CONTRACTOR READINESS ASSESSMENT (CRA)

Dated
February 17, 2017

OS-DO-RA-17-001R

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Acronyms

ADEM	Associate Directorate for Environmental Management
ADNHHO	Associate Directorate for Nuclear and High Hazard Operations
AGS	American Glovebox Society
AIB	Accident Investigation Board
ALARA	as low as reasonably achievable
AOP	abnormal operating procedure
AP	administrative procedure
ARTIC	Actinide Research and Technology Instructional Complex
Be	beryllium
BIO	Basis for Interim Operations
BS	Bachelor of Science degree
CAM	continuous air monitor
CAP	corrective action plan
CFR	Code of Federal Regulations
CIP	container information package
CM	configuration management
ConOps	conduct of operations
CR	core requirement
CRA	Contractor Readiness Assessment
CRAD	criteria and review approach document
CSA	criticality safety analyst
CSE	cognizant system engineer
CSED	criticality safety evaluation document
CSO	criticality safety officer
CTAP	Compliance Technical Assistance Program
CVS	confinement ventilation system
DAR	document action request
DEP	deployed environmental professional
DOE	Department of Energy
DOE-EM	DOE Office of Environmental Management
EDS	electrical distribution system
EM-LA	DOE EM Los Alamos field office
EPHA	emergency planning hazards assessment
ESH	environment, safety & health
ESS	Evaluation of the Safety of the Situation
EWMO	Environment and Waste Management Facility Operations
FE	facility evaluation
FGE	fissile gram equivalent
FHA	fire hazards analysis

FMH	fissile material handler
FMH	fissile material handler
FMOR	fissionable material operational review
FOD	Facility Operations Director
FP	fire protection
FP-DO	Fire Protection Division Office
FPE	fire protection engineer
FRA	federal readiness assessment
FSR	facility service request
FSS	fire suppression system
FY	fiscal year
HA	hazard analysis
HAZCOM	hazard communication
HC	hazard category
HEPA	high-efficiency particulate air
HWFP	hazardous waste facility permit
IH	industrial hygiene
IP	implementation plan
IS	industrial safety
ISI	in-service inspection
ISM / ISMS	integrated safety management / integrated safety management system
IT&M	inspection, testing, and maintenance
IVR	implementation verification review
IWD	integrated work document
LAFD	Los Alamos Fire Department
LANL / Laboratory	Los Alamos National Laboratory
M&TE	measurement and test equipment
MAR	material-at-risk
MEL	master equipment list
ML / MLD	management level / management level determination
MOT	management oversight team
MOV	management observation
MRB	management review board
MS	Master of Science degree
MSA	management self-assessment
NA-LA	Los Alamos DOE field office
NCR	nonconformance report
NCS	nuclear criticality safety
NCSD	NCS Division
NFPA	National Fire Protection Association
NMED	New Mexico Environment Department

NNSA	National Nuclear Security Administration
O	order
OFI	opportunity for improvement
OIT	operator interface terminal
OJT	on-the-job training
ORM	operations responsible manager
ORS	operations responsible supervisor
OSH	occupational safety & health
PC	performance category
PE-Ci	plutonium-239 equivalent curies
PFITS	Performance Feedback and Improvement Tracking System
PIC	person in charge
PISA	potential inadequacy of the safety analysis
PMT	post-maintenance testing
POA	plan of action
POC	pipe overpack container
PPE	personal protective equipment
PRDwSF	pressure relief device with supplemental filtration
QA	quality assurance
QAP	quality assurance plan
QEV	qualified evaluator
R2A2s	roles, responsibilities, authorities, and accountability
RANT	radioassay and nondestructive testing
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
RNS	remediated nitrate salt
RP	radiological protection
RPP	radiological protection program
RWP	radiological work permit
SAT	systematic approach to training
SBDL	safety basis document list
SEO	Security and Emergency Operations Emergency Management
SHR	system health report
SME	subject matter expert
SMP	safety management program
SOM	shift operations manager
SR	surveillance requirement
SSCs	structures, systems, and components
SSW	senior supervisory watch
STD	standard
TA	technical area

TPP	training program plan
TRU	transuranic
TSR	technical safety requirement
UNS	unremediated nitrate salt
UPS	uninterruptible power supply
USQ / USQD	unreviewed safety question / unreviewed safety question determination
VSS	vital safety system
VSSA	vital safety system assessment
WCATS	Waste Compliance and Tracking System
WCG	waste characterization glovebox
WCRR / WCRRF	Waste Characterization, Reduction and Repackaging Facility
WD	Waste Disposition
WD-WPE	Waste Process Engineering
WD-WT	Waste Treatment
WMC	waste management coordinator
WO	work order
WQAS	Worker Qualification Authorization System

Executive Summary

The Los Alamos National Laboratory (LANL or Laboratory) Contractor Readiness Assessment (CRA) required for restart of the Technical Area (TA) 50 Waste Characterization, Reduction, and Repackaging Facility (WCRRF) for remediated nitrate salt (RNS) waste operations was performed in compliance with the requirements of Department of Energy (DOE) Order (O) 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*, and LANL procedure FSD-115-001, *Verification of Readiness to Start Up or Restart LANL Nuclear Facilities, Activities, and Operations*.

The CRA was conducted from January 30 – February 10, 2017, in accordance with the approved plan of action (POA), WCRR-PLAN-1388, R0, *Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF)*, approved October 12, 2016, and implementation plan (IP) OS-DO-RA-17-001P, R1, *Implementation Plan (IP) for the Restart of The Waste Characterization, Reduction and Repackaging Facility (WCRRF) Contractor Readiness Assessment*, dated February 6, 2017.

The CRA confirmed that the preparation, documentation, verification, and approval processes for the restart of the WCRRF for RNS waste operations performed at TA-50 are adequate for the planned activities.

The scope of operations to be authorized following completion of readiness assessment activities included the WCRR facility, personnel, procedures, and processes to safely treat and repackage the RNS wastes in 60 RNS containers that will be transported from TA-54, Area G, to WCRRF.

The CRA team was led by Mr. Greg Stephens, and Mr. Chip Lagdon served as the team's senior advisor. Eleven other team members were selected by the team leader based on their relevant experience in management, nuclear operations, engineering, nuclear criticality safety, quality assurance, maintenance, fire protection, and safety management; expertise in their assigned areas of review; and freedom from conflict of interest in their assigned review area. Team members conducted their reviews, inspections, interviews, and observations in accordance with the sixteen criteria and review approach documents (CRADs) of the IP.

During the course of the review, more than 900 documents were reviewed, more than 45 interviews were conducted, and more than 45 observations of evolutions (including pre- and post-job briefings, work performance demonstrations, and facility and equipment walkdowns) were conducted. The results of the team's evaluations were documented on Assessment Forms (Form 1s) in Appendix 1.

POA Core Requirement (CR) 1 (implementation of safety management programs [SMPs]) was demonstrated by interviews and evaluation using the following CRADs: CS1, EM1, ENG1, FP1, MN1, MN2, OPS1, OPS2, OSH1, QA1, RP1, SB1, TQ1, WM1. Objective MG1 served as a consolidation and integration mechanism for the results and conclusions of those SMP-related CRADs.

The CRA team concluded, based on interviews and observations, that several important elements of an effective safety culture were evident among the WCRRF team. Examples are:

- Strong understanding of performance expectations, including the expectation of the entire workforce to pause or stop work when things do not look or feel right,
- Sufficient knowledge and acceptance of the operations restart process following a pause/stop work,
- Healthy safety attitude and willingness to raise safety, nuclear safety, quality, or other issues without fear of retribution,
- Respectful attitude towards coworkers, evaluators, leadership and oversight personnel, and
- Excellent conduct of operations (ConOps) commitment evidenced by the performance of evolutions.

The CRA team identified five pre-start findings (see Table ES1) and no post-start findings. The CRA team determined that fifteen out of the sixteen CRA objectives were met. The CRA team concluded that, subject to satisfactory resolution of the pre-start findings identified by the CRA team, LANL has adequately demonstrated readiness for equipment, procedures, and personnel to support WCRRF RNS operations safely in a nuclear environment.

TABLE ES1 LIST OF PRE-START FINDINGS

Finding Number	Description
MG2-PRE-1	The startup plan lacks sufficient definition in terms of acceptable operational performance with surrogate materials before commencing actual RNS waste operations in WCRRF; it does not adequately address transition from ARTIC to WCRRF prior to authorization to startup; and it does not include sufficient acceptance criteria for stepping out of management oversight and SSWs.
OPS2-PRE-1	The operations procedures necessary for WCRRF RNS waste processing operations lacked adequate field validation with appropriate personnel. Additional effort is necessary to ensure they can be performed as intended and achieve the desired consistency of performance.
TQ1-PRE-1	The current documented basis for determination that FMH certification is not required for process operators in EWMO facilities is inadequate.
TQ1-PRE-2	WCRRF maintenance training has been developed but has not been effectively implemented. Maintenance personnel lack required training on VSSs.
WM1-PRE-1	The version of WCATS currently being used is a beta version of the software. The production version must be tested and in use prior to beginning RNS operations.

1.0 Introduction

1.1 Facility Description

The WCRRF is located in the northwest corner of TA-50 at LANL. The facility is south of Pecos Drive and west of building TA-50-0037 (the Actinide Research and Technology Instructional Complex [ARTIC] facility). The WCRRF is comprised of building TA-50-0069 and a partially fenced, partially paved outside yard containing support facilities, equipment, and transuranic (TRU) waste container (transportainer) staging areas.

The WCRRF was constructed in the mid-1980s with an initial mission to sample, examine, characterize, reduce the volume, and repackage a variety of TRU wastes. The WCRRF operations are carried out in building TA-50-0069 and in outdoor waste staging areas. Building TA-50-0069 and the outdoor waste staging areas comprise the WCRRF site.

The building TA-50-0069 structure is rated at performance category (PC) 2 for seismic, wind, and snow. It is the only nuclear facility at LANL that has a ready capability to remediate or repackage TRU waste containers with material-at-risk (MAR) greater than 56 plutonium-239 equivalent curies (PE-Ci).

The current WCRRF mission has been identified as critical for the National Nuclear Security Administration (NNSA) and LANL to eliminate the hazards associated with the RNS waste. The WCRRF is a permitted treatment storage disposal facility.

Building TA-50-0069 is a small, one-story steel-frame building and is used primarily for waste remediation and repackaging activities, specifically in the waste characterization glovebox (WCG). These activities are conducted in a process area that is serviced by the building's ventilation system (including HEPA [high-efficiency particulate air] filtered exhausts), a fire suppression system (FSS), radiation monitoring, and other support systems. The primary equipment in the building used for waste processing activities is the WCG. Other ancillary structures, including office trailers and electrical power distribution equipment, are also located in the yard area. An auxiliary diesel generator supporting the WCRRF is installed just inside the WCRRF boundary.

A vehicle access system is established around the WCRRF during "warm standby" and "operation" modes. This system is defined by vehicle barriers and administrative procedures. Gasoline-, diesel-, propane-, or other combustible-fueled vehicles or forklifts are not used inside the vehicle access system, except for delivery of the RNS waste into the yard and pickup of TRU waste from the yard.

Primary confinement inside TA-50-0069 is provided by TRU waste containers, as well as by the WCG. Final confinement is provided by the building structure (roof, walls, and slab), HEPA filter banks, and airlocks. In addition to maintaining appropriate air quality in the building, the ventilation systems provide differential pressure control and filtration functions; these limit contamination spread and mitigate potential releases. The TRU waste containers acceptable for use at WCRRF have a filtered vent and are of steel construction.

The WCG is similar to many gloveboxes used at LANL. It has three drum ports and is equipped with glove ports. One 55-gal drum port is located on the side of the glovebox. The WCG also has an introductory box to pass tools and other supplies to the glovebox. The WCG is maintained at a negative pressure with respect to the main process area by exhausting air from the WCG to the exhaust ducts that lead to a HEPA filtration unit on the mezzanine; the air is then exhausted from the building. The WCG has two HEPA-filtered intakes and two HEPA-filtered exhaust lines that are combined into a single exhaust line. The exhaust from the WCG goes through HEPA canisters located on the glovebox. The exhaust flow then passes through a spark-arrestor screen, prefilters, HEPA filters, and fan, and then out the glovebox exhaust stack.

The WCG instrumentation includes differential pressure gauges, which are connected to the automated ventilation system operator interface terminal (OIT). Loss of negative pressure in the WCG caused by changes in the exhaust flow rate or glovebox confinement activates warning alarms on the OIT. Operators have the opportunity to check the pressure differential locally by using the Magnehelic® gauges mounted on the WCG. A camera system has been installed that permits recording and remote monitoring of WCG operations. The WCG is equipped with a horizontal sidewall sprinkler connected to the building FSS. The seismic capacity of the WCG and the lift rack immediately adjacent to the glovebox has been evaluated to meet PC-2 natural phenomena hazard seismic criteria. A seismic expansion joint allows the sprinkler system component mounted to the glovebox to move independently from those that are supported by the building structure.

The structure, which includes the roof, walls, and cement slab floor, provides final confinement in the event of a release of radioactive material inside the building. The metal roof deck is supported by a bar joist which spans between load-bearing stud walls. The exterior walls are constructed of structural steel-stud framing with a plaster finish. Penetrations through the exterior walls typically include ductwork, electrical conduit, breathing air lines, and personnel and vehicle doors. Equipment penetrations are sealed. Building TA-50-0069 has a vehicle airlock that is used for moving waste containers to and from the main process area. The airlock is separated from the outside environment and the main process area inside the building by a pair of overhead rollup doors. One door opens to the outside, and the other door separates the main process area from the vehicle airlock. The vehicle airlock also helps ensure that the building is maintained at a negative pressure relative to the outside environment, while personnel and materials move to and from the building. In addition to the rollup doors, there are personnel doorways into the vehicle airlock from the outside and into the main process area from the airlock. Two sets of personnel access doors are on the west side of the building. These doors and the spaces between each pair of doors serve as airlocks to maintain building confinement.

Firefighting water is gravity-fed from a 500,000-gal storage tank that supplies water to all TA-50 facilities. A 12-in. water main supplies water to an 8-in. WCRRF water line. The 8-in. water line supplies a hydrant and water to two separate lines: a 2-in. domestic line and a 6-in. fire line. This 6-in. fire line provides firefighting water to TA-50-0069. A single FSS is provided for TA-50-0069, including the WCG, and consists of a wet-pipe sprinkler system that protects the building. Fire sprinkler water flows from the building floor drains through a common drain line that flows to the Radioactive Liquid Waste Treatment Facility. Activation of the building, WCG, or glovebox enclosure sprinkler heads automatically activates the fire alarm panel and transmits

a fire alarm signal to the Los Alamos Central Alarm Station. Fire alarm pull stations located by exit doors also transmit a fire alarm to the Central Alarm Station. The Central Alarm Station dispatcher notifies the fire department. The fire alarm panel is equipped with a backup battery in case of power failure. With a fire localized to the WCG, the single sidewall sprinkler inside the WCG should activate independently of the building sprinklers, limiting the volume of fire suppression water generated in the event of a glovebox fire.

Continuous air monitors (CAMs) are located throughout TA-50-0069 to monitor airborne radioactivity. Each CAM has a visual sample airflow meter and a local alarm for low airflow and radiation. Service checks and filter changes are conducted regularly. The CAMs are located throughout the facility at key locations to take advantage of airflow patterns and to be in close proximity to material-at-risk. In the event of an electrical failure, CAMs receive emergency power from an uninterruptible power supply (UPS).

The auxiliary diesel generator provides long-term backup power once it picks up the loads. In addition, fixed-head air samplers are scattered throughout the building to provide more accurate airborne radiological data. The samples they collect are analyzed regularly to monitor airborne radioactive materials during normal operation. Vacuum pumps are located outside building TA-50-0069 to support CAMs and fixed-head air sampling.

Telephones are installed throughout the WCRRF. Red-light beacons installed outside TA-50-0069 above personnel doors provide notification when hazardous activities such as operations requiring respirators are being performed in the building. Automatic alarms, both visual and audible, are installed in the OIT unit.

The lightning protection system for building TA-50-0069 consists of multiple, independent earth-grounded conductors connected to a grounding grid. These systems are maintained operable in accordance with National Fire Protection Association (NFPA) 780.

Electrical power is supplied to the WCRRF by 13.2-kV/480V 225 kVA transformer and is located more than 25 ft. northeast of building TA-50-0069. The transformer supplies power to building TA-50-0069 and office building TA-50-0084.

A 100-kW, 125-kVA auxiliary diesel generator supplies power for WCRRF confinement ventilation system in the event that normal site power fails. The generator is mounted on a concrete pad approximately 28 ft. east of the northeast corner of TA-50-0069, just inside the WCRRF boundary. The diesel fuel tank is double-walled to contain potential leaks from the primary tank. The auxiliary generator is connected to the electrical distribution system (EDS) through an automatic transfer switch. When the switch detects a loss of utility power, it signals the generator to start. The transfer switch does not have built-in load sequencing capability. An UPS is located in the vehicle airlock, with output to continuous air monitors and the ventilation control system.

During the CRA, the bulk of the operations and evolutions witnessed were performed in ARTIC. The ARTIC facility provides a favorable environment for operational evolution practice and for evaluation of operational readiness, due to its close proximity, lack of radiological restrictions,

and the fact that it closely matches the process footprint of WCRRF. During the CRA, the team evaluated the differences between the two facilities and drew conclusions regarding the readiness of WCRRF based on the fidelity and the performance of the operations staff under the mock environment in ARTIC. The team concluded that this was a reasonable approach after evaluation and discussion of the key parameters involved in the evolutions and procedure executions required for processing RNS waste. The operational differences are highlighted and addressed in the startup plan. Upon resolution of findings OPS2-PRE-1 and MG2-PRE-1, the startup plan and operating procedures should contain sufficient detail and instruction to start up WCRRF for RNS operations successfully.

1.2 Recent Operational Background

Operations involving the specific materials, waste treatment and mixing protocols, and processes required to remediate the materials in the 60 RNS containers drums have not been previously accomplished at WCRRF, although similar waste handling activities have been successfully executed in the past.

The activities within the scope of this CRA include remediation of RNS containers of waste that will be transported to WCRRF, unpackaged, treated, and repackaged to eliminate the likelihood of corrosion or deflagration of materials in the drums.

This action is being taken as a result of a potential inadequacy of the safety analysis (PISA), which was declared for TA-54 Area G Basis for Interim Operations (BIO) because of concerns for an increased likelihood of previously analyzed accident scenarios for TRU waste drum deflagration and fire events, and also because of concerns that adequate controls may not be in place for such events. The PISA is documented in Occurrence Report NA-LASO-LANL-WASTEMGT-2014-0004, PISA: *TRU Waste Drums Containing Treated Nitrate Salts May Challenge the Safety Analysis*, dated May 20, 2014. The PISA declaration was based on information received by the Facility Operations Director (FOD) on May 15, 2014, that a TRU waste drum shipped from LANL had breached while in storage at the Waste Isolation Pilot Plant in Carlsbad, New Mexico, resulting in the release of some undetermined fraction of its contents on February 14, 2014.

In response to the PISA, operational restrictions were implemented at LANL to secure RNS drums for storage at Area G. In accordance with the PISA process, an Evaluation of the Safety of the Situation (ESS) was developed and approved for the storage and monitoring of the RNS waste containers. Full recovery and closeout of the PISA conditions requires treatment and stabilization of the nitrate-salt-bearing waste. The programmatic decision was made and approved by DOE to perform these operations at the WCRRF.

The following additional or modified activities, which are described in a submitted BIO Attachment and associated page change are new to the waste characterization, reduction, and repackaging processes at the TA-50 facility: 1) receipt of waste containers that are not type A rated; 2) movement of waste containers in and out of a refrigeration unit; and 3) adding liquids to waste materials and the use of blending tools and equipment inside the WCG.

The treatment of RNS waste is necessary to eliminate the waste's ignitability and corrosivity characteristics, thereby allowing for future disposal of the waste and achieving closure of the outstanding RNS PISA condition at Area G.

This activity is categorized as a restart after an extended shutdown exceeding twelve months for a hazard category (HC)-2 or -3 facility, activity, or operation. Prior to resuming operations the Los Alamos DOE field office (NA-LA) has directed that a NNSA federal readiness assessment (FRA) be conducted. Per the requirements of FSD-115-001, a CRA must be performed prior to the FRA. The CRA was performed commensurate with various factors, including the relative risk to the worker, the risk to the public in the event of an accident, the level of confidence in controls and mitigating systems, the breadth of scope described in the POA, and the depth of inquiry detailed in the CRADs contained in the IP.

1.3 Purpose and Scope of the Contractor Readiness Assessment

The purpose of the CRA was to provide a confirmatory review of the readiness of the WCRR facility, personnel, procedures, and processes to commence operations within WCRRF and to treat the remediated nitrate salt waste currently stored at Area G safely. It was not intended that the CRA duplicate the activity of previous reviews; rather this assessment provided a balanced, performance-based evaluation of the level of overall readiness to execute the defined scope. The approaches and methodologies identified in the IP were used to verify that the EWMO FOD has provided reasonable assurance for adequate protection of workers, the public, and the environment in preparation for WCRRF restart and execution of RNS waste treatment.

The scope of this CRA was defined in WCRR-PLAN-1388, R0, *Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF)*, as approved by the Startup Authorization Authority, the Associate Directorate for Nuclear and High Hazard Operations (ADNHHO).

As specified in the approved WCRRF POA, the CRA will focus on assessing the equipment, personnel, safety features, and operating procedures for WCRRF, and direct support systems provided by the WCRRF facility that houses the activities. It will address the adequacy of implementation of the BIO and the technical safety requirements (TSRs), including identified controls, as approved through the DOE review and approval process.

The scope of the review includes all equipment, personnel, documentation, and interfaces associated with the operations shown in Table 1.

Table 1, Waste Operating Processes and Procedures for WCRRF

Location	Process Activities	Procedures	Lead Group	Performance Demonstration
WCRRF	WCRRF Facility Rounds	WCRR-FO-DOP-1397, *WCRRF Rounds Sheets*	EWMO personnel	Selected for Demonstration [WCRRF facility]

Location	Process Activities	Procedures	Lead Group	Performance Demonstration
WCRRF	RNS waste container unloaded from transport vehicle RNS waste container transferred to WCRRF refrigerator	WCRR-WO-DOP-1378, *WCRRF RNS Waste Container Receipt and Handling*	Waste Disposition-Storage and Shipping [Area G, Dome 375 personnel]	Selected for Demonstration [WCRRF facility]
WCRRF	RNS parent waste containers removed from WCRRF refrigerator Waste drum moved from refrigerator to WCRRF Waste Characterization Glovebox (WCG) Parent waste container secured in drum lift PRDwSF removed Parent waste container docked on WCG with drum lift Parent waste Container bagged on Over-packing empty parent drum into 85-gallon over-pack. [Bag-off, at evolution end] [DOP also includes undocking and closing of parent drum]	WCRR-WO-DOP-1380, *WCRRF Waste Characterization Glovebox Parent Drum Operations*	Waste Disposition-Waste Treatment	Selected for Demonstration [Mock-up, ARTIC facility, TA-50-0037] Discussed but not physically demonstrated
WCRRF	Daughter Drums bagged off and secured	WCRR-WO-DOP-1381, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*	Waste Disposition-Waste Treatment	Selected for Demonstration [Mock-up, ARTIC facility, TA-50-0037]
WCRRF	Remove lid/ring to RNS drum. RNS waste removed from parent drum	WCRR-WO-DOP-1376, *WCRRF RNS Waste Treatment*	Waste Disposition-Waste Treatment	Selected for Demonstration

Location	Process Activities	Procedures	Lead Group	Performance Demonstration
	RNS waste segregated RNS waste remediated with water and zeolite and placed into RNS treated waste daughter drum WypAll® Rags blended and treated as RNS waste. Debris wiped down and placed into debris daughter drum RNS treated waste placed into daughter drums WCG cleanup Waste records/documentation [Parent Drum Closure occurs in processing flow here, in accordance with WCRR-WO-DOP-1380, *WCRRF Waste Characterization Glovebox Parent Drum Operations*]			[Mock-up, ARTIC facility, TA-50-0037]
WCRRF	Waste containers identified for shipment back to Area G Waste containers moved to WCRRF moved to loading pad and on to transport vehicle	WCRR-WO-DOP-1379, *WCRRF Waste Container Shipment Preparation*	Waste Disposition-Storage and Shipping	Tabletop Review/Discussion Discussed but not physically demonstrated
WCRRF	Exercise WCRRF Drum Lift	WCRR-WO-DOP-1380, *WCRRF Waste Characterization Glovebox Operations*	Waste Disposition-Waste Treatment	Selected for Demonstration [TA-50-0069 WCRR facility and equipment or mockup demonstration in ARTIC] Discussed but not physically demonstrated in WCRRF

The scope of the CRA field demonstrations included activities that demonstrated the full scope of WCRRF operations. The demonstrations employed surrogate material where necessary to simulate the use of actual waste. In some cases, actual material or a surrogate could not be employed in the demonstration due to material compatibility, potential contamination of the process equipment, or the potential to damage the equipment. In those instances, the process steps were simulated using methods predefined by facility personnel or using methods jointly developed by the CRA team and facility personnel during the assessment. All personnel, procedures, and equipment associated with the operations listed in Table 1 were within the scope of this assessment.

The demonstrations were intended to complement the CRA team's documentation reviews and personnel interviews by providing the team with a broad examination of the operations in the field, personnel knowledge and performance, safety-class and safety-significant structures, systems, and components (SSCs) that are in play at the WCRRF. The CRA also evaluated:

- Facility configuration, confinement enclosures, gloveboxes, process equipment, WCRRF facility interfacing systems, and safety systems relevant to WCRRF RNS operations.
- Closure of pre-start actions resulting from the WCRRF MSA and implementation verification reviews (IVRs) performed prior to the CRA.
- The adequacy of the implementation of the integrated safety management (ISM) program.
- Prerequisites and the ability of the facility to meet those requirements.
- The manageable list of open pre-start issues, and Accident Investigation Board (AIB) corrective action plan (CAP) actions that can affect WCRRF RNS restart
- The startup plan to ensure the transition to operations from the completion of readiness verification activities is appropriate for the facility being restarted.

The operating procedures selected for demonstration were bounding for the described waste container being secured to the WCG drum lift, raised, and docked to the WCG. Evolutions included treatment of RNS waste using water and zeolite, waste segregation, and management of daughter drums. The development and management of treatment records, along with waste shipment documentation and managing waste transfers in Waste Compliance and Tracking System (WCATS), was also reviewed. Other activities selected for demonstration included moving waste containers from the LANL Packaging and Transportation group's transport vehicle and the WCRRF loading dock. For those activities selected for demonstration, the WCRRF and related facility systems (e.g., WCRRF refrigerator, WCG, and other facility systems) were included in the TA-50-0069 facility tour.

Activities such as facility rounds, unloading of RNS containers from the transport vehicle, and moving the container into the WCRRF refrigerator were demonstrated in the WCRRF. Waste treatment was demonstrated in the nearby ARTIC facility. The ARTIC facility included high-fidelity equipment mock-ups (e.g., virtually identical WCG drum lift device and WCG). The demonstrated activities did not involve nuclear material, but instead included a drum of simulated RNS waste. Shipping and waste manifest documentation as well as waste transfer entries in WCATS were developed and performed as described in associated operating procedures but did not correspond to actual RNS waste.

Activities demonstrated for the CRA included integrated activities between waste personnel, facility operation personnel, and Packaging and Transportation; the transfer of waste and verification of acceptability of new location for waste in WCATS; and physical movement of the waste in containers. WCRRF programs were included in the scope of review of site infrastructure and programs during this CRA. This CRA assessed all CRs referenced in DOE Order (O) 425.1D, V*erification of Readiness to Start Up or Restart Nuclear Facilities*, Attachment 1, *Contractors Requirement Document (CRD)*, as implemented through LANL FSD-115-001; no CRs were excluded from this assessment.

1.4 Description of RNS Processes and Activities

WCRRF RNS processes and activities are summarized and fully described below. Details include process parameters, process equipment, control systems, and operational considerations.

The operations conducted at WCRRF consist of the following activities:

- Unload waste container and transfer to TA-50-0069
- Transfer to the waste container cooling unit
- Bag-on container to the glovebox and remove lid
- Remove contents and segregate
- Blend RNS waste and place into daughter drum
- Wipe down and place debris into daughter drum
- Bag-off and lid all drums
- Record-keeping
- All facility support operations

Processing of the RNS waste requires that 60 containers be transported from TA-54, Area G, to WCRRF. Waste containers include a recently installed safety-class pressure relief device with supplemental filtration (PRDwSF), on all but the four POCs in 85-gallon containers. Support activities include, denesting all RNS containers (48 drums and eight POCs in SWBs and four POCs in 85-gallon overpacks) within the 54-0375 Perma-Con®, and transporting waste drums using a LANL vehicle approved by the transportation safety document, with PRDwSF assemblies attached as needed (all but the four POCs in 85-gallon containers).

Transport to the receiving area is covered by an approved transportation safety document and is not within the scope of this review. All normal health & safety, radiological, environmental, and safety basis control activities are within the scope of this activity.

Unload and transfer RNS container(s)

Unloading involves moving the RNS waste container(s) from the transport vehicle using manual drum handling equipment. The transport vehicle is driven into the WCRRF yard where the trailer is backed to the TA-50-0069 vehicle airlock pad. The cab remains downslope from the airlock. It is during this part of the operation that a visual inspection of the waste container is performed to ascertain container integrity (e.g., properly secured PRDwSF for applicable container). Radiation surveys of the container are also performed. Metal pallets are used as needed. A spotter and stationary fire watch are present during this phase of the operation and whenever the RNS waste

container(s) is moved. Upon completion of the inspection, the container will be transferred from the vehicle to the building TA-50-0069 Vehicle Airlock pad.

Staging container on building floor or in refrigerator

Offloading of the RNS waste container is performed using a manually operated lift device to place the drum on other handling equipment (e.g., dollies, pallet jack, or hand truck) in the High Bay Area outside of the refrigerator. Twelve of the RNS containers are in pipe overpack containers (POCs). Four of these are in 85-gallon overpacks. The four POCs in 85-gallon overpacks do not have a PRDwSF; however, these four were processed with Waste Lock® 770 rather than sWheat® kitty litter, have been analyzed, and were determined to present minimal hazard for thermal runaway. At this point, either the container will be immediately bagged on to the WCG or it will be placed into the refrigerator, where it will be maintained at ≤ 57°F as a defense-in-depth measure.

RNS container preparation and bag-on to WCG

Field preparation inspections are performed and results recorded as part of the parent drum preparation activities. The parent waste container is positioned and secured onto the WCG port door by using the electronically operated drum lift fixture. The lift rotates the drum to the horizontal position and lifts it to the entry port. The drum is bonded to the WCG with a cable and clamps to prevent electrostatic discharge between the WCG and the drum. If installed, the PRDwSF is removed with nonsparking tools prior to drum lift.

Remove drum contents and segregate

Once the RNS waste container is bagged on to the WCG, nonsparking hand tools are used to loosen and remove the lid. The contents of the RNS container will be examined to separate the debris from RNS bearing waste in preparation for treatment. Solid samples will be collected from six RNS waste containers during this phase of the operation, with drum 68685 (sister of the incident drum at the Waste Isolation Pilot Plant) as one of the containers that must be sampled. The collected sample analysis is out of scope. All contents will be treated in accordance with WCRR-WO-DOP-1376, *WCRRF RNS Waste Treatment*. The drum will be verified empty.

Blend RNS waste and place into daughter drum(s)

Mixers and a blender located in the WCG are used to ensure the waste being treated is thoroughly mixed. Volumetric containers are used to measure the ingredients (water, waste, and zeolite). Waste removed from the waste container will be collected in a container then moved to the mixers for treatment. Water will be delivered to the mixer by piping through the WCG patch panel. The liquid contents of the RNS containers will be decanted from the parent waste container, absorbed with zeolite, captured, and added to the mixer, then further blended with zeolite. The volumetric blend ratios are the guiding requirements for the process. The waste will be blended to the appropriate ratios of waste to water to zeolite in accordance with permit requirements. Waste treatment of the solid RNS-bearing waste will occur by adding a premeasured amount of water to the mixing bowl. A premeasured quantity of waste will then be

added to the mixing bowl and mixed. Then zeolite will be added to the blender for the final combination with the waste/water mixture.

Return debris into parent/daughter drum(s)

Most debris within the waste containers does not require additional treatment and will be placed into a daughter waste container. Cellulosic material found within the parent container that requires additional treatment (e.g., cheese cloth, WypAlls®, etc.) will either be macerated with water using a high speed blender and then mixed with zeolite or size reduced by hand and hand-mixed with zeolite. Waste placed into daughter drums will be from a single parent drum.

Bag-off and close all drums

Once the parent waste container has been properly secured, it will be lowered using the drum lift fixture and the bag-off bag inspected for damage. The parent waste container is then transferred to another area of room 102 in building TA-50-0069. At this point in the process, the contents of the drum will no longer carry the hazardous characteristic of ignitability. The daughter drum(s) will be removed from the lift table to the drum dolly and applicable inspections performed before transferring the container to another area building in TA-50-0069. Dollies, pallet jacks, or hand trucks can be used to move the daughter waste containers. At this point, the treated waste is considered TRU inventory and covered by the existing WCRRF BIO. Subsequent movement of the waste daughter drums to Area G is outside the scope of this CRA.

Glovebox operations and maintenance activities

Common operational steps are the bag-on and bag-off steps used to connect and remove drums or other containers from the WCG. Bag-on and bag-off steps ensure contamination and radioactive material control when attaching or removing drums from the glovebox. Consumable plastic sleeves, bags, and sealing devices such as straps and tape are used for bag-on or bag-off. Container lids are installed in accordance with the manufacturer's instructions and LANL procedures. Routine glovebox maintenance includes replacing glovebox inlet HEPA filters and changing gloves, glass panels, seals, or other mechanical items when necessary.

Facility support operations

Other facility support activities will be required to perform the RNS processing. These activities include operations center tasks for access control, waste processing and production control coordination, and work control. TSR surveillances and in-service inspections (ISIs) will be performed as required, as will facility rounds and routines. Environmental inspections and waste management practices will be performed as required. Preventative and corrective work packages will be performed as required to support facility operations. Additionally, all routine health, safety, and radiological practices will be within the scope of this review.

Mock waste operations will be performed and observed. This includes a variety of operations such as waste receipts, waste movements, PRDwSF assembly removal, denesting containers,

MAR tracking, bag-on/bag-off evolutions, glovebox operations involving RNS treatment, and abnormal events associated with operational upsets, as well as emergency response.

1.5 Definition of Safety SSCs within the scope of this CRA

The scope of this CRA included ten safety SSCs and excluded three. The SSCs included in the scope of this CRA are shown in Table 2. The excluded SSCs were:

- Two transportainers (commercial cargo containers), identified as structures 50-075 and 50-384 were located in the yard area southwest of TA-50-0069. These transport containers were normally used for staging and inspection activities involving TRU waste containers. These structures will not be used for the RNS waste treatment campaign, since they are precluded per the BIO attachment, and, as such, were not included in the scope of this CRA.
- An additional walk-in glovebox enclosure was present in building TA-50-0069 and was under ventilation control, but will not be used for this waste campaign and was not included in the scope of this CRA.

Table 2, Credited Safety SSCs

Control	Classification	Safety Function and Description
Vehicle Barriers	Safety-Class Design Feature	Prevent impacts between moving vehicles and TRU waste containers staged inside buildingTA-50-0069 and prevent subsequent vehicle fuel pool fires involving TRU waste as a result of the separation distance between pooled fuel and the TRU waste containers.
TRU-Waste Container	Safety-Significant (Inside)	Provide primary confinement for TRU waste. Mitigate releases of TRU waste subjected to mechanical stresses from postulated accidents. Mitigate releases of TRU waste subjected to thermal stresses from postulated accidents. Prevent accumulation of flammable gases inside the TRU waste containers.
Building TA-50-0069 and WCG FSS	Safety-Significant	Limit the size and duration of fires in the WCG and in building TA-50-0069, thereby protecting the staged TRU waste and the building ventilation system high-efficiency particulate air (HEPA) filters from over temperature threats and minimizing the release of radioactive material from building TA-50-0069 to the environment.
Building TA-50-0069 Structural Integrity	Safety-Significant	Provides structural integrity to support safety SSCs. Prevent insult to the MAR inside building TA-50-0069. Mitigates releases of MAR in conjunction with the confinement ventilation system.
Building TA-50-0069 Confinement Ventilation System (CVS)	Safety-Significant	Mitigates releases of MAR in conjunction with the WCG and building TA-50-0069 structural integrity.

Control	Classification	Safety Function and Description
Uninterruptible Power Supply (UPS)	Safety-Significant (support to CVS)	Provides continuous, conditioned power to the control system for the confinement ventilation system.
Electrical Distribution System (EDS)	Safety-Significant (support to the CVS and UPS)	Provides power to the confinement ventilation system and UPS.
WCG	Safety-Significant	The WCG must provide primary confinement for visual inspection, waste characterization, and repackaging operations.
Drum Lift Fixture	Safety-Significant	The Drum Lift Fixture must prevent drum drops and mitigate the consequences from malfunction and/or seismic events.
RNS-Bearing Waste Container PRDwSF	Safety-Class	Reduces the likelihood of thermal runaway by relieving pressure at or below the pressure required to sustain a thermal runaway.

1.6 CRA Conduct and Team Composition

The CRA utilized a performance-based review process with emphasis on reviewing performance for adequacy and less emphasis on the systematic review of program structure and organization, in accordance with DOE O 425.1D. A graded approach was taken in the conduct of this CRA, based upon the results of previously conducted facility evaluations (FEs), MSAs, a pre-CRA facility visit, and the understanding of the hazards associated with the limited scope and duration of the RNS processing mission to be completed in the facility. DOE-STD-3006-2010, *Planning and Conducting Readiness Reviews*, states, "The RA [readiness assessment] should be a performance-based assessment that includes observing and documenting the responses of operating and support program personnel to normal and off-normal events as demonstrated by drills, preoperational tests, evolutions, and exercises. In addition, field assessments should be conducted to verify that field configurations match the applicable supporting documentation."

The schedule and team assignments were established to assess the physical facility and infrastructure, observe the various operations and demonstrations, and determine the level to which the key SMPs have been implemented by multiple, technically diverse individuals from a variety of disciplines to ensure adequate assessment of capability, readiness to commence operations safely, and implementation and effectiveness of the SMPs. This approach, which has historically been the most effective in the conduct of readiness assessments, resulted in a sequence that employed a demanding initial schedule of facility operations, maintenance activities, and briefings. The front-end loaded series of field evolutions enabled the CRA team to view in real time the implementation of SMPs, the viability of procedures and processes necessary to commence and sustain routine operations, and the capability of the operations staff to perform the work safely while dealing with the inevitable series of daily challenges that are common in this high-risk, regulated environment. It also afforded the CRA team the opportunity to see how functional and well integrated the larger organization was, including the relationships

between operations, engineering, maintenance, safety basis, occupational safety & health, radiological control, emergency management, and other organizations.

As the CRA team observed operational activities and evaluated performance during the early days of the assessment, additional questions and a more targeted analysis of the SMP implementation developed. As the team transitioned from reviewing the overall operation and facility condition to focusing their efforts on their respective SMPs and assigned CRADs to ensure a comprehensive review, there was increased cross-discipline communication and collaboration. Further interviews were scheduled and additional activities observed, if necessary, to evaluate the health of each SMP, its implementation, and the interrelation of the SMPs near the end of the first week and during the second week of the review. The team leader and senior advisor individually reviewed each CRAD with the lead assessor periodically during the assessment to ensure appropriate breadth, depth, quality, and comprehensiveness. The team leader held team-training discussions once at the inception of the review to ensure team consistency, and throughout the CRA to ensure alignment and common understanding among the team members.

The breadth of the CRA was defined in the POA and IP. The depth to which the CRA evaluated this scope was identified in the CRADs, which served as the principal means by which the CRA evaluated the CRs chosen for review in the approved POA. The reviews conducted by each CRA team member were guided by CRADs, which were grouped into functional areas. Each functional area CRAD addressed one or more CRs, and contained specific criteria upon which CRA team members objectively verified CR adequacy and the readiness of systems, processes, personnel, and management programs to restart WCRRF safely.

The team leader and senior advisor conducted the planning and overall management of the CRA. The CRA team members reviewed documentation and procedures; inspected equipment, systems, and buildings; interviewed personnel; and observed performance of simulated or actual evolutions, including an operational drill, in order to ascertain the extent to which TSRs and specified SMPs were safely and effectively implemented. This also included evaluation of the proficiency of personnel and determined if the personnel, equipment, and procedure preparations were sufficient to ensure safe and effective operation.

During the course of the review, more than 900 documents were reviewed, more than 45 interviews were conducted, and more than 45 observations (including pre- and post-job briefings, work performance demonstrations, and facility and equipment walkdowns) were conducted. These reviews, interviews, and observations were conducted in accordance with the CRADs of the IP. The results of the team's evaluations associated with each of the CRADs were documented in Appendix 1, *Assessment Forms (Form 1)*.

The CRA team was led by Mr. Greg Stephens, and Mr. Chip Lagdon served as the team's senior advisor. Eleven other team members were selected by the team leader based on their relevant experience in management, nuclear operations, engineering, nuclear criticality safety, quality assurance, maintenance, fire protection, and safety management, expertise in their assigned areas of review, and freedom from conflict of interest in their assigned review area. CRA team members reviewed and approved their respective CRADs and evaluated documentation for their

assigned areas prior to and during the performance of the review. Biographical information regarding the team leader, senior advisor, and team members is provided in Appendix 2, *Review Team Biographies*.

The CRA team, associated roles, responsibilities, and interfaces, and their assessment objectives and CRADs were organized and assigned as described in Table 2.

Table 3, CRA Team Assignments

NAME	FUNCTIONAL AREA	CRAD
Greg Stephens	Team Leader	
Chip Lagdon	Senior Advisor	
Nolan Cagle	Hazardous Material and Waste Management	*WM1
Diane Cato	Safety Basis / Engineering	ENG1, *SB1
Robert Deschambeault	Fire Protection	*FP1
Scott Lonchar	Radiation Protection / Engineering / Training & Qualification	*ENG1, *RP1, TQ1
William Mathison	Maintenance / Operations / Engineering	ENG1, *MN1, *MN2, OP1, OP2
Steven McNitt	Emergency Management / Radiation Protection / Quality Assurance	*EM1, QA1, RP1
Ruby Molinar	Training & Qualification	*TQ1
Mike Montini	OSH / Operations / QA / Emergency Management	EM1, OP1, OP2, *OSH1, *QA1
C. Eric Shogren	Management / Emergency Management / Operations / Safety Management Programs	EM1, *MG1 (SMPs), *MG2, *OP1, *OP2
Leah Stanley	Maintenance / Engineering	ENG1, MN1, MN2
E. Fitz Trumble	Criticality Safety / Safety Basis	*CS1, SB1

* Lead assessor for this CRAD.

1.7 Application of the Graded Approach

Appendix 1 to DOE-STD-3006-2010 describes criteria for applying the graded approach during the readiness assessment process. The graded approach is defined as the process by which the readiness determination is adjusted in the scope of detail required and magnitude of resources needed to be commensurate with the facility's potential impact on safety and other areas. This approach is commensurate with:

- The importance to safety, safeguards, and security;
- The magnitude of any hazard involved;
- The lifecycle stage of a facility;
- The programmatic mission of a facility;
- The particular characteristics of a facility;
- The cause and circumstances of the facility shutdown;
- Complexity of the weapons-related or research activity; and
- Other relevant factors.

WC-304, R1, *Waste Campaign Plan 304 – Treatment of RNS Waste Containers at LANL*, contains a detailed discussion of the waste processing to be conducted and description of activities. The campaign consists of 60 RNS containers currently stored at TA-54 Area G, Dome 375 Perma-Con®. The processing of RNS waste containers will involve denesting, cooling, preparing for transportation at TA-54 Area G, transporting from Area G to TA-50 WCRRF, and cooling and treating at WCRRF.

The understanding of RNS behavior was derived both from actual RNS waste monitoring and from surrogate waste testing. The full-scale tests demonstrated that a thermal runaway and drum rupture with a plausible surrogate nitrate salt/sWheat® mixture is possible and that pressurization is required for a runaway to occur. Under normal storage conditions, the RNS waste drums have not displayed WIPP-like behavior for over two years, and evidence exists to show that low-level reaction rates have decreased under the current storage conditions. However, high-level reactions could be activated if external heating is applied or the drum is pressurized. The safety-class pressure control (PRDwSF) identified for the proposed activities prevents thermal runaway. Cooling of the drums during transport provides additional defense-in-depth in preventing a thermal runaway.

The maximum curie content of any single drum being processed in WCRRF will not exceed 39.7 PE-Ci or 173.19 fissile-equivalent grams of material. No single container processed at WCRRF will contain greater than HC-3 radiological material quantities.

The RNS treatment process is expected to produce two daughter drums of treated RNS waste per operator shift. The current estimate calculates a total of 136 daughter drums will be generated from the 60 parent drums and require 85 shifts to complete. Overall schedule estimates are approximately three months to complete the campaign.

The CRA team members, in the evaluation of their respective reviews, considered these factors in determining the classification of issues and disposition of findings (pre- or post-start). The process being reviewed is not complex or large in size, and once the activity is completed, it will reduce the overall risk for the LANL site.

2.0 CRA Evaluation

2.1 Summary Results and Conclusions

The CRA team concluded that fifteen out of the sixteen CRA objectives were met. The CRA team identified five pre-start findings (see Table 4) and no post-start findings. Findings were determined to be pre- or post-start findings according to the criteria found in Appendix 3, *Issue Classification Criteria*.

Table 4, List of Pre-Start Findings

Finding Number	Description
MG2-PRE-1	The startup plan lacks sufficient definition in terms of acceptable operational performance with surrogate materials before commencing actual RNS waste operations in WCRRF; it does not adequately address transition from ARTIC to WCRRF prior to authorization to startup; and it does not include sufficient acceptance criteria for stepping out of management oversight and SSWs.
OPS2-PRE-1	The operations procedures necessary for WCRRF RNS waste processing operations lacked adequate field validation with appropriate personnel. Additional effort is necessary to ensure they can be performed as intended and achieve the desired consistency of performance.
TQ1-PRE-1	The current documented basis for determination that FMH certification is not required for process operators in EWMO facilities is inadequate.
TQ1-PRE-2	WCRRF maintenance training has been developed but has not been effectively implemented. Maintenance personnel lack required training on VSSs.
WM1-PRE-1	The version of WCATS currently being used is a beta version of the software. The production version must be tested and in use prior to beginning RNS operations.

Review results and conclusions of the CRADs summarized here are found in detail in the Assessment Forms (Appendix 1).

CS1: This objective was met. Results of evolutions, document reviews, and interviews led the CRA team to the conclusion that, while there are areas of necessary improvement, the current level of implementation of criticality safety is sufficient to process the limited RNS waste campaign in the WCRRF WCG. Operator knowledge is sufficient and the procedures are adequate to provide assurance of safe operations for the identified scope covered by this CRA. Support resources (e.g., criticality safety officers and criticality safety analysts), while sufficient in number, have not had appropriate priority to ensure that the nuclear criticality safety program and its implementation are flawless; however, these improvements do not constitute a systematic failure of the program, nor was a significant failure found that could result in unacceptable impact on personnel, the facility, the public, or the environment. No findings were identified.

EM1: This objective was met. Based on observations of drills and hotwashes, documentation reviews, facility walkdowns, and interviews, the CRA team concluded that a routine operations drill program and an emergency management drill and exercise program have been established and implemented to support restart of WCRRF RNS operations. Records for each program are adequate to demonstrate the effectiveness of completed drills and exercises and their use in planning for future drills and exercises. When weaknesses or opportunities for improvement are identified in WCRRF operational drills and emergency drills and exercises, corrective actions are developed and implemented. The emergency management SMP was verified to be adequately implemented for WCRRF. No findings were identified.

ENG1: This objective was met. Based on documents reviewed, interviews conducted, and evolutions witnessed, the CRA team concluded that the WCRRF engineering/configuration management (CM) program is in compliance with DOE orders and LANL requirements, and that the Conduct of Engineering program is effectively implemented. Facility engineering and programmatic engineering personnel interviewed demonstrated an acceptable level of knowledge of CM principles for maintaining the technical baseline of their assigned SSCs.

For the vital safety systems (VSSs) for RNS processing at WCRRF, the CRA team concluded that sufficient processes and procedures have been established for designation of design features and functions credited in the BIO; management of change control; application of technical reviews, including unreviewed safety question determinations (USQDs); determination of system health, including VSSs status and assessment; and control of system modifications to demonstrate the acceptability of the configuration control program for safe WCRRF restart and RNS operations.

Although there are some concerns identified in areas of CM related to consistency of the master equipment list (MEL) and management level determinations (MLDs), current implementation of the CM SMP will support RNS processing at WCRRF. No findings were identified.

FP1: This objective was met. WCRRF line management has established and implemented a Fire Protection (FP) SMP to ensure safe accomplishment of work. The level of knowledge of FP managers and staff is adequate, based on review of examinations and examination results, interviews, and observation of operational demonstrations. The FP contract requirements are flowed into institutional and facility-specific procedures and the procedures are effectively implemented in support of the facility. WCRRF has FP exemptions and equivalencies pertaining to their facility. Compensatory measures and conditions of approval associated with them are effectively implemented. There are three exemptions/equivalencies submitted to NA-LA for approval. DOE has not responded or approved these requests and their associated compensatory measures; however, LANL is working to implement these compensatory measures. There are sufficient qualified personnel available to implement the FP program effectively in support of the facility. The level of knowledge of personnel responsible for administering and implementing the FP program is sufficient.

After reviewing pertinent documentation, inspecting the facilities, and interviewing facility management and FP support personnel, the CRA team has concluded that adequate facilities and equipment are available and are sufficient for safe WCRRF restart and RNS operations with respect to FP. There was one work order (WO) associated with the replacement of a FPS sprinkler head in the WCG that was scheduled to be completed after completion of the CRA fieldwork. This WO was reviewed and discussed and no significant issues with this routine maintenance activity were noted or anticipated. No findings were identified.

MG1: This objective was met. WCRRF line management has clearly identified, documented, and integrated the WCRRF BIO SMPs with LANL's integrated safety management system (ISMS) and quality assurance plan (QAP). The CRA team concluded that all SMPs are adequately implemented. The CRA team noted issues within management, operations, training and qualification, and waste management functional areas; specific issues involved the startup plan's

lack of sufficient detail (MG2-PRE-1), operations procedures lack of adequate field validations (OPS2-PRE-1), inadequate documentation that fissile material handler (FMH) certification was not required (TQ1-PRE-1), ineffective implementation of maintenance training (TQ1-PRE-2), and utilization of the beta version of WCATS (WM1-PRE-1).

Facility leadership demonstrates a commitment to ConOps, and regularly reinforces the expectation that every employee must strive for compliant execution and continuous improvement in all facets of WCRRF operations and support. The management functional area has been determined to be capable of supporting the safe operation of WCRRF upon closure of identified pre-start findings. No findings were identified.

MG2: This objective was met. The WCRRF startup plan (WCRR-PLAN-1387, R1, *WCRRF RNS Waste Operations Startup Plan*) contains the required elements as defined by DOE O 425.1D Admin Chg 1, DOE-STD-3006-2010, and FSD-115-001. The scope, extent, and controls of the startup plan will provide a controlled approach to normal operations with adequate management attention, review, and approval for release to full operations. Management oversight team (MOT) members are designated in accordance with the startup plan, and senior supervisory watch (SSW) personnel on the MOT are designated in accordance with the WCRRF startup plan. One finding was identified.

MG2-PRE-1: The startup plan lacks sufficient definition in terms of acceptable operational performance with surrogate materials before commencing actual RNS waste operations in WCRRF; it does not adequately address transition from ARTIC to WCRRF prior to authorization to startup; and it does not include sufficient acceptance criteria for stepping out of management oversight and SSWs.

MN1: This objective was met. Current implementation of the maintenance SMP will support safe startup and operations of WCRRF. The maintenance program has demonstrated that there is ownership and deliberate team engagement by the maintenance staff. This fosters improvements in planning and performance of work that is conducted in a safe and compliant manner. Observed work execution demonstrates that “pause work” is utilized without regard to schedule pressures. The process for scoping work and performance of walkdowns, hazards and safety evaluations, pre-job/post-job briefs, work planning, and documentation was observed to be effective.

All MSA findings and Performance Feedback and Improvement Tracking System (PFITS) actions that can affect WCRRF RNS restart have been verified as closed or on a manageable list of open pre-start issues based on review of objective evidence, interviews with WCRRF and support personnel, walkdowns of facilities, and observation of RNS operational and maintenance demonstrations.

While it is recognized that there are deficiencies identified in maintenance training, the staff is knowledgeable with regard to these systems, indicating that system level training and on-the-job experience has occurred. Review of evidence files by the CRA team verified that integrated work documents (IWDs) are effectively implemented and the Conduct of Maintenance program is adequate to support WCRRF RNS operations restart. Based on the CRA team’s interviews,

operations demonstrations, maintenance evolutions, and documented evidence, current implementation of the maintenance SMP will support safe restart of RNS operations at WCRRF. No findings were identified.

MN2: This objective was met. Through document reviews, interviews, observations, and evaluation of emergent activities observed, the CRA team concluded that WCRRF line management has implemented a maintenance and work control SMP that will ensure safe RNS treatment operations in the WCRRF. EWMO and Waste Disposition (WD) personnel at TA-50-0084 and -0069 have effectively implemented VSSAs, surveillance testing, maintenance operations, and calibration programs to confirm and monitor the condition and operability of programmatic and facility systems associated with or supporting RNS operations. There are adequate facilities, equipment, and commodities available to support safe and sustained WCRRF operations for the duration of the campaign. No findings were identified.

OPS1: This objective was met. The WCRRF TSRs identify SMP 5.6.3, Conduct of Operations, as a requirement of the WCRRF ConOps program. Based on documents reviewed, interviews conducted, and evolutions witnessed, the WCRRF ConOps program is in compliance with DOE order and LANL requirements, and is determined to be effective overall. ConOps principles are being applied in the facility through procedures, knowledgeable personnel, and maintained equipment and processes. Both the FOD and WD personnel exhibited ownership and strong adherence to "working to procedures" as evidenced by demonstrations, interviews and document reviews. Facility operations components including management supervision, work planning, change control, and proper equipment selection are also robust. The ConOps program requires that performance criteria be considered when accepting or authorizing work, identifying the risks to operations, and developing and implementing the controls needed to perform work safely and securely. Observed evolutions demonstrated adequate understanding of ConOps, with few discrepancies, none of which elevated to a concern with readiness to restart. The operators also demonstrated an adequate understanding of criticality controls, even though procedures require improvement, as identified in finding OPS2-PRE-1. No findings were identified.

OPS2: This objective was **not** met. The WCRRF TSRs identify SMP 5.6.13, Procedures Management, as a requirement of the WCRRF ConOps program. Upon closure of OPS2-PRE-1, WCRRF operations will have adequate procedures to cover the activities under this restart effort, as evidenced through document reviews and observed evolutions. ISI procedures are in place to ensure operability of TSR-credited systems, and their performance for WCRRF restart has been verified under objective SB1. Based on documents reviewed and interviews conducted, the WCRRF ConOps Program is in compliance with the DOE order and LANL procedure control requirements, and is determined to be effective overall, as further evidenced through observed evolutions. ConOps principles are being applied in the facility through procedures and personnel are knowledgeable and competent. The weaknesses observed in the procedures can be minimized with additional, thorough field validation with the procedure writers, operators, subject matter experts (SMEs), and facility personnel involved. In general, the critical portions of the procedures were able to be executed safely; however, improved validation will drive improved operator execution performance. One finding was identified.

OPS2-PRE-1: The operations procedures necessary for WCRRF RNS waste processing operations lacked adequate field validation with appropriate personnel. Additional effort is necessary to ensure they can be performed as intended and achieve the desired consistency of performance.

OSH1: This objective was met. Based on interviews with management, operations, and support personnel, review of applicable work documents and analyses, observation of work demonstrations in the ARTIC mockup facility, and walkdown of the WCRRF, there is adequate evaluation of RNS operations industrial safety (IS) and industrial hygiene (IH) hazards and selection/implementation of appropriate controls. Personnel interviewed are competent to perform their assigned duties, knowledgeable of the RNS operations and the hazards at all levels, actively engaged in assuring safe and compliant work, self-critical and willing to stop when actions cannot be performed as defined in work documents or unknown conditions are encountered, and are acting as a team. Pre-start and post-start issues identified dung the MSA have been adequately closed, and evidence of closure is acceptable. Open issues from the AIB report affecting occupational safety & health (OSH), have been closed by the organization and only a few are awaiting final closure by DOE (related to approval of the RNS processing procedures). Due to identified safety and ergonomic issues during the CRA and lack of evidence for an extent of condition review in closure of MSA pre-start finding OSH-PRE-1 for additional IS and ergonomic hazards, the facility would benefit from a fresh walkdown of ARTIC and WCRRF and observation of processing by OSH personnel to ensure additional safety or ergonomic issues are addressed. Based on the interviews, operations demonstrations, and documented evidence, current implementation of the OSH SMP will support safe restart of RNS operations at WCRRF. No findings were identified.

QA1: This objective was met. With the exception of a manageable list of open pre-start issues, all MSA findings and AIB CAP actions that can affect WCRRF RNS restart have been verified as closed based on review of objective evidence, interviews with WCRRF and support personnel, walkdown of facilities, and observation of RNS operational demonstrations. Review of evidence files by the CRA team verified that quality assurance (QA) procedures have been effectively implemented, and the EWMO QA program is adequate to support WCRRF RNS operations. WCRRF operations are effectively integrated into the LANL feedback and improvement program, including MSAs that meet Contractor Assurance Program requirements. Software verification and validation processes are adequately understood and implemented, although the beta version functionality of the WCATS has not yet been incorporated into the production version required for actual RNS waste processing. Measurement and test equipment (M&TE) required for WCRRF restart has been calibrated, and previously identified issues related to M&TE control in WCRRF have been addressed. Based on the interviews, operations demonstrations, and documented evidence, current implementation of the QA SMP will support safe restart of RNS operations at WCRRF. No findings were identified.

RP1: This objective was met. Current implementation of the radiological protection (RP) SMP will support safe restart of WCRRF operations. An RP program (RPP) is established to ensure safe accomplishment of work at WCRRF, while protecting the employees, public, and the environment during radiological operations at the facility. RP procedures and radiological work permits (RWPs) are effectively implemented in support of WCRRF. An adequate number of RPP

personnel are available to support WCRRF restart activities. Interviews were conducted with several RP personnel and they were all found to be very knowledgeable about their areas of responsibility. No findings were identified.

SB1: This objective was met. The BIO and TSRs have been developed, approved, and implemented. The TSR SMPs, including unreviewed safety question (USQ) program, were verified to be implemented. As demonstrated through observations and interviews, the level of knowledge of managers, operations, and support personnel regarding their responsibilities and the safety basis is adequate to support RNS processing. The safety-class/safety-significant SSCs and criticality safety engineered requirements are contained in the MEL, although seven of the VSSs have open items in the PFITS to review and update the MEL. The BIO and TSRs are consistent with the WCRRF configuration, with minor inconsistencies identified, and the requirements and controls have been implemented into procedures to support RNS processing. The facility has a rigorous implementation verification process. The WCRRF ISIs were verified to be completed. The USQ program is effectively implemented for facility and procedure changes and supports safe RNS processing. Safety basis and USQ personnel are knowledgeable of their roles and responsibilities for RNS processing. Overall, issues from previous assessments of the safety basis and USQ programs related to WCRRF RNS processing have been effectively tracked and resolved. No findings were identified.

TQ1: This objective was met. Current implementation of the training and qualification SMP, upon closure of TQ1-PRE-1 and TQ1-PRE-2, will support safe restart of RNS operations at WCRRF. The CRA team interviews and document reviews conducted for all positions, according to the EWMO Training Program Plan (TPP), confirm that an effective training and qualification program is developed and appropriately implemented at WCRRF, with limited exceptions. Interviews conducted demonstrate that WCRRF personnel display personal ownership of the established SMPs, including training and qualification. Through interviews and review of training material, procedures, and other relevant documentation, the CRA team determined that the necessary training requirements to support safe work performance are adequately flowed down to the workforce. WCRRF personnel are confident and knowledgeable, and demonstrated this during evolutions and interviews. Supervisors, managers, and workers displayed a strong ownership of training and qualification at WCRRF. WCRRF personnel demonstrated that they understood their function, roles, and responsibilities in accordance with DOE O 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*, and LANL P781-1, *Conduct of Training*. Two findings were identified.

TQ1-PRE-1: The current documented basis for determination that FMH certification is not required for process operators in EWMO facilities is inadequate.

TQ1-PRE-2: WCRRF maintenance training has been developed but has not been effectively implemented. Maintenance personnel lack required training on VSSs.

WM1: This objective was met. Current implementation of the Hazardous Material and Waste Management SMP, upon closure of WM1-PRE-1, will support safe restart of RNS operations at WCRRF. The WCRRF facility operations personnel, waste disposition operations personnel, and support personnel have demonstrated sufficient knowledge and ability to commence processing

RNS waste safely and compliantly. Procedures implement the requirements of the hazardous waste facility permit (HWFP) and the safety basis and provide adequate technical direction to perform WCRRF RNS processing safely. There is adequate staffing to safely process RNS waste under current conditions. However, expanding operations to additional shifts will require additional operations staff. Line management has set clear expectations and commitment to comply with public and worker safety, health, and environmental protection requirements. WCRRF facility and support personnel have clearly defined roles, responsibilities, authorities, and accountability (R2A2s) within the organization. Current implementation of the waste management, hazard management, & environmental compliance SMP will support safe restart of RNS operations at WCRRF. One finding was identified.

WM1-PRE-1: The version of WCATS currently being used is a beta version of the software. The production version must be tested and in use prior to beginning RNS operations.

2.2 Evaluation of Prerequisites

Prerequisites, found in section 4.0 of the IP, were verified through examination of the WCRRF FOD's *Readiness Review Prerequisites Acceptance Form*, and associated evidence packages, where appropriate. The CRA team noted that there was one MSA pre-start item still open that is being tracked on the manageable list of open pre-start issues.

Through review of objective evidence, personnel interviews, and observation of simulated work activities, the review team substantiated the MSA team leader and FOD prerequisite certifications.

2.3 Safety Culture

The CRA team concluded, based on interviews and observations, that several important elements of an effective safety culture were evident among the WCRRF team. Examples are:

- Strong understanding of performance expectations, including the expectation of the entire workforce to pause or stop work when things do not look or feel right,
- Sufficient knowledge and acceptance of the operations restart process following a pause/stop work,
- Healthy safety attitude and willingness to raise safety, nuclear safety, quality, or other issues without fear of retribution,
- Respectful attitude towards coworkers, evaluators, leadership and oversight personnel,
- Excellent ConOps commitment evidenced by the performance of evolutions.
- Detailed pre-job briefs that engage operators, including assuring understanding of performance expectations, actions to take when abnormal conditions exist, and the ability to raise concerns.
- Post-job critiques, in which operators openly discussed actions, mistakes, and issues to resolve concerns identified with the execution of procedures.

2.4 Conclusion

The CRA team observed the performance of the seven operations selected for field demonstration, which included operators, engineers, and management from all WCRRF functional organizations. These operations were:

- WCRR-FO-DOP-1396, *WCRRF WCATS Operations for RNS Waste Treatment*
- WCRR-FO-DOP-1397, *WCRRF Rounds Sheets*
- WCRR-WO-DOP-1376, *WCRRF RNS Waste Treatment*
- WCRR-WO-DOP-1378, *WCRRF RNS Waste Container Receipt and Handling*
- WCRR-WO-DOP-1379, *WCRRF Waste Container Shipment Preparation*
- WCRR-WO-DOP-1380, *WCRRF Waste Characterization Glovebox Parent Drum Operations*
- WCRR-WO-DOP-1381, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*

The CRA team concluded that, subject to satisfactory resolution of pre-start findings identified by the CRA team, LANL has adequately demonstrated its readiness for equipment, procedures, and personnel to support WCRRF safely in a nuclear environment.

3.0 Noteworthy Practices & Lessons Learned

The following noteworthy practices were identified by the team:

- During the tabletop review of the RNS waste transportation evolution, it was identified that the that the communications and R2A2s aspects of the transportation process underwent a lean six sigma review to streamline the interfaces and handoff of the waste drums between Area G and WCRRF. The CRA team recommends further use of this practice to ensure the RNS waste processing procedures in WCRRF are evaluated to remove unnecessary actions.
- Long form pre-job briefs were conducted in a very thorough manner and kept operations personnel engaged. The approach to quizzing operators and the identification of Human Performance Error Precursors as they relate to the process were noteworthy. The Safety Basis was also discussed, and operators demonstrated thorough knowledge of the related requirements. Operations supervision demonstrated outstanding leadership in the conduct of the briefs and the evolutions.

Lessons Learned from execution problems encountered by the CRA team, as well as successes encountered during this review, could be used by future teams to improve the review process.

- It is line management's responsibility to verify the prerequisites and certify them in their readiness to proceed memorandum. This needs to be remembered when developing the contractor IP, which originally stated that this was a CRA team leader requirement. The CRA team verifies the adequacy of the implementation of the prerequisites during the review.

- The CRA team leader needs to establish expected communication protocols with stakeholders during the in-brief. Better execution of these protocols will ensure efficient coordination of activities related to the conduct of the review.
- Training for the CRA team needs to be conducted before the review begins to establish consistent performance. The level of training needs to be commensurate with the level of readiness assessment experience of the team.

Appendix 1: Assessment Forms (Form 1)

ASSESSMENT FORM (FORM 1)

Functional Area: **Criticality Safety**	Objective: CS1 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE

CS1: A criticality safety program is in place to ensure WCRRF operations remain subcritical under normal and credible abnormal conditions. The level of knowledge of criticality safety managers and staff is adequate based on review of examinations and examination results, interviews, and observation operational demonstrations. (CR1, CR4, CR6, CR9)

CRITERIA

1. Prerequisites related to criticality safety findings from previous readiness activities including the MSA are fully met (e.g., labeling, criticality safety evaluation document [CSED] technical adequacy), and any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. Management has formulated a nuclear criticality safety (NCS) SMP and has implemented it, including a clear understanding by all responsible parties of the R2A2s established therein (SD130, section 6.2.1.a), ensuring that criticality safety contract requirements are flowed into facility operations procedures.
3. Proposed operations have been evaluated, and appropriate limits on control parameters (i.e. requirements) are identified (SD130, section 6.3 and section 6.5), ensuring that criticality safety controls and limits from the criticality safety evaluations are technically adequate, clear, and defensible.
4. Requirements and assumptions important to criticality safety are appropriately implemented in the design of equipment or steps of an operating procedure (SD130, section 6.6.2, and section 6.4.2), ensuring that criticality safety controls and limits from the criticality safety evaluations are flowed into facility operating procedures and effectively implemented in support of the facility operations.
5. Operator aids and material labeling incorporate relevant information in an adequate, accurate, unambiguous, understandable, and consistent manner (SD130, section 6.8), ensuring material identification/labeling practices are in accordance with SD130, *Nuclear Criticality Safety Program*, and EP-DIV-AP-20075, *EWMO Nuclear Criticality Safety Administration*.
6. A change control process exists and is utilized such that NCS personnel review proposed changes to equipment or procedures that have an impact upon the criticality safety of the operation. (SD130, section 6.4.1.1)
7. A process exists and is utilized to identify potential process deviations and ensure that appropriate actions are taken. (SD130, section 6.6.4 and section 6.10.1)
8. Sufficient qualified personnel are available to implement the criticality safety program. (SD130, section 5.8)
9. Operations personnel and criticality safety staff are trained commensurate to their R2A2s (SD130, section 6.15.1 and section 4.3), ensuring that the level of knowledge of facility

operations managers and staff responsible for administering and implementing the criticality safety program is adequate.

10. Adequate facilities and equipment are available to ensure criticality safety support. (SD130, section 5.7)

APPROACH

Records Reviewed

- Area G-WO-DOP-1383, R1, *TA-54 Area G RNS Waste Container Shipment Preparation*, 1/12/2017
- Container Information Package (CIP) for 69519 11-22-2016 For Training Purposes Only (WD-AP-20098 Attachment 1)
- DOE-STD-1158-2010, *Self-Assessment Standard for DOE Contractor Criticality Safety Programs*, 3/2010
- DHF-WCRR-WO-DOP-1381 R0 and R1 (DAR-16-00113) undated compilation of forms
- EM-AP-10008, R1, *ADEM Roles, Responsibilities, Authorities, and Accountabilities*, 1/30/2017
- EP-DIV-AP-20075, R2, *EWMO Nuclear Criticality Safety Administration*, 7/23/2015
- EWMO-RM-AOP-20124, *EWMO Nuclear Criticality Safety Requirement Non-Compliance*, 9/1/2016
- FE(16)-004.000, *EWMO and the ADEM at Area G and the Waste Characterization, Reduction an Repackaging Facility (WCRRF) Facility Evaluation*, 10/21/2016
- FMOR TA-50-WCRR-00, *Fissionable Material Operational Review*, 1/10/2017
- FMOR TA-50-WCRR-00, *Fissionable Material Operational Review*, 1/4/2017
- Memorandum, AD-NHHO-TR-16-020, Barbee to Sonnenberg, Subject: *Non-FMH Decision at Area G, RANT and WCRRF*, 12/1/2016
- Memorandum, NCS-MEMO-15-002, Subject: *Criticality Accident Alarm System Evaluation for EWMO Facilities*, 1/28/2015
- Memorandum, NCS-MEMO-16-041, from Wysong to Cabbil, Subject: *FY17-FY2019 Nuclear Criticality Safety Program Assessment Schedule*, 12/2/2017
- NCS Committee end of year briefing slides, Crooks, 6/21/2016
- NCS-CSED-07-009, *Criticality Safety Evaluation for WCRRF*, 5/31/2007
- NCS-CSED-16-086, *Criticality Safety Evaluation for Treatment of Previously Remediated Nitrate Salt Bearing Waste at WCRRF TA-50*, 11/9/2016
- NCS-CSED-16-113, *Criticality Safety Evaluation for the Replacement of Outlet HEPA Filters in the Waste Characterization Glovebox at the Waste Characterization, Reduction, and Repackaging Facility at TA-50*, 11/10/2016
- NCS-CSLA-10-131, *Waste Characterization, Reduction, and Repackaging (WCCR) Facility*, 10/28/2010
- PFITS report WCRRF MSA CAP Status, 1/27/2017
- SD-130, R3, *Nuclear Criticality Safety Program*, 9/24/2015
- UTrain training records summary, Work Authorization System, NCS CSAs, 11/28/2016
- UTrain training records summary, EWMO CSO, 2/2/2017

- UTrain training records summary, EWMO WD Waste Treatment Operator 2/2/2017
- WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, 1/11/2017
- WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, 1/27/2017
- WCRR-WO-DOP-1378, R2, *WCRRF Waste Container Receipt and Handling*, 1/11/2017
- WCRR-WO-DOP-1380, R2, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, 1/27/2017
- WCRR-WO-DOP-1381, R1, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*, 1/11/2017

Interviews Conducted

- EM Associate Director
- EM Deputy Associate Director
- EWMO Criticality Safety Officer (CSO)
- EWMO Procedure Writers (2)
- NCS Criticality Safety Analyst (CSA)
- NCS Division (NCSD) Leader
- WD Person in Charge (PIC)
- WD Waste Treatment (WT) Group Leader
- WD-WT operators (3)

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Pre-job Brief DOP 1380/1381
- RNS Treatment DOP 1380 evolution
- RNS Treatment DOP 1381 evolution
- Post-job Brief DOP 1380
- Pre-job Brief RNS Treatment DOP 1376
- RNS Treatment DOP 1376 evolution
- Post-job Brief DOP 1376
- Emergency Drill Observer Briefing
- Emergency Drill Evolution

DISCUSSION OF RESULTS

1. *Prerequisites related to criticality safety findings from previous readiness activities including the MSA are fully met (e.g., labeling, CSED technical adequacy), and any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

Prerequisites associated with the following areas were reviewed: MSA pre-start and post-start items related to NCS; 2016 FE of EWMO (Aug, 2016) findings in the criticality safety area that apply to WCRRF. In terms of the MSA, there was one pre-start item (PFITS 2017-80 with two

actions, 1 and 2). Review of the PFITS report shows both these actions were closed based on fissionable material operational reviews (FMORs) being performed for both the waste processing and the HEPA change-out activities. Review of these FMORs show that both were completed. Several MSA opportunities for improvement (OFIs) remain open with due dates after the date of this CRA, however, none of these would challenge the ability of the operations within the scope of this CRA to be performed safely.

PFITS 2017-119 associated with Parent Record 2016-293 CS-OFI-3 dealing with staffing levels of the CSO is shown as closed with no action required. However, the CRA team noted that CSO availability and engagement continues to be an issue that is impacting the implementation of criticality safety in the EWMO WCRRF.

There was a finding against criticality safety in the FE from August 2016, which had several subparts. PFITS items associated with that finding has been reviewed and the pre-starts (#66, #80, and #93) have been verified to be closed. Items #80 and #93 do not directly apply to WCRRF. Several other subparts to the finding remain open (as OFIs), some of which have due dates beyond the date of the CRA; however, none of them impact the ability of the operations within the scope of the CRA to be performed safely. An OFI from the FE regarding the need for a revision of EP-DIV-AP-20075, R2, *EWMO Nuclear Criticality Safety Administration*, to incorporate SD130, R3, *Nuclear Criticality Safety Program*, was not captured in PFITS and was not corrected by the date of the CRA. This is discussed further in criteria 2 and 9; however, not correcting this within the window identified by the FE has taken the facility out of compliance with SD130, R3. The issue of labeling (CS1 criterion 5) was acknowledged by the FE as a pre-start finding (#66), and was closed by verification that WCATS mobile has the capability to display fissile gram equivalent (FGE) contents. This handheld capability was verified during the CRA as part of the WCATS demonstration.

This criterion was met.

2. *Management has formulated an NCS SMP, and has implemented it, including a clear understanding by all responsible parties of the R2A2s established therein (SD130, section 6.2.1.a), ensuring that criticality safety contract requirements are flowed into facility operations procedures.*

SD130, R3, is the site-level criticality safety program document. Section 5.3 states that the responsible Associate Director is responsible for implementation of the requirements of this document, including monitoring of the NCS program. Section 5.5 assigns the FOD responsibility for generating and maintaining a facility-specific NCSD-implementing procedure. EP-DIV-AP-20075, R2 (7/2015), is the implementing procedure for EWMO. SD130 requires in section 7 that facility-implementing procedures be in compliance with the latest revision of SD130 within one year of the LANL Director's office approving the revision. SD130, R3, was approved on 9/24/2015 and thus should be implemented in the facility procedure by 9/24/2016. As of 2/2/2017, AP-20075 referenced SD130, Revision 2. Discussions with the EWMO CSO on 2/1/2017 confirmed that AP-20075, R2, is the latest revision of this document. Several important criticality safety changes took place between Revision 2 and Revision 3 of SD130; these changes

are not reflected in AP-20075, R2. These changes will not affect the ability of the RNS operation in WCRRF to be performed safely. Discussions with the responsible Associate Director and Deputy Associate Director for EWMO on 2/2/2017 confirmed that AP-20075 has not been updated beyond Revision 2.

One of the MSA OFIs dealt with responsibilities between the operations responsible supervisor (ORS)/operations responsible manager (ORM) being not clearly delineated. This was closed by modification of EM-AP-10008, *ADEM Roles, Responsibilities, Authorities, and Accountabilities*, which defined these R2A2s more clearly. AP-20075 also lists R2A2s for the ORS/ORM positions; this has not been modified to reflect the changes to AP-10008 (this R2A2s issue was captured in MSA 2016-293 CS-OFI-1).

In terms of monitoring, an FE was performed in August of 2016, in which criticality safety took part. In addition, in June 2016 the NCS Committee performed a walkthrough of the EWMO facilities including WCRRF WCG and ARTIC mockup. In December of 2016, NCS-MEMO-16-041, *FY17-FY2019 Nuclear Criticality Safety Program Assessment Schedule*, prepared an NCS program assessment schedule that is intended to ensure that requirements of DOE-STD-1158-2010, *Self-Assessment Standard for DOE Contractor Criticality Safety Programs*, are met within the 3-year window. EWMO is scheduled for a management assessment in FY (fiscal year) 2019 2nd Quarter. This schedule is based on crediting the FE conducted in 2016 as meeting the DOE-STD-1158-2010 requirement. This satisfies the requirement for the responsible Associate Director to ensure monitoring is in place for the NCS program.

While the NCS SMP as implemented by EP-DIV-AP-20075 is in place, it is out of date with the institutional program, does not define R2A2s consistent with other EWMO or SD130 documents, and thus does not fully ensure that criticality safety contract requirements are flowed into facility operating procedures.

This criterion was **not** met.

3. *Proposed operations have been evaluated, and appropriate limits on control parameters (i.e. requirements) are identified (SD130, section 6.3 and section 6.5), ensuring that criticality safety controls and limits from the criticality safety evaluations are technically adequate, clear, and defensible.*

Work in the WCRRF prior to the RNS waste was evaluated in NCS-CSED-07-009, *Criticality Safety Evaluation for WCRRF*, and those limits were captured in NCS-CSLA-10-131, *Waste Characterization, Reduction, and Repackaging (WCCR) Facility*. Evaluation of the criticality safety of the RNS waste (60 drums) was evaluated in NCS-CSED-16-086, *Criticality Safety Evaluation for Treatment of Previously Remediated Nitrate Salt Bearing Waste at WCRRF TA-50* (11-2016). Limits on mass, comingling of material, and the engineered feature of 55-gal drums were identified. CSED-16-086 incorporates the RNS, as well as (by reference) the previous controls from the CSLA-10-131. Both evaluations use a comparison of normal and abnormal conditions to the limits contained in American National Standards Institute 8 standards. As such, they are technically adequate and defensible. Both CSED-16-086 and CSED-

07-009 fail to address a sump in the bottom of the WCG. This sump, according to the facility, is approximately 2 inches deep, 28 inches long and 27 inches wide, and could hold approximately 3.25 gal (12.3 liters). There is a statement within CSED-16-086 that 520 grams in spherical configuration at optimum concentration would require approximately 17 liters of volume. Based on the depth, shape, and the volume of the sump, there does not appear to be a criticality concern; however, the sump is not evaluated in the CSEDs for the process.

This criterion was **partially** met.

4. *Requirements and assumptions important to criticality safety are appropriately implemented in the design of equipment or steps of an operating procedure (SD130, section 6.6.2, and section 6.4.2), ensuring that criticality safety controls and limits from the criticality safety evaluations are flowed into facility operating procedures and effectively implemented in support of the facility operations.*

Procedures WCRR-WO-DOP-1376, *WCRRF RNS Waste Treatment*, WCRR-WO-DOP-1380, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, and WCRR-WO-DOP-1381, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*, were reviewed for incorporation of appropriate controls and assumptions. All three procedures appropriately implement the administrative controls for criticality safety (i.e. mass limits, no commingling of material); however, none of the three appear to implement that the waste is within a 55-gal drum, which is an engineered feature relied on in both CSEDs. Steps in the procedures associated with shipping and receipt of RNS waste were also reviewed and this verification was not in those steps either. This could be an attribute of expecting the obvious: the 60 drums of material to be processed in the RNS campaign have been identified and are all in 55-gal drums. However, this does not negate the importance and necessity of the verification that the engineered feature is met when the material is brought into the facility.

CRA team observation of evolutions of the parent drum receipt, waste processing, and daughter drum operations showed that the controls are implemented in the facility operations. During the observed evolutions, there was some question regarding what level of “residual waste” could be left in the box/trays, however, the PIC paused and requested clarification, prior to proceeding. There is an ENSURE step (step 4.3[4] of DOP-1380, R2 IPC-1) that “all waste” has been removed; waste remained in the glovebox, but this step was completed without full recognition that waste remained.

Prior to the next evolution (DOP-1381 daughter drum bag-off), this residual waste had been removed from the glovebox. The DOP-1381 evolution was witnessed and demonstrated a very thorough cleanout of the residual waste and proper processing through the DOP-1376 evolution. There were sequencing of steps that were not clear between the DOP-1381 activities and the DOP-1376 activities during the handling of “residual waste in the box” associated with step 6.6 (DOP-1381) handing off to step 5.2 (DOP-1376) and then back to DOP-1381. This is captured in the pre-start finding (OPS2-PRE-1) regarding the maturity of development and validation of the procedures to be implemented as “use every time.”

WCRRF procedure WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, was reviewed against the criticality safety controls contained in NCS-CSED-16-113, *Criticality Safety Evaluation for the Replacement of Outlet HEPA Filters in the Waste Characterization Glovebox at the Waste Characterization, Reduction, and Repackaging Facility at TA-50*, and was found to contain all the necessary criticality safety steps. Some explanatory notes in the procedure that provide guidance on the allowance of filters and materials in the drums would be helpful during execution of the procedure. This material is currently covered only in section 3.3 of the procedure. Based on the presence of criticality safety controls in the operating procedures this criterion was determined to be met.

This criterion was met.

5. *Operator aids and material labeling incorporate relevant information in an adequate, accurate, unambiguous, understandable, and consistent manner (SD130, section 6.8), ensuring material identification/labeling practices are in accordance with SD130,* Nuclear Criticality Safety Program*, and EP-DIV-AP-20075,* EWMO Nuclear Criticality Safety Administration*.*

Labeling of the drum is provided via a drum number and bar code that is tied to WCATS. WCATS contains the FGE value for the drum as well as information on the container (e.g., 55-gallon container or POC). SD130, R3, section 6.8 states that the ORS must require that material/containers be unambiguously labeled with specifications consistent with parameters that are under control (e.g., mass, container types, and form). EP-DIV-AP-20075, R2, states in section 6.1 that "fissile content shall be identified in WCATS. A label indicating FGE is not required on containers/packages with less than 200 FGE." While not physically attached to the drum, when processing drums in WCRRF as part of the RNS wastes, a container information package (CIP) sheet is generated that contains the FGE for the container and includes the drum number as well as information on the outer container. For drum 69519, which was used in the evolution, the CIP lists the "total FGE" as 1.87E1, but it is not clear this is in FGE Pu^{239}. There is no assay sheet included as part of the CIP, so it would be difficult to determine if this was truly Pu^{239} FGE. The CIP also lists the outer container as "other –POC." From this information, it is not clear how it was confirmed that the drum was indeed a 55-gal drum (per NCS requirements). Section 2 of the real-time radiography report within the CIP does list the container type as 55-gal drum; this is not a convenient place for the PIC to confirm the outer container type.

EP-DIV-AP-20075 was approved by the NCS CSA and the NCSD, signifying concurrence with this practice. NCSD should review and concur if the practices in AP--20075 are still in compliance with SD130, R3. During the FE in August 2016, a finding (CS-F.1a) was generated that labeling did not meet SD130 requirements. This was closed in PFITS (2016-2044, 2015-612 CS-F.1) by evaluation of the "efficacy" of the WCATS handheld scanner to provide the container information and the FGE for that drum. The CRA team validated during the WCATS demonstration that FGE could be displayed on the WCATS handheld. Other issues with WCATS are documented in CRAD WM1, criterion 6.

After the parent drum is emptied, and prior to overpack, an NCS Empty label is not applied to the empty parent drum, as would be required by EP-DIV-AP-20075, R2, step 6.2. Conversely the NCS Empty label could be placed on the overpack drum designating that all practical material has been removed from a criticality safety perspective (this issue with NCS Empty stickers was identified in the MSA 2016-293 CS-OFI-02). Because the drum is empty, there is not a direct criticality concern, as the drum would be treated more conservatively as if it did contain fissile material.

This criterion was **partially** met.

6. *A change control process exists and is utilized such that NCS personnel review proposed changes to equipment or procedures that have an impact upon the criticality safety of the operation. (SD130, section 6.4.1.1)*

An FMOR process (NCS-AP-003, *Training and Mentoring*) is in place, which ensures that an annual operations review is performed. The MSA team noted as a pre-start finding that an FMOR would need to be performed prior to restart of the facility due to the length of shutdown and the new equipment being placed into the facility as part of the RNS operation. That FMOR for waste handling was started on 1/4/2017 and included NCS, CSO, and operations. The FMOR evaluated the process against procedures DOP-1381, R1, DOP-1380, R2, DOP-1376, R2, and DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*. There were no concerns noted in the FMOR, other than the need for a clarification associated with stacking the drums up to three high, as opposed to less than three high. When the FMOR was started, the WCG had not been cleaned out and process equipment for waste processing had not been installed; thus the FMOR was paused until cleanout was completed. This was noted on a second FMOR that was performed for the HEPA filter change-out on 1/10/2017. During this FMOR for the HEPA change-out CSED, it was noted that the equipment had not yet been installed in the box, and that the box had not yet been cleaned out. Following the start of the waste processing CSED FMOR, the glovebox had been cleaned of residual waste (approximately 2 cups were removed), however, the parent drum is still attached to the glovebox. The FMOR for waste processing recommenced and the “are required engineered features in place” was also checked as yes, referring to the procurement specifications for the 55-gal drums. The FMOR was completed on 1/19/2017, after the cleanout of the box and installation of the waste processing equipment were complete.

Review of procedures DOP-1381, DOP-1380, and DOP-1376 showed that there are no “circle-CS” steps associated with ensuring that the material is in a 55-gal drum (this is an engineered feature credited in the analysis). Procedures Area G-WO-DOP-1383, R1, *TA-54 Area G RNS Waste Container Shipment Preparation*, and WCRR-WO-DOP-1378, R2, *WCRRF Waste Container Receipt and Handling*, were reviewed and they also did not contain any circle-CS steps verifying the material was in a 55-gal drum.

In terms of review of procedures by NCS, a review of procedures DOP-1381, DOP-1380, and DOP-1376 demonstrated that revisions to these documents did receive review by NCS prior to

them being approved. Based on the FMORs being performed and the procedure changes being approved by NCS, this criterion was met.

Review of NCS-MEMO-15-002, *Criticality Accident Alarm System (CAAS) Evaluation for EWMO Facilities*, reveals that the current RNS activities in WCRRF are not specifically evaluated. There is a section within MEMO-15-002 that considers waste container remediation, and mentions that "only one process is currently authorized in WCRRF involving the manipulation of a single waste container at a time." That process evaluated in Jan 2015 is different from the RNS activities; however, many of the same controls are in place, and thus the same conclusion may be appropriate. Discussion in the CSED-16-086 does account for the presence of water piped to the glovebox, which is new since the NCS-MEMO-15-002 was evaluated, and comes to the same conclusion (section 4.4) that CAAS is not required. NCS-MEMO-15-002 should be updated to reflect these changed operations in WCRRF. Concerns over the lack of the CAAS memo covering the complete scope of operations was also acknowledged as CS-F.1e (OFI) from the FE. This issue did not get entered in PFITS associated with the FE and still remains an open OFI.

This criterion was met.

7. *A process exists and is utilized to identify potential process deviations and ensure that appropriate actions are taken (SD130, section 6.6.4, and section 6.10.1).*

EWMO-RM-AOP-20124, R0 (9/1/2016), *EWMO Nuclear Criticality Safety Requirement Non-Compliance*, outlines the steps associated with determining an EWMO criticality safety requirement noncompliance. The process is comprehensive, with the exceptions of the potential of missing an entry condition associated with WCRRF for material not in a 55-gal drum, and one for placing a drum containing an unassayed outlet HEPA filter within 10 feet of any other fissionable material. This abnormal operating procedure (AOP) was reviewed/approved by the NCSD and the CSO. The CRA team believes there is value in referencing the event/fact finding procedure that will be carried out in the event the determination is made that a noncompliance exists. Most importantly, the direction not to recover the situation is made within the AOP; however, this is directed to the operations center. In step 2.3, the operations center is directed to communicate with "personnel" to "DO NOT ATTEMPT to recover from the situation." This is the correct action, but it is not clear from interviews with the waste operators how effective the training on EWMO-RM-AOP-20124 is, and thus they may try to recover before making notification to their PIC. Interviews with the WD operators/PIC and the WD division leader revealed they were unaware of the AOP.

Reviews of UTrain (the LANL online training software) records (2/6/17) revealed that WCRRF operators/PICs are trained to this AOP via a required reading, and that those operators involved with DOP-1376 and DOP-1381 did complete this required reading. The operators did acknowledge that they would take part in a fact finding if one were called. They did not know what procedure controlled that fact finding, however, the WD division leader acknowledged that the FOD would lead such an event if it were to occur. Interviews with the PIC and operators revealed that they would pause if there was a question and they would notify the PIC. It was not

clear that the PIC would have a clear understanding on when a potential criticality noncompliance may have occurred. The WD-WT group leader was also queried as to their familiarity with the criticality safety noncompliance procedure (AOP-20124). The WD-WT group leader stated that they were familiar with the actions associated with this AOP and provided the correct actions during the interview. Review of the UTrain records (2/6/17) does not show that the WD-WT group leader completed a required reading of this procedure. The systematic approach to training determination form shows target audience as all waste operators, operations center personnel, Area G and WCRRF nuclear operators, operations center operator, shift operations supervisor (the group leader) and shift operations manager (SOM, the division leader). Review of the UTrain records (2/6/17) does not show the SOM during the DOP-1376 and DOP-1381 evolutions to have completed this required reading, however, during interviews the SOM stated he was aware of the AOP and commented that their training may have been at Area G. The operations center interviews showed that the operations center operators were aware of AOP-20124, however, only one of the two operations center operators interviewed showed complete on the required reading associated with this AOP.

During one of the evolutions, the operators found residual waste in the glovebox. The PIC was notified, work was paused, and the team leader was notified. The WD engineer was notified, and the PIC was asked to quantify the volume of waste. The PIC relayed this to an operator who had difficulty understanding how to quantify the waste. Upon relaying that the material was approximately half a tablespoon, the WD engineer and team leader concurred that this was less than the amount of “a few ounces or less” specified in the CSED, and the PIC was directed to continue work. During this discussion the operations center was not notified of the pause, and thus neither the CSO nor the NCSD was notified or requested to provide information/guidance. While, in this case, such notification may have been unnecessary, no other condition in the evolutions provided an opportunity to determine if the AOP would have been invoked if necessary. Review of UTrain Course 21287, R1, *Waste Disposition Criticality Safety Fundamentals*, shows that this concept of stop, stand back, call the operations center, and wait is well covered. There are also several slides and a review question that specifically cover the concept of not attempting to recover, pausing work, stepping away, controlling access, notifying others in the area and supervision/operations center, and waiting. Operators that were interviewed were well aware of the pause, step back, warn, isolate, and notify PIC; however, none mentioned the 15-foot distance as a requirement. The approval for the criticality safety training course (#21287) was signed by the CSO as the developer and also as SME. Typically, the SME signature would have been the NCSD. While previous revisions of this training were reviewed/approved by NCSD, it was confirmed via email with the CSA that this version was not reviewed/approved by NCSD.

Based on the training coverage, and the operator’s knowledge and demonstration to stop and contact the PIC upon a question on the compliance to criticality safety, this criterion is considered met. Procedures for the determination of process deviations/noncompliance exist and are current.

This criterion was met.

8. Sufficient qualified personnel are available to implement the criticality safety program. (SD130, section 5.8)

Implementation of the NCS program is shared by ORM/ORS, CSOs, and NCS CSAs. The NCS program is implemented via training, procedures, postings, and policy. Evolutions witnessed and interviews conducted pointed out weaknesses in these areas that were indicative of insufficient resources being applied to implement the NCS program completely. Other demands being placed on the CSO has led to limited time in the WCRRF and limited interaction with the operators associated with specific activities associated with RNS waste processing. Recent loss of the primary EWMO CSA (October 2016) within the NCSD has led to limited engagement by NCS CSAs to evaluate the actual practice of the procedures by operations in the ARTIC facility. This limited interaction by both the CSO and the CSAs has led to a condition where CSED requirements have not been adequately conveyed to the operations staff. This limited engagement was confirmed with both the CSO and the CSAs during interviews. No CSO or CSA presence was noted at any of the pre- or post-job briefings for the CRA evolutions, nor were they present for the evolutions themselves. The operations staff confirmed that they had received no CSED-specific training from either the CSO or the CSA, nor had they seen either of them in the facility during the practices. CSAs are coming up to speed on the facility since the departure of the primary CSA; however, this has led to a condition where the CSA staffing level is adequate to perform paper reviews but facility familiarity is still being developed. This may have led to the fact that some facility conditions were not addressed in the CSED and some criticality safety steps did not appear in the operational procedures.

By the end of the CRA evolutions, the operators demonstrated an adequate understanding of the criticality safety controls necessary to process this limited scope associated with RNS at WCRRF. CSED inadequacies and missing criticality safety steps in procedures were evaluated not to impact the ability to operate WCRRF safely for the scope evaluated by the CRA.

This criterion was **not** met.

9. Operations personnel and criticality safety staff are trained commensurate to their R2A2s (SD130, section 6.15.1 and section 4.3), ensuring that the level of knowledge of facility operations managers and staff responsible for administering and implementing the criticality safety program is adequate.

Interviews with the CSO determined that he had received no LANL or EWMO training specific to becoming a CSO. The current CSO has been in place about 18 months. He mentioned that since becoming a CSO he has received no additional training in criticality safety or on roles/responsibilities of the position. EP-DIV-AP-20075, R2, section 7.3 states that the CSO shall successfully complete and maintain training to the AP-20075 procedure. In addition, the CSO should complete the DOE NCS program course for managers. The NCSD organization may assist in the CSO training. The CSO was part of the review group for the revision to EP-DIV-AP-20075. The CSO took a previous version of the TA-18 criticality hands-on training while it was still being held at LANL, but has not had any documented refresher training in this area since his original class in 1997 (20 years). Review of the training database showed that the CSO

was not current on training to the AP-20075 procedure and had not attended the DOE NCS program manager's class. The CSO mentioned that he was not part of any type of CSO distribution or contact for lessons learned from the TA-55 CSOs. This is a lost opportunity for both education and knowledge sharing.

The lack of a defined CSO qualification or training package has been noted in previous institutional reviews.

Waste operations handlers are not certified as fissile material handlers based on a memo AD-NHHO-TR-16-020 (Barbee to Sonnenberg), *Non-FMH Decision at Area G, RANT and WCRRF*, sent December 1, 2016. Waste operations handlers do receive qualification, and that qualification was checked as part of the pre-job brief. The waste operators mentioned during the evaluation that they had performed multiple practice runs in the mock-up facility using the procedures including the criticality safety steps. Criticality awareness is covered as part of that training, however, CSED-specific training has not been provided to the workers specific to the RNS waste activities. During an evolution on RNS waste processing, a question arose on what was meant by one of the criticality safety steps. The PIC paused and asked the WD-WT group leader for clarification. This was the appropriate response, but it did highlight that the level of familiarity with this criticality safety basis was less than expected. Because the proper action was taken, this criterion is determined to be met, and, while this is sufficient for the current scope of this operation, CSED-specific training by NCS to both the CSO and operations staff would help them better evaluate conditions in the field as they are performing work.

NCS CSA qualifications were reviewed in UTrain; there was one NCS senior CSA-qualified and three CSA-qualified individuals in the database. None of these individuals are solely devoted to EWMO since the loss of the NCSD resource in October 2016. Sufficient qualified staff is in place, however, the priority provided to EWMO may not be sufficient during times of development of new processes and procedures (e.g., RNS waste processing) to ensure full NCS in-field compliance and understanding by the operators.

This criterion was met.

10. Adequate facilities and equipment are available to ensure criticality safety support. (SD130, section 5.7)

Discussions with NCSD and NCS CSA supporting WCRRF did not identify any equipment or facility needs that would prevent adequate support for criticality safety. In the past, the CSA was co-located with the operations in EWMO, which provided for easier access to the CSA by operations personnel. NCSD should evaluate colocation of the CSA either part- or full-time, even on a rotational basis, in a location that is more accessible to the EWMO personnel. Discussions with the FOD, WD division leader, and operators did not identify any concerns that criticality safety was not adequately supporting the facility needs.

This criterion was met.

CONCLUSION

Results of evolutions, document reviews, and interviews led the CRA team to the conclusion that, while there are areas of necessary improvement, the current level of implementation of criticality safety is sufficient to process the limited RNS waste campaign in the WCRRF WCG. Operator knowledge is sufficient and the procedures are adequate to provide assurance of safe operations for the identified scope covered by this CRA. Support resources (e.g., CSO and CSAs), while sufficient in number, have not had appropriate priority to ensure that the NCS program and its implementation are flawless; however, these improvements do not constitute a systematic failure of the program, nor was a significant failure found that could result in unacceptable impact on personnel, the facility, the public, or the environment.

This objective was met. No findings were identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	E. Fitz Trumble **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Emergency Management**	Objective: EM1 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

EM1: A routine operations drill program and an emergency management drill and exercise program have been established and implemented. Records for each program are adequate to demonstrate the effectiveness of completed drills and exercises as well as planning for future drills and exercises. (CR1, CR4, CR6, CR5, CR10)

CRITERIA

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. A WCRRF drill program (addressing anticipated abnormal and emergency scenarios, including those identified in the BIO and the emergency planning hazards assessment [EPHA]) has been established and implemented for WCRRF operations. (DOE O 151.1C)
3. Records for WCRRF operational drills, emergency drills, and exercises are adequate to demonstrate the effectiveness of completed drills and exercises, as well as planning for future drills and exercises. (DOE O 151.1C)
4. When weaknesses (or opportunities for improvement) are identified in WCRRF operational drills and emergency drills and exercises, corrective actions are developed and implemented. (DOE O 151.1C)
5. Observed WCRRF operations drills or emergency exercises demonstrate adequate performance to meet objectives of the drill plan. (DOE O 151.1C)

APPROACH

Records Reviewed

- ABD-WFM-005, R2, *Basis for Interim Operation for Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, 11/9/2011
- ABD-WFM-005, R2.1.A, Attachment 1, R1, *WCRRF Support Activities for the Treatment of RNS Waste.* 10/21/2016
- AREAG-RM-AOP-1299, R1, *TA-54-375 and RNS Waste Container Abnormal Conditions*, 11/29/2016
- EWMO-WCRRF-16-001, Attachment 2, *Loss of the RNS Refrigerator*, 11/7/2016
- DOE G 151.1-2, *TECHNICAL PLANNING BASIS Emergency Management Guide*, 7/11/2007
- DOE O 151.1C, *Comprehensive Emergency Management System*, 11/2/2005
- Email, Solms to Romero, Subject: *Re: EM assessor question*, 2/7/2017
- *Emergency Drill Comments* from 2/7/2017 WCRRF Emergency Exercise

- *Emergency Drill comments from 2/7/2017 WCRRF Emergency Exercise Guide*, 2/8/2017
- EPHA Briefing RNS Drum, Training Course Information /Roster, Form 1651con, 11/30/2016
- EPP-AAR-260, R0, *April 9, 2014 Waste Characterization, Reduction, and Repackaging Facility (WCRRF) Exercise After Action Report*, 4/30/2014
- EWMO-AP-0112, R0, *EWMO Pre-Job Briefings*, 8/5/2016
- EWMO-AP-20297, R0, *EWMO Emergency and Operational Drill Program*, 8/25/2016
- EWMO-AP-20297, R0, *Emergency and Operational Drill Guide Template*, 8/26/2016
- EWMO-BEP-20048, R0, *EWMO Division Building Emergency Plan*, 8/29/2016
- EWMO-RM-AOP-20201, R0, *Discovery of an Airborne, Liquid, and/or Solid Material Release or Spill*, 9/1/2016
- EWMO-RM-AOP-20203, R0, *Severe Weather*, 9/16/2016
- EWMO-RM-ERP-20200, R1, *EWMO Area Emergency Response*, 11/23/2016
- EWMO-RM-ERP-20200, R1, *EWMO Area Emergency Response*, 11/22/2016
- EWMO-RP-003, R0, *Responding to a CAM Alarm at TA-50, Artic/Bldg. 69, Rm 102*, 9/30/2016
- EWMO-RP-004,R0, *Responding to a Glove Failure at TA-50, ARTIC/Bldg. 69 Rm 102*, 10/26/2016
- EWMO-RP-008, R0, *EWMO Responding to a Glove Failure*, 2/3/2017
- EWMO-RP-17-008, R0, *Responding to a Glove Failure at the WCG in WCRRF*, 2/3/2017
- EWMO-TPP-001, R1, *Environmental Waste Management Operations (EWMO) Training Program Plan*, 1/11/2017
- EWMO-WCRRF-16-001, R0, *Loss of the RNS Refrigerator*, 10/27/2016
- EWMO-WDD-16-1205, R0, *Operational Drill-Type 3 Degraded RNS drum in 231 (simulating Dome 375 Permacon)*, 12/5/2016
- EWMO-WDWT-16-001, *Operational Drill- WCG Glove Tear*, 9/12/2016
- Excel Spreadsheet, *Drill Schedule Export r4*, from Gonzales, 11/30/2016
- Excel Spreadsheet, *Emergency Mgmt Actions and All Actions Report*, from Tingey 12/1/2016
- Memorandum from Lovato and Stokes to Streit dated 1/30/2017
- Memorandum QPA-DO: 16-067, from Spain to Distribution, *Transmittal to the Facility Evaluation (FE) Report*, 10/21/2016
- Memorandum, ADMASER: 17-001, from Telles to Funk, Subject: *TRU Nitrate Salt Waste Drums Addendum to the EPHA for TA-54 AREA G Site*, 1/20/2017
- Memorandum, ADMASER:16-433, from Lansing to Muñoz, Subject: *Transmittal of EPHA Program Request*, 11/8/2016
- NHHO-PLAN-011, R0, *DOE Order 426.2 Compliance Plan*, 4/5/2016
- OS-DO-RA-17-001P, *Implementation Plan (IP) for the Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF)*, 1/27/2017
- P1201-4, R3, *LANL Emergency Procedures and Protective Actions*, 12/22/2015
- P121, R5, *Radiation Protection, Attachment A, Functional Areas*, 10/27/2016
- PD1200, R4, *Emergency Management*, 10/5/2016

- PD322, R3, *Laboratory Performance Feedback and Improvement*, 4/21/2016
- PFITS 2017-259, *Not all issues identified during emergency drills were screened through the EWMO Management Review Boards and placed in PFITS, as required in P322.*
- PFITS 2017-121, *Formal training for exercise controllers and evaluators is needed.*
- *Report for the Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF) Management Self-Assessment (MSA)*, 1/6/2017
- SEO-287, R0, *Los Alamos National Laboratory Functional Exercise at WCRR Facility After Action Report*, 3/25/2015
- SEO-48, R0.2, *Emergency Drill Program Plan*, 6/30/2016
- SEO-AAR-287, R0, *February 4, 2015 Los Alamos National Laboratory Functional Exercise at WCRR Facility After Action Report*, 3/25/2015
- SEO-AAR-326, R0, *December 8, 2016 Waste Characterization, Reduction and Repackaging Facility Exercise After Action Report*, 1/17/2017
- SEO-EXPLAN-326, R0, *December 8, 2016 Waste Characterization, Reduction, and Repackaging Facility Exercise Plan*, 12/5/2016
- SEO-PLAN-120, R3.4, *Exercise Program Plan*, 1/24/2017
- SEO-PLAN-148, R0.2, *Exercise Drill Program Plan*, 6/30/2016
- SEO-SO-008, R1, *TRU Nitrate Salt Waste Drums Addendum to EPHA for the TA-54 Area G Site*, 11/18/2016
- Slides, *RNS Waste Receipt & Handling Comprehensive Pre-job Brief*, 1/31/2017
- Slides, *RNS Waste Treatment Operations Comprehensive Pre-job Brief*, 1/31/2017
- WCRR-FO-AP-1339, R0, *Radiation Protection Requirements*, 8/5/2016
- WCRR-PLAN-1388, R0, *Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF) Contractor Readiness Assessment (CRA) Plan of Action (POA)*, 10/11/2016
- WCRR-PLAN-1388, R0, *Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF)*, 10/11/2016
- WCRR-RM-AOP-1165, R0, *WCRRF Loss of Confinement Ventilation System*, 10/4/2016
- WCRR-RM-AOP-1173, R0, *Loss of Glovebox Integrity*, 10/4/2016
- WCRR-RM-AOP-1392, R0, *Emergency and Operational Drill Guide Template*, 10/31/2016
- WCRR-RM-AOP-1392, R1, *WCRRF and RNS Waste Container Abnormal Conditions*, 11/28/2016
- WCRR-RM-ARP-1394, R0, *WCRRF Confinement Ventilation System Alarms*, 11/7/2016
- WCRR-SO-1406, R0, *Administrative Control 5.6.2, Emergency Preparedness Program*, 1/9/2017
- WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, 1/27/2017
- WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, 1/11/2017
- WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, 1/27/2017
- WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, 1/27/2017

- WCRR-WO-DOP-1381, R1, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*, 1/11/2017
- WD/EWMO Action Closure Forms

Interviews Conducted

- Environment, Safety & Health Manager
- Emergency Program & EPHA Manager/Coordinator
- Operational Drill Program Manager

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Tabletop Discussion of RNS Shipment Preparation (Area G), 1/31/2017
- Verification of readiness to receive at WCRRF (WO-DOP-1383), 1/31/2017
- Comprehensive pre-job brief of Receipt and Handling (1378), 1/31/2017
- Comprehensive pre-job brief on RNS Treatment (DOP 1376, 1380, 1381, 1396), 1/31/2017
- Evolution: Perform prerequisites for treatment and Parent Drum Operations (DOP 1380), 1/31/2017
- Prerequisites Preparation for RNS Treatment- Post-Job Review, 1/31/2017
- Prerequisites for Treatment Pre-Job, 2/1/2017
- Evolution: RNS Waste Treatment Operations (DOPs 1376, 1396), 2/1/2017
- Evolution: complete RNS Treatment and Daughter Drum Operations DOP 1381, 2/1/2017
- RNS Treatment Operations Post-Job Review, 2/1/2017
- Emergency Drill Planning/Walkdown, 2/2/2017
- Demonstration: WCG Maintenance Evolution - WCRR-WO-DOP-1101, R1 2/3/2017
- Pre-Job and Daughter / Parent Bag-Off Evolution, 2/3/2017
- Evolution: complete RNS treatment-one batch and WypAlls into daughter drum (DOP-1376), 2/1/2017
- Post-Job Daughter Bag-Off, 2/3/2017
- Pre-job and Operational Drill, EWMO-RP-17-008, R0, *Responding to a Glove Failure at the WCG in WCRRF*, 2/3/2017
- Emergency Drill Prep- Controller/Evaluator Briefing, 2/6/2017
- Emergency Drill Prep-SEO Observer, 2/6/201
- Controller Evaluator Briefing, 2/7/2017
- Emergency Drill Prep- SEO Player Briefing, 2/7/2017
- Emergency Drill, 2/7/2017
- Emergency Drill Controller Hotwash and Critique, 2/7/2017
- Operational Drill, 2/8/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

There are no targeted prerequisites identified in WCRR-PLAN-1388 or the IP for this functional area. Two pre-start findings were identified in the MSA related to emergency management. The status of those findings is as follows:

- "EM-PRE-1: The EPHA for Area G that includes updates for the RNS waste drums at WCRRF has not been approved, as required by DOE O 151.1C." Evidence confirms that DOE approval of the EPHA was received on 12/22/2016.
- "EM-PRE-2: The emergency management program at WCRRF did not demonstrate proficiency during the planning and execution of the scheduled emergency exercise per DOE-STD-3006-2010." The PFITS item 2017-82 was generated to address this issue. All actions and supporting documentation were reviewed, and closure of the actions was confirmed.

This criterion was met.

2. *A WCRRF drill program (addressing anticipated abnormal and emergency scenarios, including those identified in the BIO and the EPHA) has been established and implemented for WCRRF operations. (DOE O 151.1C)*

A review of the MSA and FE evaluation of the WCRRF drill program, as well as review of the governing documents, indicates that the program documents are consistent and provide sufficient guidance to implement the emergency management program effectively at WCRRF. PD1200, *Emergency Management*, incorporates the requirements of the order and flows that down through P1201-4, *LANL Emergency Procedures and Protective Actions*, to the various facilities at LANL, including EWMO. EWMO-BEP-20048, R0, *EWMO Division Building Emergency Plan (BEP)*, 8/29/2016, addresses the requirements of P1201-4 for activities that are in the scope of EWMO, and specifies the development of emergency drills and exercises for known emergency response scenarios.

The emergency management program is, with one exception, in compliance with the requirements of DOE O 151.1C, *Comprehensive Emergency Management System*. The facility has not integrated SEO-SO-008, R1, *TRU Nitrate Salt Waste Drums Addendum to EPHA for the TA-54 Area G Site*, into the emergency drill and exercise program, as required per DOE O 151.1C and PD1200 sections 4.7, 4.11, and 4.12. This was captured in the MSA as a post-start action (EM-POST-1) and is being tracked as PFITS item 2017-102. An email from Solms to Romero, Subject: *Re: EM assessor question*, sent on 2/7/2017, indicated the anticipated closure date of this action is 2/15/2017 with the deliverable of a revision to EWMO-AP-20297, R0, *EWMO Emergency and Operational Drill Program*, 08/25/2016.

Interviews with the emergency management drill coordinator and the operational drill program manager indicate that sufficient resources are available to meet the drill schedules and manage both programs.

This criterion was met.

3. *Records for WCRRF operational drills, emergency drills, and exercises are adequate to demonstrate the effectiveness of completed drills and exercises, as well as planning for future drills and exercises. (DOE O 151.1C)*

A review of the governing documents and review of the after-action reports for the 2014, 2015, and 2016 emergency exercises, as well as nine after-action reports for operational drills, demonstrated that the emergency actions are being adequately addressed, and lessons learned are being identified. However, tracking and trending of drill findings is not formalized. The operational drill program manager stated that reviews of past drills to identify lessons learned and focus areas is occurring. He also stated that he was aware that this was a weakness and plans to evolve the program to track and trend results. The creation of Attachment 2 of AP-20297 is an improvement for capturing and categorizing operational drill observations. It was identified that AP-20297 was not consistently used during the latest drills.

During this assessment, it was identified that the operator aids abnormal/emergency responses cards worn by the operators were not the current revision found in EWMO-BEP-20048, R0. This was corrected during the assessment.

All objectives identified in the December 8, 2016 WCRRF exercise relating to LANL's Security and Emergency Operations Emergency Management (SEO) organization were met. However, during the exercise, the injured person was not recovered for 90 minutes; this one area of concern resulted in the creation of 10 proposed actions raising concerns over the efficacy of the exercise objectives as created by the computer program, Exercise Builder. Evidence was not produced that the SEO organization has taken action to address Laboratory-wide program actions that improve recovery of an injury or casualty during drills. This item does not impact WCRRF meeting this objective.

This criterion was met.

4. *When weaknesses (or opportunities for improvement) are identified in WCRRF operational drills and emergency drills and exercises, corrective actions are developed and implemented. (DOE O 151.1C)*

Based on document reviews, observations of drills and hotwashes, and interviews with emergency management personnel, the CRA team concludes that, when weaknesses or OFIs are identified in WCRRF operational drills, emergency drills, and exercises, corrective actions are developed and implemented.

PFITS action 2017-259 (generated by the Area G MSA finding "EM-POST-2: Not all issues identified during emergency drills were screened through the EWMO Management Review Boards and placed in PFITS, as required in P322.") is scheduled for closure 2/15/17. This action will ensure that the management review board (MRB) has oversight of issues identified from the drills. The operational drill program manager is also driving the controllers and evaluators to improve the drill process. This was evident during the critique of emergency drill, when the operational drill program manager mentored an evaluator to create specific critical comments that were actionable.

PFITS action 2017-121 (Area G MSA OFI "EM-OFI-1: Formal training for exercise controllers and evaluators is needed.") identified that formal training was needed for controllers and evaluators, and has a due date of 2/15/2017. A review of the training records against 2017-EWMO-017 Controller Listing, identified that four out of twenty evaluators had not completed the training. The review also identified that, as of 2/9/2017, no RP personnel supporting EWMO have completed the training.

WCRRF has identified that improvements are necessary for identifying observations from emergency and operational drills that require formal tracking.

This criterion was met.

5. *Observed WCRRF operations drills or emergency exercises demonstrate adequate performance to meet objectives of the drill plan. (DOE O 151.1C)*

Based on observations of drills and hotwashes, the CRA team concluded that observed WCRRF operations drills or emergency exercises demonstrated adequate performance to meet objectives of the drill plan. Observation of two operational drills and an emergency drill during this CRA indicated that the program is improving in both planning and execution, and that the continuous improvement component of the program is active. A strong safety culture of the drill participants was evident in the participants' morale and enthusiasm observed during the drills, as well as the critical nature of the hotwashes. The first of the two operational drills, EWMO-RP-17-008, *Responding to a Glove Failure at the WCG in WCRRF*, was deemed an inadequate demonstration by the CRA team, leading the team to request that the drill be repeated, the second time in the WCRRF instead of ARTIC. The second operational drill was very well performed in both planning and execution, and was considered satisfactory.

The first operational drill witnessed by the CRA team was performed in the ARTIC facility. Controls initiated by the radiological control technician (RCT) were not in accordance with the procedure and ultimately led to the simulated contamination of the room and a resulting simulated CAM alarm. While the actions of the RCTs would have prevented a radioactive inhalation to the glovebox worker, actions taken as a result of the CAM alarm resulted in the contaminated man comingling with the previously evacuated workers. This created a potential source term for inhalation to the evacuated workers. An additional issue resulted when the second RCT left the room when the order was given for the workers to evacuate the area,

effectively leaving one RCT to complete the corrective actions. Overall, the performance in this drill was not an adequate demonstration of the facility to respond to a radiological event.

The second operational drill EWMO-RP-17-008, R1, demonstrated significant improvement over the first drill. The RCTs were successful in removing the worker from the torn glove without a spread of contamination. The operations center worked well, and satisfactory drill communications were observed. The health physics field coordinator at the operations center took an overview positon and made sound recommendations. Three issues were identified in the drill: in response to a loss of glovebox integrity, the work crew is to take differential pressure readings of the glovebox as they exit the area. There were no operators in the area that were qualified to read the Allen-Bradley unit used to measure glovebox differential pressure. This was recognized in the hotwash, with an action taken to review this requirement. At one point in the drill, two operators and a drill controller were seen standing on a work platform that was approved for only two persons. These discrepancies did not impact meeting drill objectives.

The emergency drill conducted during the review demonstrated significant improvement with respect to the exercise performed during the MSA. While there were issues associated with RP response and sheltering in-place, all objectives of the Los Alamos Fire Department (LAFD) and the emergency managers were met. The drill was deemed to be an adequate demonstration of WCRRF to conduct and evaluate performance. Good performance was witnessed by the WCRRF work crew who, upon failure of the rupture disc, immediately evacuated the facility, assisting the injured person until receiving a drill inject to leave the injured person. The actions of the RCTs at the assembly area were uncoordinated, did not fully utilize resources available, and would have made control of the hot/warm zone interface difficult. Observation of sheltering in-place at the second floor of building 54 identified deficiencies that were not recognized by the drill evaluator, including the condition that no audible notification could be heard from that location that a shelter in-place had been declared.

This criterion was met.

CONCLUSION

Based on observations of drills and hotwashes, documentation reviews, facility walkdowns, and interviews, the CRA team concluded that a routine operations drill program and an emergency management drill and exercise program have been established and implemented to support restart of WCRRF RNS operations. Records for each program are adequate to demonstrate the effectiveness of completed drills and exercises and their use in planning for future drills and exercises. When weaknesses or opportunities for improvement are identified in WCRRF operational drills and emergency drills and exercises, corrective actions are developed and implemented. The emergency management SMP was verified to be adequately implemented for WCRRF.

This objective was met. No findings were identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Steven McNitt **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Engineering**	Objective: ENG1 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

ENG1: The facility systems and procedures, as affected by facility modifications, are consistent with the description of the facility, procedures, accident analysis, and assumptions included in the safety documentation. A formal program is defined and implemented to control facility modifications. Authorized modifications within the scope of the readiness review have been completed and fully closed, or evaluated and determined not to affect the ability to start nuclear operations safely. (CR 1, CR2, CR3, CR4, CR5, CR6, CR7, CR8, CR9)

CRITERIA

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. A CM program that incorporates WCRRF operations safety systems, including VSSs and design features listed in the WCRRF BIO and TSRs, has been implemented. (10 CFR 830.122, DOE O 420.1C, DOE O 433.1B)
3. The CM program in support of WCRRF results in accurate as-built drawings and other necessary technical documentation to support safe operations, maintenance, and emergency planning for WCRRF operations. The WCRRF technical baseline documentation is accurate, up-to-date, and consistent with the descriptions and assumptions in the safety basis documentation for WCRRF. (DOE O 433.1B, 10 CFR 830.122)
4. Configuration management processes associated with WCRRF include a robust USQ program. (10 CFR 830.203)
5. VSSAs and system health reporting have been performed to verify that safety SSCs configuration and performance are maintained consistent with safety basis requirements. (10 CFR 830)
6. The level of knowledge of managers and staff responsible for administering and implementing the CM and system engineering programs is adequate, based on review of examinations and examination results, interviews, and observation of operational demonstrations. (DOE O 420.1C, DOE O 426.2)
7. An adequate number of qualified cognizant system engineers (CSEs) have been assigned. CSEs act to ensure the CM and accuracy of the technical baseline for assigned systems. The level of knowledge of CSEs and other CM program personnel concerning their roles and responsibilities for WCRRF operations is adequate. (DOE O 426.2)
8. Issues from previous assessments of the CM and system engineering programs as related to WCRRF operations have been effectively tracked and resolved. (DOE O 226.1B, DOE O 414.1D, SD 330)

APPROACH

Records Reviewed

- ABD-WFM-005, R2.1, B*asis for Interim Operation for Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, 12/7/2011
- ABD-WFM-005, R2.1.A, Attachment 1, R1, *WCRRF Support Activities for Treatment of RNS Waste*, 12/14/2016
- ABD-WFM-006, R2.5.1, *Technical Safety Requirements (TSRs) for Waste Characterization, Reduction, and Repackaging Facility (WCRRF),* 12/20/2016
- AP-341-101, R3, *Designating Vital Safety Systems and Cognizant System Engineers*, 8/30/2014
- AP-341-403, R1, *Master Document List*, 8/30/2014
- AP-341-404, R2, *Master Equipment List*, 8/24/2013
- AP-341-405, R3.1, *Identification and Control of Technical Baseline, Variances, Alternate Methods, and Clarifications in Operating Facilities*, 12/15/2013
- AP-341-503, R2, *Technical Evaluation of Replacement Items*, 9/5/2012
- AP-341-504, R2, *Temporary Modification Control*, 7/31/2013
- AP-341-516, R3, *Operability Determination*, 5/24/2014
- AP-341-517, R1, *Design Change Form*, 5/18/2012
- AP-341-519, R4, *Design Revision Control*, 12/2/2015
- AP-341-611, R2, *System Design Descriptions*, 9/10/2015
- AP-341-616, R1, *Technical Baseline Change During Design*, 12/1/2013
- AP-341-703, R4, *Commercial Grade Dedication*, 12/15/2015
- AP-341-802, R4, *System Health Reporting*, 3/24/2015
- AP-341-901, R4.1, *Performing Vital Safety System Assessments*, 6/16/2015
- CSE Qualification Package for WCRRF Building TA-50-0069 Structural Integrity CSE dated 8/31/16
- CSE Qualification Package for WCRRF Waste Characterization Glovebox Drum Lift Fixture; Building TA-50-0069 FSS CSE, dated 10/6/16
- DCE-50-0069-01300, R0, *Discovered Condition Evaluation for WCRRF Building Integrity Discrepancies and Degradation*, 10/24/2016
- DCE-50-0069-104, R0, *50-0069 FPS Sprinkler Head Corrosion in the WCG*, with attached POD-50-0069-105, R0, 12/14/2016
- DCF-16-50-0069-1460, R0, *WCRRF DRE-001 and 002 Electrical Control Upgrade*, 8/15/2016
- DCF-54-0375-01189, R2, *Supplemental Venting for RNS Drums*, 11/21/2016
- EM-AP-10008, R0, *ADEM Roles, Responsibilities, Authorities, and Accountabilities*, 11/23/2016
- EP-AP-10007, R2, *Technical Procedure Development*, 11/21/2016
- EP-AP-20047, R1, *WD Glovebox and Glovebox Glove Safety Program*, 1/12/2017
- EWMO-RP-008 R0, *Operational Drill*, 2/7/2016
- NCR-2017-043, *WCRRF Fridge Temp Modification Installation*, 2/2/2017

- NI-1393, *New Information – Vital Safety System Assessment of Vehicle Barriers*, 10/26/2016
- NI-1594, *Inconsistency Between WCRRF Vehicle Barrier Design and Supporting Calculation*, Not issued
- P313, R9, *Roles, Responsibilities, Authorities, and Accountability*, 3/4/2015
- P315, R6, *Conduct of Operations Manual*, 7/8/2015
- P341, R5, *Facility Engineering Processes Manual*, 11/7/2014
- P950, R5, *Conduct of Maintenance*, 12/10/2014
- PD340, R5, *Conduct of Engineering for Facility Work*, 1/27/2014
- PFITS 2016-2167-1, *The ML determination for the EDS components does not match up with Table 4-22 of the WCRRF BIO.*
- PFITS 2016-2170-1, *WCRRF Facility Technical Baseline documents are not consistent with EDS and UPS Technical Baseline documents and are not complete or up to date.*
- PFITS 2016-2173, *The WCRRF EDS and UPS have not had a system ML Determination performed.*
- PFITS 2016-2174-1, *Drawing set C55995 R0 is out of date and not consistent with the current field configuration.*
- PFITS 2016-2175-1, *WCRRF EDS has missing or incorrect labeling.*
- PFITS 2016-2176-1, *Neither the Operability Determination Process nor Non-conformance Process was entered when system discrepancies were identified during breaker testing.*
- PFITS 2017-83, Action 1, *Complete Surveillance and ISIs to transition to Warm Standby*
- PFITS 2017-84, Action 1, *Develop an NCR for the Gypsum board to document that the gypsum meets the requirements of Chapter 4 of the BIO and can be used as is*
- PFITS 2017-85, Action 1, *Revise TMC-50-0069-112 to incorporate the identified deficiencies*
- PFITS 2017-85, Action 2, *Replace leg on the WCG*
- PFITS 2017-85, Action 4, *Complete Closure of Temp Mod -01182*
- PFITS 2017-85, Action 3, *Complete post-maintenance ISI on replaced leg*
- SAR-50-0069-00787, R0, *LANL Vital Safety Assessment Report for Confinement Ventilation System at TA-50, Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, 12/23/2013
- SAR-99-MULT-01281, R0, *Vital Safety Assessment Report for Vehicle Barriers at Area G and WCRRF)*, 9/26/2016
- SAS-50-0069-00950, R1, *Vital safety System Assessment Schedule for WCRRF*, 9/17/2015
- SBDL-WCRRF-475, R1, *Safety Basis Document List for Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, 1/3/2017
- SBP-112-3, R3.1, *Unreviewed Safety Question (USQ) Process*, 7/15/2016
- SHR-50-0069-01179, *System Health Report WCRRF Fire Suppression System (FSS)*, 2/1/2016
- SHR-50-0069-01270, *System Health Report WCRRF Building Structural Integrity*, 8/1/2016
- SHR-50-0069-105, *System Health Report WCRRF Vehicle Barriers*, 12/5/2016

- SHR-50-0069-107, *System Health Report WCRRF Fire Suppression System (FSS)*, 1/25/2017
- SHR-50-0069-109, *System Health Report WCRRF Confinement Ventilation System (CVS)*, 2/3/2017
- SHR-50-0069-110, *System Health Report WCRRF Uninterruptible Power Supply (UPS)*, 1/31/2017
- TMC-50-0069-0112, R1, *Installation of Temporary Walk In Refrigerator*, 1/26/2017
- TMC-50-0069-111, *Modifications for Processing of RNS Drums in WCG*, R1, 1/27/2017
- VAR-10075, R0, *PRDwSF Variance for P341 Administrative Procedures*, 11/15/2016
- VAR-2015-062, R0, *Reduction in Requirements for WCRRF Drum Lift, RANT Type Bs, RANT TRU Waste Containers, WCRRF Waste Confinement Glovebox, and WCRRF TRU WASTE Containers Inside and Out*, 8/6/2015
- VAR-2015-062, R1, *Reduction in Requirements for WCRRF Drum Lift, RANT Type Bs, RANT TRU Waste Containers and WCRRF TRU WASTE Containers Inside and Out*, 8/5/2016
- VSS-50-0069-00000, R4, *List of Facility VSSs and CSEs for WCRRF*
- VSS-50-0069-00000, R4, *WCRRF List of Facility VSSs and CSEs*, 11/2/2016
- *WCRRF Master Equipment List*, 11/28/2016
- WCRRF-15-211-D, R0, *WCRRF Building TA-50-69 Structural Design Integrity Inspection*, 12/7/2015
- WCRRF-FO-DOP-1193, R0, *WCRRF Waste Characterization Glovebox Annual Drum Lift Surveillance*, 8/29/2016
- WCRRF-FO-DOP-1365, R0, *Waste Characterization Glovebox In-Service Inspection*, 12/15/2016
- WCRRF-FO-DOP-1365, R0, *Waste Characterization Glovebox In-Service Inspection*, completed 1/24/2017
- WCRR-FO-DOP-1192, R0, *WCRRF Building TA-50-69 Structural Design Integrity Inspection*, 12/10/2015
- WCRR-FO-DOP-1192, R0, *WCRRF Building TA-50-69 Structural Design Integrity Inspection*, completed 10/26/2016
- WCRR-FO-DOP-1192, R0, *WCRRF Building TA-50-69 Structural Design Integrity Inspection*, completed 2/2/2017
- WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, dated 11/28/2016
- WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*, 1/5/2017
- WCRR-PLAN-1388, R0, *Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF) Contractor Readiness Assessment (CRA) Plan of Action (POA)*, 10/11/2016
- WCRR-SO-1407, R0, *Performance of WCRRF Procedures with Engineering Oversight*, 1/18/2017
- WCRR-SO-1407, R0, *Performance of WCRRF Procedures with Engineering Oversight*, 1/18/2017
- WCRR-VS-DOP-1355, R1 IPC-3, *TA-50-69-Annual Confinement Ventilation System Instrument Calibration Surveillance*, 12/20/2016

- WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, 1/11/2017
- WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, 1/27/2017
- WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, 1/11/2017
- WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, 1/27/2017
- WCRR-WO-DOP-1381, R1, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*, 1/11/2017
- WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*, 1/27/2017

Interviews Conducted

- CSEs for Glovebox/Ventilation, EDS/UPS, Building Integrity/Vehicle Barriers/Drum lift, WCRRF FSS/Structural Integrity, PRDwSF/TRU Waste Containers
- EWMO Engineering Manager
- Safety Basis Analyst (2)
- USQ Evaluator
- USQ Qualified Evaluators (QEVs) (2)
- WD Division Leader
- WCRRF Nuclear Operations Team Lead/PIC
- WCRRF Nuclear Operators (2)
- WCRRF Operations Center Operator
- WCRRF Process Engineer (PrE)
- WCRRF SOM
- WCRRF Waste Operations Team Lead/PIC
- WCRRF Waste Operators (3)

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Tabletop: AREAG-WO-DOP-1383, R1, *TA-54 Area-G RNS Waste Container Shipment Preparation*, on 1/31/2017
- Pre-Job briefing: WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, on 1/31/2017
- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, section 4.0, Prerequisite Actions, initiated 1/31/2017. Stop Work initiated on 1/31/2017
- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, on 2/1/2017
- Demonstration: WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*, on 2/1/2017
- Demonstration: WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, on 2/1/17

- Demonstration: WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*, on 2/2/2017
- Demonstration: WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, on 2/2/2017
- Demonstration: WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, section 5.1, Replace Glovebox Gloves, on 2/3/2017
- Operational Drill: Punctured Glovebox Glove on 2/3/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

Based on observation of field activities, procedure and document reviews, and formal/informal interviews, the CRA team concluded that the prerequisites identified in WCRR-PLAN-1388 for the engineering functional area have been met. The health of the engineering program was reviewed and found acceptable as implemented to support the restart of WCRRF operations. Management signatures attesting to the health of the USQ program and the engineering/ configuration management (CM) program are included on the *Readiness Review Prerequisite Acceptance Form*.

The Conduct of Engineering program and, in particular, the CM SMP, are implemented and in compliance with both PD340, *Conduct of Engineering for Facility Work*, and the associated procedures, which meet the requirements of DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, and DOE O 420.1C, *Facility Safety*. Roles and responsibilities are described in EM-AP-10008, *ADEM Roles, Responsibilities, Authorities, and Accountabilities*, for the engineering organizations assigned to support WCRRF operations. The twelve identified VSSs all have a qualified primary CSEs identified. There is currently one qualified PrE assigned to support WCRRF operations. WCRRF has not developed a facility level CM document; instead the engineering administrative procedures (APs) are implemented directly, and are in compliance with DOE-STD-1073-2003, *Configuration Management*, and DOE-STD-433.1B, *Maintenance Management Program for DOE Nuclear Facilities*.

There were three pre-start items identified for engineering during the MSA. A review of the closure package for ENG-PRE-1 from the MSA (PFITS 2017-83 Action 1) demonstrates that surveillance requirements (SRs) and ISIs have been performed to support going to “warm standby” and “operations” modes. The MSA identified a pre-start finding (ENG-PRE-2) regarding verification of building ceiling repair attributes versus the WCRRF BIO Chapter 4 description has been closed (PFITS 2017-84, Action 1). A nonconformance report (NCR) was issued with a “use-as-is” disposition approved. Additionally, ENG-PRE-3 was identified in the MSA related to temporary modifications TMC-50-0069-112 (*Installation of Temporary Walk In Refrigerator*) and TMC-50-0069-01182 (*TA-50-69 Engineering to Remove Leg of Glovebox*). The WCG leg was reinstalled and TMC-50-0069-01182 was closed (PFITS 2017-85, Actions 2, 3, and 4). TMC-50-0069-0112 for installation of the refrigerator was revised (PFITS 2017-85, Action 1); however, due to an identified nonconforming condition, the temporary modification – and therefore the refrigerator – is not yet accepted by operations.

The BIO and TSR modifications to support RNS processing have been approved, verified, and implemented (see CRAD SB1 for detailed discussion). Evidence shows that the USQ program is implemented at WCRRF and integrated with CM (for more detail, see criterion 4). Discussions with engineers/engineering management and a review of organizational charts indicate that there are an adequate number of qualified/knowledgeable personnel to provide appropriate engineering support to WCRFF operations (for more detail, see criteria 6 and 7). Engineering roles and responsibilities have been clearly defined, understood, and are effectively implemented at WCRRF (for more detail, see criterion 7).

Based on document reviews, interviews with engineering personnel, walkdowns, and witnessed evolutions, the CRA team concluded that the CM program is acceptably implemented for the processes encompassed by this review. The current implementation of the CM SMP will support safe restart of RNS waste operations at WCRRF.

This criterion was met.

2. *A configuration management program that incorporates WCRRF operations safety systems, including VSSs and design features listed in the WCRRF BIO and TSRs, has been implemented. (10 CFR 830.122, DOE O 420.1C, DOE O 433.1B)*

Based on documents reviewed, interviews conducted, and observations/walkdowns, the CRA team concluded that a CM program is in place and is sufficient to maintain control over facility and programmatic process design bases, with emphasis on credited VSSs. The facility implements CM through compliance to PD340. This document complies with P341, *Facility Engineering Processes Manual*, P950, *Conduct of Maintenance*, and P315, *Conduct of Operations Manual*, and ensures compliance with DOE-STD-1073-2003 and DOE-STD-433.1B.

In support of RNS processing, one additional system was designated as VSS: the PRDwSF. VAR-10075, *PRDwSF Variance for P341 Administrative Procedures*, excludes requirements for VSSAs and inclusion in the MEL. Document reviews and interviews indicated sufficient processes and procedures have been established for designation of design features and functions credited in the BIO; management of change control; application of technical reviews, including USQDs; determination of system health, including VSS status and assessment; and control of system modifications, to demonstrate the acceptability of the configuration control program. Interviews with facility engineering personnel indicated that there is adequate knowledge of the configuration of systems and with the expected application of Conduct of Engineering processes to SSCs. Additional discussion regarding implementation of various aspects of the CM program is covered in criteria below.

This criterion was met.

3. *The configuration management program in support of WCRRF results in accurate as-built drawings and other necessary technical documentation to support safe operations, maintenance, and emergency planning for WCRRF operations. The WCRRF technical baseline documentation is accurate, up-to-date, and is consistent with the descriptions and*

assumptions in the safety basis documentation for WCRRF. (DOE O 433.1B, 10 CFR 830.122)

As discussed in CRAD SB1, review of the WCRRF BIO and TSRs, interviews, and walkdowns with WCRRF engineering and operations personnel demonstrated the facility descriptions in the BIO are consistent with the physical facility configuration, with some exceptions noted.

The EWMO-Area G FE identified a finding that engineering documentation does not demonstrate alignment with requirements in all cases (CoE-F.1). Closure of PFITS actions 2016-2037-2 and -4 were reviewed, with no deficiencies identified. Based on interviews, the CSEs understood their responsibilities regarding CM of the technical baseline documents with emphasis on accurate drawings to support safe operations. Engineers perform field walkdowns of their systems and update drawings as necessary. The CSEs indicated this is a mature process and the drawings are in good condition.

Based on the review of recent VSSAs that covered the EDS and UPS (SAR-50-0069-105) and vehicle barriers (SAR-99-MULTI-01281), the reports were comprehensive and critical, based on the issues and observations identified. The findings and observations were entered into PFITS for tracking.

AP-341-802, *System Health Reporting*, includes criteria for CM. The system health reports (SHRs) reviewed indicated the engineers are updating drawings as discrepancies are identified. The template for the SHRs included in AP-341-802 also requires a discussion of PFITS items to aid in tracking of items identified in VSSAs, SHRs, and other sources.

Procedure AP-341-404, *Master Equipment List*, requires that active and passive VSSs be included in the MEL. A review of the WCRRF VSS List (VSS-50-0069-00000, R4) identified 12 VSSs relevant to WCRRF. The MEL printout provided to the CRA team was reviewed for a sampling of WCRRF VSS items. This review identified that, while WCRRF VSS items were listed, there were some discrepancies (see CRAD MN1 for additional discussion). It is noted that seven of the VSSs have an open PFITS item to review and update the MEL, MLD, and Attachment As to AP-MNT-006, *Preventive and Predictive Maintenance.* These are PFITS 2016-2042-7 and 2016-2042-11 through -16, which have a due date of 3/15/2017.

There is an open issue with the vehicle barrier configuration. As discussed in CRAD SB1, the new information/initial confirmatory process was entered on 1/24/2017. The issue was identified in a VSSA (SAR-99-MULTI-01281).

Several temporary modifications were reviewed as discussed above related to closure of MSA pre-start PFITS items. Design change packages for *Supplemental Venting for RNS Drums* and *WCRRF DRE-001 and 002 Electrical Control Upgrade* were reviewed. No significant technical deficiencies were identified.

After reviewing the technical baseline documents and the facility's implementation of the CM program, it was determined that the engineering processes are sufficient to identify, initiate,

control, and document the baseline, modifications to the baseline, approved methods for configuration control, and place appropriate emphasis on VSS. While system engineers expressed adequate knowledge and understanding of their systems, system boundaries, and the importance of properly managing those systems, there were still examples (as described above) where some concerns were identified related to consistency of the MEL and MLDs. It was concluded that overall the CM program is established and will ensure that technical baseline and modifications are effectively controlled.

This criterion was met.

4. *Configuration management processes associated with WCRRF include a robust USQ program. (10 CFR 830.203)*

The USQ process is implemented by SBP-112-3, R3.1, *Unreviewed Safety Question (USQ) Process*. LANL P341, *Facility Engineering Processes Manual*, requires compliance with LANL PD110, *Safety Basis*, which invokes and applies the USQ process to changes to facility systems and procedures. AP-341-504, R2, *Temporary Modification Control*, AP-341-517, R1, *Design Change Form*, and AP-341-519, R4, *Design Revision Control*, appropriately invoke PD110 and the USQ process. EP-AP-10007, R2, *Technical Procedure Development*, reviewer matrices require that all types of technical procedure documents must receive a safety basis review, and EM-AP-10001, R1, *Document Control*, requires documents to be sent for USQ review. Most of the qualified CSEs are USQ-qualified. Additionally, the engineering manager instituted a CSE review signature on USQDs to ensure integration with engineering and accurate proposed activity descriptions. The CRA team reviewed a sampling of USQDs. This is discussed in CRAD SB1, with no significant deficiencies identified.

This criterion was met.

5. *VSSAs and system health reporting have been performed to verify that safety SSCs configuration and performance are maintained consistent with safety basis requirements. (10 CFR 830)*

VSSAs are performed in accordance AP-341-901, R4.1, *Performing Vital Safety System Assessments*. VAR-10075 exempts the PRDwSF from VSSAs and inclusion in the MEL. The assessments listed in the 2016 VSSA schedule for WCRRF (SAS-50-0069-00950) were completed, with the areas initially scheduled for 5/2017 completed in September 2016. The engineering manager indicated the 2017 schedule was being developed. As discussed in criterion 3 of this CRAD, recent assessments that covered the EDS and UPS (SAR-50-0069-105) and vehicle barriers (SAR-99-MULTI-01281) were reviewed. The reports were comprehensive and were appropriately critical based on the issues and observations identified. The findings and observations were entered into PFITS for tracking.

Recent SHRs were reviewed. It was noted that, based on VAR-2015-062, R0 and R1, some VSSs were exempted from the requirement to perform SHRs. Area G will be performing an SHR for PRDwSF. The remaining WCRRF VSS have had SHRs performed as required and

scheduled. SHRs are adequate for system monitoring and CM compliance. As noted in criterion 3 of this CRAD, the SHRs also include review of recently closed and open PFITS items. The latest SHR for UPS included update to the MEL, MLD, and critical spare list, as well as a recent design information reconstitution package.

This criterion was met.

6. *The level of knowledge of managers and staff responsible for administering and implementing the CM and system engineering programs is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (DOE O 420.1C, DOE O 426.2)*

The CRA team evaluated the level of knowledge of engineering managers, system engineers, and staff. CSEs, safety basis analyst, PrE, and the engineering manager were interviewed. They were questioned about institutional processes and Conduct of Engineering requirements including change control, BIO content, alignment with the physical facility and procedures, and overall Conduct of Engineering. There was consistently strong understanding of the institutional requirements and procedures, as well as the requirements for WCRRF operations, including safety basis interaction and protection. Two completed CSE qualification packages were reviewed; they were comprehensive and appropriate.

Based upon the CRA team's review of training and qualification records, engineering work document records, interviews, and observation of fieldwork, the team determined that the engineering manager and CSEs have an adequate level of knowledge of CM and system engineering program requirements.

This criterion was met.

7. *An adequate number of qualified CSE have been assigned. CSEs act to ensure the CM and accuracy of the technical baseline for assigned systems. The level of knowledge of CSEs and other CM program personnel concerning their roles and responsibilities for WCRRF operations is adequate. (DOE O 426.2)*

VSS-50-0069-00000 indicates that each VSS has a qualified primary CSE assigned, and has an engineer assigned as secondary CSE, although several secondary CSEs are not qualified CSEs. Verification of qualification was performed through review of LANL worker authorization status reports. Two completed CSE qualification packages were reviewed, which were comprehensive and appropriate. The engineering manager indicated that although she has one vacancy for a WCRRF engineer, she believes staffing is adequate, and efforts to get the secondary CSEs qualified are ongoing. Observation and interviews indicated that the facility is satisfied with the engineer's support and the CSEs are well integrated with operations and maintenance personnel. The qualification of the assigned PrE was verified. There is currently not a qualified back up but there are two more PrEs who are in the process of obtaining the qualification.

Standing order WCRR-SO-1407, *Performance of WCRRF Procedures with Engineering Oversight*, was issued on 1/18/2017. It requires engineering personnel to supervise infrequently performed ISI procedures. Although personnel frequently observed ISI completion in the past, the listed procedures have not been performed since the standing order was issued, so there were not any forms available for review.

One of the CSE duties is to provide recommendation to operations regarding operability of assigned VSSs. Several recent immediate operability determinations and prompt operability determinations were reviewed; they were of sufficient detail to support the conclusions reached.

Interviews with the CSEs for systems, identified in the interviews section above, indicate sufficient knowledge of their systems and high level of integration with the facility personnel. Interviews with the PrE for the WCRRF indicate a high level of ownership, understanding, and control of the process.

This criterion was met.

8. *Issues from previous assessments of the CM and system engineering programs as related to WCRRF operations have been effectively tracked and resolved. (DOE O 226.1B, DOE O 414.1D, SD 330)*

The CM/engineering issues from the FE and the MSA were reviewed. Additionally, previous CRAs and FRAs were reviewed for issues related to engineering and the associated CM program, and open PFITS items that are identified as being CM related were reviewed for impact on restart of the WCRRF processes. The MSA pre-start item closures were reviewed and discussed in criterion 1 of this CRAD. Applicable PFITS items, listed in the records reviewed section, were reviewed. Further evaluation of the applicable open issues through document reviews and interviews with engineering personnel indicated that none of the open items impact safe restart of the WCRRF processes.

This criterion was met.

CONCLUSION

Based on documents reviewed, interviews conducted, and evolutions witnessed, the CRA team concluded that the WCRRF engineering/CM program is in compliance with DOE orders and LANL requirements, and that the Conduct of Engineering program is effectively implemented. Facility engineering and programmatic engineering personnel interviewed demonstrated an acceptable level of knowledge of CM principles for maintaining the technical baseline of their assigned SSCs.

For the VSSs for RNS processing at WCRRF, the CRA team concluded that sufficient processes and procedures have been established for designation of design features and functions credited in the BIO; management of change control; application of technical reviews, including USQDs; determination of system health, including VSSs status and assessment; and control of system

modifications to demonstrate the acceptability of the configuration control program for safe WCRRF restart and RNS operations.

Although there are some concerns identified in areas of CM related to consistency of the MEL and MLDs, current implementation of the CM SMP will support RNS processing at WCRRF.

This objective was met. No findings were identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Scott Lonchar **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Fire Protection**	Objective: FP1 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

FP1: Line Management has established and implemented a fire protection (FP) SMP to ensure safe accomplishment of work and contract requirements for the FP SMP have been incorporated into facility-specific procedures. The level of knowledge of FP managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (CR1, CR4, CR5, CR6, CR8, CR9)

CRITERIA

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. FP procedures are effectively implemented in support of WCRRF operations. (DOE O 420.1C)
3. BIO/TSRs commitments associated with the FP systems and the FP programs are accurately and effectively implemented for WCRRF operations. (10 CFR 830.204)
4. The fire hazards analysis is current and reflects the current state of the facility, operations, and fire-protection-related SSCs.
5. TSRs for transient combustible loading have been flowed into facility specific procedures and those procedures are effectively implemented in support of WCRRF operations.
6. Commitments, compensatory measures, and conditions of approval associated with FP exemptions and equivalencies associated with WCRRF operations are effectively implemented. (DOE O 420.1C)
7. Sufficient qualified personnel are available to implement the FP program effectively in support of the facility. (DOE O 420.1C)
8. The facility FP systems and procedures, as affected by facility modifications, are consistent with the description of the facility, procedures, and accident analysis and assumptions included in the safety documentation. (DOE O 425.1D)
9. Adequate facilities and equipment are available to ensure that FP support and services are adequate for safe operation of WCRRF operations. (DOE O 420.1C)
10. The level of knowledge of managers and staff responsible for administering and implementing the FP program is adequate based on interviews, qualification packages, and observation of operational demonstrations. (DOE O 420.1C, DOE O 426.2)

APPROACH

Records Reviewed

- ABD-WFM-006, R2.5.1, *Technical Safety Requirements for Waste Characterization, Reduction, and Repackaging Facility (WCRRF),* 12/14/2016
- ABD-WFM-006, R2.5.1, *Technical Safety Requirements (TSRs) for Waste Characterization, Reduction and Repackaging Facility (WCRRF),* 12/12/2016
- AD-NHHO-11-238, LANL-DOE-Order-420.1B-EX-2007-001, R2, *Revised Request for Exemption Approval to DOE Order 420.1B and NFPA 801 Requirements for the Los Alamos National Laboratory (LANL) Building TA-50-69 Waste Characterization, Reduction and Repackaging Facility (WCRRF), Insufficient Means of Preventing the Accidental Release of Contaminated Firefighting Water Run-off,* 9/20/2011
- ADNHHO-16-121, *Status of Approved Exemption Request for Exemption Approval to DOE Order 420.1B and NFPA 801 Requirements for the Los Alamos National Laboratory (LANL) Building TA-50-69 Waste Characterization, Reduction and Repackaging Facility (WCRRF), Insufficient Means of Preventing the Accidental Release of Contaminated Firefighting Water Run-off,* 8/25/2016
- AD-NHHO-16-184, LANL-DOE-Order-420.1C-EX-2016-009, *Request for Permanent Exemption Approval to DOE Order 420.1C, DOE-STD-1066-2012 and NFPA 13 Requirements for Existing Automatic Sprinkler Configuration within the Los Alamos National Laboratory (LANL) Building TA-50-69 Waste Characterization, Reduction and Repackaging Facility (WCRRF) Glovebox Enclosure (GBE),* 11/29/2016
- AD-NHHO-2017-013, LANL-NFPA 1/IFC-EQ-2016-007, *Request for Equivalency Approval to National Fire Protection Association (NFPA) 1 and International Fire Code (IFC) Requirements for the Existing Fire Department Access Road at the Los Alamos National Laboratory (LANL) Building TA-50-69 Waste Characterization, Reduction and Repackaging Facility,* 1/27/2016
- American Glovebox Society (AGS) Guide G010, *Standard Practice for Glovebox Fire Protection,* 2011
- AP-FPDO-FHE, R4 *Fire Hazard Evaluation Development and Maintenance,* 12/16/2016
- DCE-50-0069-104, *Discovered Condition Evaluation and Closure, FPS Sprinkler Head Corrosion in the WCG*, 12/12/2016
- DCE-50-0069-16-003, *Discovered Condition Evaluation and Closure, Fire Sprinkler Head*, 9/13/2016
- DOE O 420.1C, *Facility Safety*, 12/4/2012 (superseded by DOE O 420.1C Chg 1, *Facility Safety*, on 2/27/2015)
- DOE-STD-1066-2012, *Fire Protection,* 2012
- Drawing C-55995, R6, *WCRR Fire Protection System P&ID,* 8/13/2015
- Drawing TMC-50-0069-112-SK-01, R1, *WCRR Freezer Installation Fire Protection Modification, Fire Sprinkler Plan,* 6/27/2016
- EM2016-5363, *Final Report for the Restart of the Waste Characterization, Reduction, and Repackaging Facility (WCRRF) Management Self-Assessment,* 1/6/2017

- EM-AP-10008, R1, *ADEM Roles, Responsibilities, Authorities, and Accountabilities*, 1/30/2017
- EP-WCRR-FO-DOP-0403, R7, *WCRRF Lightning Protection System Visual/Continuity Inspection*, 8/21/2013
- EP-WCRR-FO-DOP-0403, R7, *WCRRF Lightning Protection System Visual/Continuity Inspection*, completed on 6/14/2016
- EP-WCRR-VS-DOP-1359, R7, *TA-50-69 Ventilation System TE/TI-001 and TE/TI-002 LOOP Verification and Interlock Test*, 12/16/2016
- FPA-15-086, *Facility Fire Protection & Life Safety Assessment for Building(s) TA-50-0069*, dated 11/3/2015
- FP-DO-12-096, R9, *Fire Hazards Analysis, Waste Characterization Reduction and Repackaging Facility (WCRRF)*, 11/2016
- NFPA 780, *Standard for Installation of Lightning Protection Systems for Lightning Protection Systems*, 2013
- NFPA 801, *Standard for Fire Protection for Facilities Handling Radioactive Materials*, 2014
- PD1220, R5, *LANL Fire Protection Program*, 8/20/2015
- Post-Modification Test, *50-69 Freezer Install (sprinkler)*, 11/4/2016
- SDD-TA-50-0069-FSS-R.3, *Waste Characterization, Reduction, and Repackaging Facility Fire Suppression System Design Description*, 11/1/2016
- SHR-50-0069-0107, *System Health Report, Fire Suppression System*, 1/25/2017
- SHR-50-0069-01179, *System Health Report, Fire Suppression System*, 2/1/2016
- TA-50-0069, *Pre-Incident Plan, Los Alamos Fire Department*, dated 1/25/2017
- TMC-50-0069-112, R1, *Installation of Temporary Walk In Refrigerator*, 1/20/2017
- Training Report, *WQ7134/WQ WD WCRRF Glovebox Fire Watch*, dated 1/31/2017
- WCRRF-FO-AP-1399. R0, *WCRRF Fire Protection Program*, 11/18/2016
- WCRRF-FO-DOP-1338, R1, *WCRRF Fire Patrol/Stationary Fire Watch*, 11/18/2016
- WCRRF-FP-DOP-1226, R1, *WCRRF Fire Suppression System Alignment Checklist*, 11/28/2016
- WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, 11/28/2016
- WCRR-FP-DOP-1322, R1, *WCRRF Monthly Fire Suppression Supply Valve Check*, 11/28/2016
- WCRR-FP-DOP-1328, R0, *WCRRF Fire Suppression System Startup*, 8/2/2016
- WCRR-FP-DOP-1329, R0, *Fire Suppression System Shutdown*, 7/28/2016
- WCRR-FP-DOP-1330, R1, *WCRRF Hydrant Flow Test*, 12/17/2016
- WCRR-FP-DOP-1331, R0, *WCRRF Main Drain and Full Flow (Inspectors Valve) Test*, 7/29/2016
- WCRR-FP-DOP-1332, R2, *WCRRF Quarterly Combustible Loading Surveillance*, conducted on 1/3/2017
- WCRR-FP-DOP-1332, R2, *WCRRF Quarterly Combustible Loading Surveillance*, conducted on 12/12/2016
- WCRR-FP-DOP-1333, R0, *WCRRF Fire Suppression Supply Pressure Gauge Calibration*, 7/26/2016
- WCRR-RM-AOP-1166, R0, *WCG Fire Suppression Inadvertent Initiation*, 11/14/2016

- WO #00515340-01, *50-69 (5 YR) WET AUTOMATIC SPRINKLER SYSTEMS INSP. & TESTING*, 4/30/2015
- WO #00541099-01, *50-69 (2-Yr) FIRE ALARM SYSTEM INSP & TESTING*, 2/25/2016
- WO #00541136-01, *50-69 (A) WET AUTOMATIC SPRINKLER SYSTEMS INSP. & TESTING*, 3/3/2016
- WO #00548549-01, *50-69 (A) EMERGENCY LIGHTS / EXIT SIGNS*, 6/30/2016
- WO #00550239-01, *50-69 TSR (A) FSS RISER REPLACE PRESSURE GAUGE (4.2.7)*, 6/29/2016
- WO #00555888-01, *50-69 TSR (A) MAIN DRAIN TEST (4.2.6)*, 10/13/2016
- WO #00556555-01, *50 (A) FIRE EXTINGUISHER (WCRRF)*, 10/3/2016
- WO #00556564-01, *50-69 (SA) WET AUTOMATIC SPRINKLER SYSTEMS INSP. & TESTING*, 9/12/2016
- WO #00556574-01, *50-69 (SA) FIRE ALARM SYSTEM INSP & TESTING*, 9/7/2016
- WO #00559435-01, *50-69 (M) FIRE EXTINGUISHERS*, 12/20/2016
- WO #00559436-01, *50-69 (M) EMERGENCY LIGHTS / EXIT SIGNS*, 12/20/2016
- WO #00562367-01, *50-69 (Q) WET AUTOMATIC SPRINKLER SYSTEMS INSP. & TESTING*, 12/5/2016
- WO #00564738-01, *50-69 (M) WET AUTOMATIC SPRINKLER SYSTEMS INSP. & TESTING*, 1/5/2017
- WO #00570846-01, *50-69 TSR (A) HYDRANT FLOW TEST (4.2.5)*, 10/13/2016

Interviews Conducted

- CSE – Fire Protection
- CSE – Glovebox and Ventilation
- FOD
- Fire Protection Division Office (FP-DO) Division Leader
- FP-DO Fire Protection Engineer
- FP-DO Group Leader
- FP-DO Qualified Fire Protection Engineer
- Glovebox Operators
- PIC – WCRRF RNS Waste Treatment
- SSW
- SOM
- Stationary Fire Watch

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Pre-Job Briefing, WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*
- Demonstration, WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*
- Post-Job Briefing, WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*
- Pre-Job Briefing, WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*

- Demonstration, WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*
- Post-Job Briefing, WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*
- Pre-Job Briefing, WCRR-FP-DOP-1322, R1 *WCRRF Monthly Fire Suppression System Valve Alignment Check*
- Demonstration, WCRR-FP-DOP-1322, R1, *WCRRF Monthly Fire Suppression System Valve Alignment Check*
- Walkdown, FSS
- Walkdown, Combustible Loading
- Emergency Drill Prep-SEO Observer, 2/6/201
- Emergency Drill, 2/7/2017
- Emergency Drill Controller Hotwash and Critique, 2/7/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

The prerequisites for CRs assigned to this functional area as identified in WCRR-PLAN-1388 have been reviewed and determined to be satisfactorily completed, with the exceptions noted below. The plans and procedures have been reviewed, and adequately characterize the hazards associated with fire and controls necessary for those hazards.

LANL document PD1220, *Fire Protection Program*, applies to all Laboratory facilities and personnel. PD1220 is the overall FP program document, and directly implements the requirements of DOE O 420.1C, *Facility Safety*. PD1220 tailors the DOE O 420.1C requirements into a LANL-specific format. PD1220 defines roles of divisions and personnel that have responsibilities for various aspects of FP. PD1220-100, *LANL Fire Program Manual*, is the functional area document for implementing the LANL FP program.

Institutional and facility-specific procedures are in place for FP systems and features and inspection, testing, and maintenance (IT&M). There are procedures in place to limit combustible loading in the WCRRF. The FP (sprinkler system) and combustible loading programs, as identified in the BIO and TSR are adequately implemented. FP contract requirements within the scope of this CRA are flowed into institutional and facility-specific procedures.

The MSA was reviewed and found to be adequate. The MSA found three pre-start and no post-start findings regarding the FP program. The pre-start finding concerning updating the LAFD pre-incident plan has been completed (see criterion 6 of this CRAD for further discussion). The pre-start finding concerning the TSR required vehicle access barrier is being addressed via AD-NHHO-2017-013, LANL-NFPA 1/IFC-EQ-2016-007, *Request for Equivalency Approval to National Fire Protection Association (NFPA) 1 and International Fire Code (IFC) Requirements for the Existing Fire Department Access Road at the Los Alamos National Laboratory (LANL) Building TA-50-69 Waste Characterization, Reduction and*

Repackaging Facility. The remaining pre-start finding for replacing the WCG sprinkler is not complete at the time of this CRA, but is included in the manageable list of open pre-start issues.

This criterion was met.

2. *FP procedures are effectively implemented in support of WCRRF operations. (DOE O 420.1C)*

FP procedures are effectively implemented in support of the facility. This was demonstrated by a review of completed procedures, listed in the records reviewed section above. The CRA team observed the performance of several procedures including *Operator Rounds* and the *Monthly Fire Suppression Supply Valve Alignment Check*. The operators performing these procedures were knowledgeable of the procedures and the requirements and executed them properly.

DOE O 420.1C, Attachment II, *Contractor Requirements Document*, Chapter II, Fire Protection, requires the applicable building code and NFPA codes and standards be identified in the FP programs. WCRR-FO-AP-1399, *WCRRF Fire Protection Program*, requires compliance with established LANL requirements. The FP program is not a comprehensive and exhaustive program document, in that it does not annotate all aspects of the FP program that are being implemented at WCRRF, such as compliance with the NFPA codes and standards and IT&M requirements for the FP systems. In addition, WCRR-FO-AP-1399 does not explicitly define R2A2s for personnel responsible for FP. The MSA identified the R2A2s issue as FP-OFI-2. The FP program does annotate safety basis requirements, fuel restrictions, refueling exclusion, hot work, ignition source control, and combustible loading. This issue is not considered significant, as the facility has completed all required IT&M on the FP systems as part of the maintenance program. See criteria 8 and 9 of this CRAD for information on the IT&M.

The WCRRF FP program also does not indicate the NFPA 801 requirement that, “When the gloves are no longer needed for operations, they shall be removed and glove port covers installed if fire hazards are present inside the box” (NFPA 801:7.1.4.4.4). During a facility walkdown, it was noted that this requirement has not been fully implemented. The glovebox enclosure has glovebox port covers installed; however, the WCG did not have glove port covers installed and will need them installed within 60 days of being inactive. This is not an issue for startup or operation, but should be included in the WCRRF FP program to ensure this is complete upon finishing the campaign.

WCRR-FP-DOP-1332, *WCRRF Quarterly Combustible Loading Surveillance*, and WCRR-FO-DOP-1397, *WCRRF Operator Rounds*, implement controls required by the BIO and TSR for combustible loading. The quarterly surveillance is conducted by the FP-DO FP engineer (FPE), and determines compliance with the TSR requirement for combustible loading, including the loading to be less than 0.6 lb/ft². This surveillance was conducted in December 2016 with an unsuccessful result of facility loading of 0.84 lb/ft². The facility, with assistance of the FP-DO FPE, worked to reduce the combustible inventory in the building. The procedure was performed once again in January 2017 with a result of 0.576 lb/ft².

Operator rounds are performed daily and verify that:

- transient combustibles not required for the process are not in the building,
- flammable or combustible liquids that are not excluded are not present,
- flammable gasses that are not excluded are not present,
- no combustibles are in the WCG exclusion zone, except allowed exclusions,
- fuel packages are less than 50 pounds and separated by a minimum of six feet,
- sprinkler system pressure and water tank level is adequate,
- fire hydrant and fire lanes are clear, and
- no wooden pallets are present.

The WCRRF utilizes various procedures to implement IT&M for the fire sprinkler system and fire alarm system. The CRA team reviewed the procedures and the sprinkler system IT&M is current. For additional information on the sprinkler system, see criteria 3 and 8 of this CRAD below. The pertinent fire detection devices for the scope of the CRA are the manual pull stations, water flow switch, and alarm indicating devices.

WCRR-FO-AP-1399 section 3.3 defines when a stationary fire watch is required and implements the TSR requirements indicated by specific administrative control 5.10.7. WCRR-FO-DOP-1338, R1, *WCRRF Fire Patrol/Stationary Fire Watch*, implements this requirement and provides guidance for establishing and conducting fire patrols and stationary fire watches. A stationary fire watch is required when RNS waste containers are outside the refrigerator for container movement or attached to the WCG. The CRA team witnessed the performance of a stationary fire watch during the RNS waste treatment evolution. The CRA team interviewed stationary fire watch personnel and found them to be well versed in their roles and responsibilities. The CRA team verified the training and qualification for personnel conducting the stationary fire watch was up-to-date. Operators were diligent in fulfilling their duties and are knowledgeable of their duties and responsibilities.

EP-WCRR-FO-DOP-0403, R7, *WCRRF Lightning Protection System Visual/Continuity Inspection*, conducts the visual and the continuity inspection requirements suggested in Annex D, *Inspection and Maintenance of Lightning Protection System*, of the NFPA 780, *Standard for Installation of Lightning Protection Systems for Lightning Protection Systems* (LPS). The inspections were completed in June 2016 with two deficiencies noted. The deficiencies relate to protecting the down conductors. A reinspection noted no deficiencies.

LANL PD1220 requires an annual FP assessment be performed for HC-2 or -3 nuclear facilities. WCRRF is a HC-2 facility and, therefore, an annual assessment is required. The latest *Facility Fire Protection & Life Safety Assessment for Building TA-50-0069* (FPA-15-086) was conducted on November 3, 2015 and is required to be performed annually. Four issues were noted in this assessment, including housekeeping items and combustible loading. During interviews with the FP-DO, it was indicated that the CY2016 FPA-15-086 was incorporated into the November fire hazard analysis (FHA) update/revision. The FHA does not indicate that this document is also being used as the assessment as required by the FP-DO FHA template. The level of detail in the FHA is not consistent with the same criteria documented in FPA-15-086, such as reviewing IT&M and operability of fire and life safety systems. This is a deficient condition and needs to

be corrected. This condition does not impede the facility from operating safely, as all the FP systems and life safety features are current on their respective IT&M.

DOE O 420.1C requires pre-incident plans be developed to enhance the effectiveness of manual fire suppression activities (fire department activities). Manual fire suppression is provided by the LAFD, which has a pre-incident plan for WCRRF. LANL implements FPDO-AP-001, *Los Alamos Fire Department Pre Incident Plan Review Process*, to ensure the plans are reviewed. The pre-incident plan was recently updated to reflect the vehicle barriers and obstructed access, potentially contaminated water run-off, and the RNS inventory and hazards.

See criteria 3 and 5 of this CRAD for a discussion on combustible loading.

This criterion was met.

3. BIO/TSRs commitments associated with the FP systems and the FP programs are accurately and effectively implemented for WCRRF operations. (10 CFR 830.204)

ABD-WFM-006, R2.5.1, *Technical Safety Requirements for Waste Characterization, Reduction, and Repackaging Facility (WCRRF),* requires the following commitments for the fire sprinkler system:

- Open and unobstructed flow path from the water supply tank to the TA-50-0069 and WCG sprinkler heads
- Riser gauge static pressure of 48 psi or greater at the riser.
- Water supply tank contains 100,000 gallons or greater.
- The building temperature, including the attic space, is greater than 40°F

There are ten SRs stipulated in the TSR derived from the above requirements. They are:

DAILY

- Verify the static pressure is greater than or equal to 48 psig at the base of the riser.
- VERIFY that the temperature reading of TE/TI-001and TE/TI-002 are greater than 40 °F and have been greater than 40 °F for at least 48 hours.

WEEKLY

- VERIFY that the water supply tank contains a minimum of 100,000 gal. of firewater available.
- Verify that the valve, FS-V-017, to the WCG sprinkler head is in the open position.

MONTHLY

- VERIFY that the post indicator valves are locked in the open position.
- Perform a valve alignment inspection.

ANNUALLY

- Perform a hydrant flow test.
- Perform a main drain test.

- Calibrate the static pressure gauge on the FSS riser.
- Perform an instrument loop verification and interlock check for TE/TI-001 and TE/TI-002.

The CRA team reviewed the documentation that implements the TSR requirement and/or witnessed the actual evolutions. The requirements for the sprinkler system are implemented by:

- WCRR-FP-DOP-1322, R1, *WCRRF Monthly Fire Suppression Supply Valve Check*
- WCRR-FP-DOP-1330, R1, *WCRRF Hydrant Flow Test*
- WCRR-FP-DOP-1331, R0, *WCRRF Main Drain and Full Flow (Inspectors Valve) Test*
- WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, and
- EP-WCRR-VS-DOP-1359, R7, *TA-50-69 Ventilation System TE/TI-001 and TE/TI-002 LOOP Verification and Interlock Test*.

The CRA team reviewed these procedures and witnessed the performance of the operator rounds and the monthly fire suppression supply valve check. The above sprinkler system requirements are being appropriately implemented.

The TSR also has requirements for combustible loading. These are that the combustible and flammable loading shall be:

- ≤ 0.60 lb/ft2 on average in BUILDING TA-50-0069.
- No flammable liquids or gases and no combustible liquids with NFPA Flammability Rating greater than 1 shall be stored or used within BUILDING TA-50-0069 when INVENTORY is in BUILDING TA-50-0069, except three size 1 cylinders of P-10 gas.
- No combustibles shall be stored within the WCG exclusion zone. The WCG exclusion zone is 10 ft. around the WCG, up to the glovebox enclosure, or up to the walls of Room 102, whichever is less.
- No combustible fuel package inside Building TA-50-0069 may be greater than 50 lb. and must be separated from other combustibles by > 6 ft., excluding the change rooms/rest rooms.
- Combustible material inside and within 10 ft. of the exterior of the transportainers shall be limited to those materials and equipment necessary to accomplish required tasks.

The following are excluded from the above limitations:

- INVENTORY that is in the WCG or staged in BUILDING TA-50-0069.
- Combustible components of support equipment (e.g., wiring insulation, operator platforms and rubber mats) within the WCG Exclusion Zone and associated with WCG processing.
- Drum liners or wrapping around DEGRADED/LOSS OF INTEGRITY drums that are inside BUILDING TA-50-0069 being loaded, and working amounts of materials necessary to complete bag on/off operations such as tape, cheesecloth, and extra operator gloves.
- Hydraulic fluid within the engineered, closed-loop containment systems.
- Combustible components associated with a forklift.
- Container handling and other process equipment authorized by FP Division Office

There are five SRs stipulated in the TSR derived from the above requirements. They are:

DAILY

- Perform a BUILDING TA-50-0069 combustible material inventory inspection to VERIFY that no flammable liquids or gases, and no combustible liquids with NFPA Flammability Rating greater than 1, are stored or used when INVENTORY is in BUILDING TA-50-0069. This excludes three size 1 cylinders of P-10 gas.
- VERIFY that no combustibles are stored within the WCG exclusion zone, allowing for the listed exclusions.
- VERIFY no combustible fuel packages inside Building TA-50-0069 are greater than 50 lb. and that combustibles are separated from other combustibles by 6 ft. excluding the change rooms/rest rooms and allowing for the listed exclusions.

WEEKLY

- VERIFY that combustible materials and equipment inside and within 10 ft. of the exterior of the transportainers are limited to those necessary to accomplish required tasks.

QUARTERLY

- Perform a BUILDING TA-50-0069 combustible material inventory inspection to VERIFY that the inventory is $\leq 0.60 lb/ft^2$ on average in BUILDING TA-50-0069, allowing for the listed exclusions. (Performed by the FPE)

The requirements for the combustible loading are implemented by WCRR-FO-DOP-1397, R1, and WCRR-FP-DOP-1332, R2. The CRA team reviewed the quarterly combustible loading inspection and witnessed the performance of the operator rounds. The above combustible loading requirements are being appropriately implemented.

WCRR-FO-AP-1399 section 3.3 defines when a stationary fire watch is required and implements the TSR requirements. WCRR-FO-DOP-1338 provides guidance for establishing and conducting fire patrols and stationary fire watches. During performance of the RNS waste treatment procedure, a stationary fire watch was established. The CRA team verified the training and qualification for personnel conducting the stationary fire watch was up-to-date. The stationary fire watch was knowledgeable of their duties and responsibilities and adequately performed them.

This criterion was met.

4. The fire hazards analysis is current and reflects the current state of the facility, operations, and FP related SSCs.

FP-DO prepared the FHA for the WCRRF; Revision 9 was completed in November 2016 by a qualified FPE. The FHA is comprehensive and meets the requirements on DOE O 420.1C, Change 1, and DOE-STD-1066-2012, *Fire Protection*. The FHA analyzes the facility structure, fire hazards, life safety, and FP features.

AGS-010 and DOE-STD-1066-2012 require that a glovebox fire hazard evaluation (FHE) be performed. LANL PD1220 implements this requirement for the LANL site. Typically, a separate glovebox FHE is performed to analyze the glovebox construction, fire hazards, and fire mitigation strategy among other requirements. FP-DO-12-026, *Fire Hazard Analysis, Waste Characterization Reduction and Repackaging Facility (WCRRF),* combines the FHA and the glovebox FHE; this is primarily due to operations in the WCG being the primary mission of this facility, and that the FHE process was developed well after the WCG evaluation was included in previous revisions of the FHA.

In interviews with the FP-DO Division Leader, it was indicated that the FHA is being utilized as the annual Fire Protection & Life Safety Assessment. Previously, this assessment was documented in FPA-15-086, last performed on November 3, 2015. See criterion 2 above for additional information on the Fire Protection & Life Safety Assessment.

The FHA identifies deficiencies noted during the preparation of the document. These deficiencies and recommendation demonstrate a good understanding of the facility and the process. These issues are indicative of a robust program for an older facility. These deficiencies and recommendations are:

- Routine preventative maintenance for the vehicle barrier system (lubrication and snow removal),
- Permanent fire lane signage,
- Emergency vehicle access,
- Update *Emergency Operations WCRRF Response Guide Document* (EPP-RES-009) to address changes in water run-off containment,
- Update the LAFD pre-incident plan,
- Potentially counterfeit parts for two sprinkler riser trim valves,
- R2A2s to be included in the WCRRF FP Program,
- Issues with the WCRRF maintenance program, and
- Glovebox enclosure sprinkler coverage (exemption requested).

These issues are entered and tracked in the PFITS system. See criterion 6 of this CRAD for issues covered by equivalences or exemptions.

This criterion was met.

5. *TSRs for transient combustible loading have been flowed into facility specific procedures and those procedures are effectively implemented in support of WCRRF operations.*

The TSR has requirements for combustible loading are included here for clarity.
The combustible and flammable loading shall be:

- $\leq$ 0.60 lb/ft2 on average in BUILDING TA-50-0069.
- No flammable liquids or gases and no combustible liquids with NFPA Flammability Rating greater than 1 shall be stored or used within BUILDING TA-50-0069 when INVENTORY is in BUILDING TA-50-0069, except three size 1 cylinders of P-10 gas.

- No combustibles shall be stored within the WCG exclusion zone*. The WCG exclusion zone is 10 ft around the WCG, up to the glovebox enclosure, or up to the walls of Room 102, whichever is less.
- No combustible fuel package inside Building TA-50-0069 may be greater than 50 lb*and must be separated from other combustibles by > 6 ft.*, excluding the change rooms/rest rooms.
- Combustible material inside and within 10 ft of the exterior of the transportainers shall be limited to those materials and equipment necessary to accomplish required tasks.

The following are excluded from the above limitations:

- INVENTORY that is in the WCG or staged in BUILDING TA-50-0069.
- Combustible components of support equipment (e.g., wiring insulation, operator platforms and rubber mats) within the WCG Exclusion Zone and associated with WCG processing.
- Drum liners or wrapping around DEGRADED/LOSS OF INTEGRITY drums that are inside BUILDING TA-50-0069 being loaded, and working amounts of materials necessary to complete bag on/off operations such as tape, cheesecloth, and extra operator gloves.
- Hydraulic fluid within the engineered, closed-loop containment systems.
- Combustible components associated with a forklift.
- Container handling and other process equipment authorized by FP Division Office

There are five SRs stipulated in the TSR derived from the above requirements. They are:

DAILY

- Perform a BUILDING TA-50-0069 combustible material inventory inspection to VERIFY that no flammable liquids or gases, and no combustible liquids with NFPA Flammability Rating greater than 1, are stored or used when INVENTORY is in BUILDING TA-50-0069. This excludes three size 1 cylinders of P-10 gas.
- VERIFY that no combustibles are stored within the WCG exclusion zone, allowing for the listed exclusions.
- VERIFY no combustible fuel packages inside Building TA-50-0069 are greater than 50 lb and that combustibles are separated from other combustibles by 6 ft. excluding the change rooms/rest rooms and allowing for the listed exclusions.

WEEKLY

- VERIFY that combustible materials and equipment inside and within 10 ft. of the exterior of the transportainers are limited to those necessary to accomplish required tasks.

QUARTERLY

- Perform a BUILDING TA-50-0069 combustible material inventory inspection to VERIFY that the inventory is $\leq 0.60 lb/ft^2$ on average in BUILDING TA-50-0069, allowing for the listed exclusions. (Performed by the FPE)

WCRR-FO-AP-1399 documents the TSR requirements into the facility-specific FP program. The requirements for the combustible loading are implemented by WCRR-FO-DOP-1397, R1, and WCRR-FP-DOP-1332, R2. The CRA team reviewed the quarterly combustible loading inspection and witnessed the performance of the operator rounds. The above combustible loading requirements are being appropriately implemented.

The current combustible control program in WCRRF is newly implemented, as evidenced by only two quarterly combustible loading surveillances performed by the FPE since cessation of operations in CY2014. The first surveillance demonstrated that combustible loading was above the 0.60 lb/ft² maximum required by the TSR. The facility and the FPE worked together to remove unnecessary combustible loading. The second surveillance was performed and documented the combustible loading was less than the 0.60 lb/ft² maximum required by the TSR. Operations personnel interviewed are well versed in understanding the combustible load limits and requirements. A review of the quarterly combustible loading inspections and the operator rounds indicate the combustible inspections are performed.

This criterion was met.

6. *Commitments, compensatory measures, and conditions of approval associated with FP exemptions and equivalencies associated with WCRRF operations are effectively implemented. (DOE O 420.1C)*

There are three exemption/equivalency requests that are pertinent to the scope of this CRA. They are:

- Existing fire department access road,
- Existing automatic sprinkler configuration in the WCRRF glovebox enclosure, and
- Insufficient means of preventing the accidental release of contaminated firefighting water run-off.

The CRA team reviewed the fire program equivalency request AD-NHHO-2017-013, LANL-NFPA 1/IFC-EQ-2016-007, *Request for Equivalency Approval to National Fire Protection Association (NFPA) 1 and International Fire Code (IFC) Requirements for the Existing Fire Department Access Road at the Los Alamos National Laboratory (LANL) Building TA-50-69 Waste Characterization, Reduction and Repackaging Facility*. This equivalency request was transmitted to NA-LA on January 27, 2017. There was no DOE response to this request during the CRA. The following compensatory measures associated with this equivalency were identified:

- Inspection and Maintenance Program/Procedures for [safety-class] Vehicle Barrier System Hook Latch/Turnbuckle and Toggle Pin System [PFITS 2017-88 CA#1] Scheduled completion date: Jan 31, 2017.
- Augmentation of the WCRRF Operations Snow Removal Plan (PFITS 2016-269 and 2017-88 CA#2] Scheduled completion date: Jan 31, 2017.
- WCRRF Emergency Response Procedure Instructions. Scheduled completion date: March 15, 2017 [PFITS 2017-88 CA #4 Due March 15, 2017].

Two of these compensatory measures have been completed, as evidenced by the signed WD/EWMO action closure forms. The last compensatory measure is not due for completion until March 15, 2017.
The CRA team reviewed the fire program exemption request AD-NHHO-16-184, LANL-DOE-Order-420.1C-EX-2016-009, *Request for Permanent Exemption Approval to DOE Order 420.1C, DOE-STD-1066-2012 and NFPA 13 Requirements for Existing Automatic Sprinkler Configuration within the Los Alamos National Laboratory (LANL) Building TA-50-69 Waste Characterization, Reduction and Repackaging Facility (WCRRF) Glovebox Enclosure (GBE).* This equivalency request was transmitted to NA-LA on November 29, 2016. There was no DOE response to this request during the CRA. The following are the compensatory measures associated with this exemption request were identified:

- Existing glovebox enclosure glove port covers will be replaced with metal glove port covers and gloves will be removed if possible. Scheduled completion date: Nov 30, 2017.
- Isolate electrical power from within the glovebox enclosure. Scheduled completion date: Nov 30, 2017.
- Remove combustible materials from within the glovebox enclosure. No scheduled completion date is provided, but is stated as when feasible.

These compensatory measures have not been implemented, as the due dates are not scheduled for completion until later this year.

The CRA team reviewed the fire program exemption request AD-NHHO-11-238, LANL-DOE-Order-420.1B-EX-2007-001, R2, *Revised Request for Exemption Approval to DOE Order 420.1B and NFPA 801 Requirements for the Los Alamos National Laboratory (LANL) Building TA-50-69 Waste Characterization, Reduction and Repackaging Facility (WCRRF), Insufficient Means of Preventing the Accidental Release of Contaminated Firefighting Water Run-off*. This includes ADNHHO-16-121, *Status of Approved Exemption Request for Exemption Approval to DOE O 420.1B and NFPA 801 Requirements for the Los Alamos National Laboratory (LANL) Building TA-50-69 Waste Characterization, Reduction and Repackaging Facility (WCRRF), Insufficient Means of Preventing the Accidental Release of Contaminated Firefighting Water Run-off*. This letter notifies NA-LA of the mission change to WCRRF and provides three actions to be taken to support RNS/unremediated nitrate salt (UNS) processing. They are:

- LANL to provide updates to LAFD for inclusion into the pre-incident plan for MAR inventory, facility access issues associated with new construction, and yard drainage/water run-off considerations from low-level waste facility construction.
- Update response guidance documents for low-level waste facility construction to contain/collect/divert water discharges;
- Update the FHA incorporating the status of the exemption request, upcoming RNS/UNS campaigns, waste container MAR inventory limitations, facility access issues, yard are drainage/run-off considerations [PFITS 2016-1837 CA 1, 2, and 3]

Compensatory measures reviewed have been implemented. The LAFD pre-incident plan has been revised to incorporate MAR inventory (drum counts) access issues and water run-off. The

Emergency Response Building Run Sheet has been updated to reflect water run-off control. The FHA has been updated to reflect the above issues.

This criterion was met.

7. *Sufficient qualified personnel are available to implement the FP program effectively in support of the facility. (DOE O 420.1C)*

Interviews were performed with the CSE for FP systems (wet pipe sprinkler and water supply), the FP-DO FPE(s) supporting WCRRF, and the FP division leader/Fire Marshal. The personnel have the appropriate education and training in support of their positions and implement the FP program.

FP-DO prepared a FY-17 staffing plan, submitted it through the FP-DO management, and obtained approval. FP-DO hired an FPE to replace a retiree. For FY17, FP-DO plans to hire two FP specialists with a focus on performing facility FP assessments and providing support to FODs and other program organizations. FP-DO plans to hire one FP specialist with a focus on fire alarm operations to augment current staff in this area. FP-DO is consistent with their approved staffing plan and is actively pursuing filling these positions. The FP-DO division leader indicated during the interview that, while FP-DO does not have a dedicated person for WCRRF, the two FPEs provide the required support.

The qualified FP-DO FPE has a BS (Bachelor of Science degree) and MS (Master of Science degree) in Fire Protection Engineering and has extensive experience in FP, including nuclear power, commercial engineering firms, and over sixteen years at LANL. The FPE has approximately thirty years of experience in FP engineering. The individual meets all of the FPE qualifications. This FPE works in conjunction with another FPE. Interviews indicate the FPE is knowledgeable of the WCRRF facility, systems, and fire hazards.

The other FP-DO FPE supporting WCRRF has a BS in Fire Protection and Safety Technology from Oklahoma State University. The FPE has approximately twelve years of experience in FP engineering and has been with LANL for just under two years. The individual is a registered Professional Engineer in FP (Washington State) and has all of the FPE qualifications, with the exception of two components on the fire alarm system. This FPE works in conjunction with a qualified FPE. Interviews indicate the FPE is knowledgeable of the WCRRF facility, systems, and fire hazards. The FPE is engaged with planned modifications to the facility and the current status of each. He also is heavily involved with the combustible loading program at WCRRF.

The Fire Marshal has a BS in Chemical Engineering from California State Polytechnic University Pomona, and a MS in Mechanical Engineering, University of New Mexico. The Fire Marshal is a Professional Engineer in FP in California and a Professional Engineer in South Carolina. The Fire Marshal has 30 years of FP engineering experience, including approximately five years at Savannah River Site, two years commercial nuclear power, and 16.5 years at LANL. The Fire Marshal has been FP Division Leader at LANL since February 2009, prior to that, was the LANL FP Group Leader, and has been LANL Fire Marshal since 2001.

The CSE responsible for the FP system has a BS in Mechanical Engineering from New Mexico State University. The individual has been a qualified CSE for two years at LANL. The CSE has taken continuing education from Oklahoma State University in fire sprinkler system inspection and testing, which led to a certification in this area. The individual has been at LANL for six years. Based on interviews, the CSE has a good understanding of the system under his purview, including safety basis requirements, system operation, CM, and modifications.

Fire department response is provided by LAFD. Typical LAFD staffing is 41 personnel at all stations, with minimum staffing of 37. If less than twelve personnel are available to respond to LANL facilities, then LAFD must notify LANL so appropriate actions can be taken at the facilities. Callbacks are available, if needed, to man stations in case of a large incident in the county. The fire department holds regular drills, and personnel are familiar with WCRRF by scheduled and unscheduled tours, in-service drills, and pre-incident plan tours.

This criterion was met.

8. *The facility FP systems and procedures, as affected by facility modifications, are consistent with the description of the facility, procedures, and accident analysis and assumptions included in the safety documentation. (DOE O 425.1D)*

WCRRF is protected by a safety-significant automatic sprinkler systems and a non-safety-significant water supply. The firewater supply for WCRRF consists of a single 500,000-gallon capacity tank. This tank gravity-feeds the building TA-50-0069 sprinkler system and provides adequate water flow and pressure.

WCRRF is provided with one automatic sprinkler system for the building, WCG, and the RNS drum refrigerator. Automatic sprinkler protection within WCRRF is designed to provide, as a minimum, a level of protection for “Ordinary Hazard Group 2” hazard classifications in accordance with NPFA 13. NFPA 13 requires that any obstruction to sprinkler spray pattern greater than four-feet wide must have sprinklers installed underneath the obstruction. The WCG has been determined not to be an obstruction greater than four-feet wide, and therefore, does not require sprinklers to be installed underneath it.

A corroded sprinkler head was documented as being installed in the WCG. The FSS CSE evaluated the sprinkler in *Discovered Condition Evaluation and Closure Report* DCE-50-0069-16-003 and DCE-50-0069-104. The discovered condition evaluation determined the sprinkler is operable but degraded. The MSA identified a pre-start (FP-PRE-1) that the corroded sprinkler in the WCG must be replaced prior to restart of operations. The work package is being developed but the sprinkler has not been changed out at the time of the CRA.

A temporary modification to the FSS was prepared as part of installing the TA-50-0069 freezer (refrigerator). The modification to the FSS was to install a single, dry pendent sprinkler inside the freezer. This FSS modification was part of a larger temporary modification package for the entire freezer installation. The sprinkler head has been installed, the post-modification test performed, and the modification accepted by the CSE. The temporary modification package is

not closed out, due an NCR that is not FP-related (details of the NCR are discussed in CRAD QA1, criterion 2.j). This sprinkler modification is not reflected in the system design description document. Interviews with the engineering manager indicated that, because this is a temporary modification and is planned to be removed upon completion of the short duration campaign, the system design description would not be revised.

Two SHRs were completed for the wet pipe sprinkler system and covered the periods from January 1 through December 30, 2015, and January 1 through December 30, 2016. The reports indicated that they could not quantitatively assess major system health indicators because the system was in cold stand-by mode. However, the SHR goes on to indicate that the system has been routinely maintained and meets all the TSR and NFPA SRs. The 2015 SHR noted that three monthly surveillances were cancelled. These monthly surveillance consists of visual inspections. The 2016 SHR noted that the 5-yr surveillance was cancelled. Later determination discovered that the 5-yr had in fact been performed. The 2015 SHR noted that the water motor gong was obsolete and the alarm check valve may become obsolete in the near future. The water motor gong was replaced with a non-obsolete piece of equipment.

During the course of this assessment, all the IT&M (monthly, quarterly, semiannual, annual, and 5-yr) for the wet pipe sprinkler system have been reviewed. The NFPA and TSR required IT&M is complete and up-to-date.

This criterion was met.

9. *Adequate facilities and equipment are available to ensure that FP support and services are adequate for safe operation of WCRRF operations. (DOE O 420.1C)*

The MSA for WCRRF noted that the CSE has performed an immediate operability determination (WCRRF-FSS-IOD 9-13-2016) on the WCG FSS. This safety-significant system shows signs of corrosion on the FSS sprinkler head. The immediate operability determination found the device operable but degraded. The facility has determined that the sprinkler should be replaced and has issued a facility service request (FSR) (WO #565565-01) to replace the sprinkler head. This sprinkler must be replaced prior to resumption of operations in WCG to ensure compliance with NFPA requirements. This is identified in the MSA as FP-PRE-1, and is captured in the manageable list of open pre-start issues.

AGS Guide G010, *Standard Practice for Glovebox FP*, requires each individual glovebox to be evaluated by an FHE. PD-1220, *Fire Protection Program*, indicated that FHEs are considered a special type of FHA for gloveboxes. AP-FPDO-FHE, *Fire Hazard Evaluation Development and Maintenance*, implements the AGS requirements. As documented in criterion 4, above, the FHA documents the WCG evaluation and fire hazards associated with the operations, and specifies the required level of FP. The FHA/FHE for the WCG was updated/revised in November 2016. Gloveboxes reviewed have a fire sprinkler and manual fire suppression capabilities inside the glovebox. The WCG within the scope of this CRA has an FHE prepared. The glovebox enclosure is not in-service and is no longer used; therefore an FHE is not required.

The fire alarm system in building TA-50-0069 consists of a smoke detector above the fire alarm panel, manual pull stations, water flow switch, and alarm indicating devices. All devices associated with the scope of this CRA were successfully tested on September 7, 2016 (semiannual) and February 25, 2016 (2-yr). The annual testing is part of the two-year maintenance package. The two-year maintenance package encompasses all the annual requirements, in addition to sensitivity checks.

Portable fire extinguishers of the proper size and class are located throughout building TA-50-0069. NFPA 10, *Portable Fire Extinguishers*, requires fire extinguishers to be inspected and tested. The WOs for the latest monthly and annual inspection were completed on December 20, 2016, and October 3, 2016, respectively. The FHA does not require manual fire extinguishing agent in the WCG for the RNS/UNS campaigns, due to the nature of the material. The FHA indicates it is acceptable to utilize the manual water spray nozzle to extinguish a small fire in the WCG.

Emergency lights and exits signs are located throughout building TA-50-0069. NFPA 101, *Life Safety Code*, requires emergency lights and exit signs to be inspected and tested. The WOs for the latest monthly and annual inspection were completed on December 20, 2016, and June 30, 2016, respectively. The last *Life Safety Review Checklist* indicates that exit signs and emergency lighting are adequate and appropriate.

This criterion was met.

10. The level of knowledge of managers and staff responsible for administering and implementing the FP program is adequate based on interviews, qualification packages, and observation of operational demonstrations. (DOE O 420.1C, DOE O 426.2)

The WCRRF FP program (WCRR-FO-AP-1399, R0) is implemented by the EWMO FOD utilizing SOMs and facility personnel, with support from the FP-DO. Based on interviews and review of relevant documentation, it is apparent that adequate resources are available to implement the WCRRF FP program fully. It is of importance to note that, while adequate resources exist to implement the FP program at WCRRF, some disconnects exist between organizations. FP-DO supports the implementation of the WCRRF FP program. FP-DO management supports the use of FPEs in implementing the WCRRF FP program.

The interview with the FOD indicates WCRRF has the support of two non-dedicated, deployed FPEs from FP-DO, and a dedicated FP CSE for the credited system(s). During interviews, it was apparent that the FOD understood his roles and responsibilities as well as the interfaces between the various FP groups that have responsibilities in WCRRF. The FOD indicated that he is provided with an adequate level of support.

The SOM was well aware of the roles and responsibilities pertaining to FP at WCRRF and demonstrated familiarity with TSR required controls for combustible loading and the sprinkler system. Both FP-DO and the SOM indicate that there is a good working relationship between the

two groups, and this was evidenced by the FP-DO FPE working with the facility to reduce combustible loading.

Interviews with the RNS operations PIC and operators determined that their level of knowledge pertaining to the WCRRF FP program is adequate. They were able to articulate and demonstrate their roles and responsibilities as described in the WCRRF FP program document. Interviews with the operators indicate they are aware of options to "see and flee" or to attempt to extinguish the fire actively; either option is acceptable, if safe to do so.

Interviews with personnel responsible for the IT&M of FP systems indicate that there are adequate personnel available to perform sprinkler, fire alarm, and combustible loading inspections. The interviews and demonstrated operations also showed that the personnel assigned to complete FP inspections and comply with FP requirements had the necessary training to complete their assigned tasks correctly and implement the FP program. Interviews with the operator who conducts the monthly combustible loading inspection indicate the person is well versed in the procedure. The individual was able to articulate roles and responsibilities for performing in regards to the combustible loading program.

LANL developed and delivered training on manual firefighting techniques for gloveboxes, including hazards associated with plutonium and other pyrophoric materials to LAFD. This training is provided to each new LAFD recruit academy, and then provided as a refresher to all LAFD firefighting personnel on a three-year cycle. This training includes both classroom instruction and hands-on practical techniques for assessing fires within gloveboxes, methods of fire extinguishment, and methods for delivering extinguishing agent (including the use of in-box staged agents and the cutting of gloves to insert a Class D portable fire extinguisher wand). This training is covered under LANL Course No. 49471, *LAFD Glove Box Fires: Plutonium and Other Pyrophoric Metal Fires*, and LANL Course No. 49473, *LAFD Glove Box Fires: Plutonium and Other Pyrophoric Metal Fires Hands-On Training*, Lesson Plan.

This criterion was met.

CONCLUSION

WCRRF line management has established and implemented an FP SMP to ensure safe accomplishment of work. The level of knowledge of FP managers and staff is adequate, based on review of examinations and examination results, interviews, and observation of operational demonstrations. The FP contract requirements are flowed into institutional and facility-specific procedures and the procedures are effectively implemented in support of the facility. WCRRF has FP exemptions and equivalencies pertaining to their facility. Compensatory measures and conditions of approval associated with them are effectively implemented. There are three exemptions/equivalencies submitted to NA-LA for approval. DOE has not responded or approved these requests and their associated compensatory measures; however, LANL is working to implement these compensatory measures. There are sufficient qualified personnel available to implement the FP program effectively in support of the facility. The level of

knowledge of personnel responsible for administering and implementing the FP program is sufficient.

After reviewing pertinent documentation, inspecting the facilities, and interviewing facility management and FP support personnel, the CRA team has concluded that adequate facilities and equipment are available and are sufficient for safe WCRRF restart and RNS operations with respect to FP. There was one WO associated with the replacement of a FPS sprinkler head in the WCG that was scheduled to be completed after completion of the CRA fieldwork. This WO was reviewed and discussed and no significant issues with this routine maintenance activity were noted or anticipated.

This objective was met. No findings were identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Robert Deschambeault **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Management**	Objective: MG1 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

MG1: Line management has established and implemented SMPs to ensure safe accomplishment of work. The level of knowledge of managers, operations, and operations support personnel is adequate based on reviews of examinations and examination results, selected interviews of managers, operations, and operations support personnel and observations of operational demonstrations. (CR1, CR2, CR4, CR5, CR13)

CRITERIA

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. The WCRRF BIO has identified and documented the SMPs needed to ensure safe accomplishment of work at the WCRRF. The level of knowledge of SMP managers and staff is adequate based on review of examinations and examinations of results, interviews, and observation of operational demonstrations. (DOE O 420.1C, DOE O 440.1, DOE O 414.1D, 10 CFR 830.200, 10 CFR.120, 10 CFR 851)
3. The R2A2s of the WCRRF line operating organization and its relationships with environment, safety, and health support organizations, are clearly defined, understood, and effectively implemented with line management responsibility for control of safety. (DOE O 422.1)
4. WCRRF's line management and personnel demonstrate through their actions an awareness and high-priority commitment to comply with public and worker safety, health, and environmental protection requirements. (48 CFR 952.5223-1, 10 CFR 851.20, 10 CFR 830.120, 10 CFR 830.200)
5. Management frequently monitors field activities for safe operations and promptly stops work when unsafe conditions arise. (DOE O 422.1)
6. The safety basis document list (SBDL) accurately reflects the approved safety envelope for the facility and RNS activities.

APPROACH

Records Reviewed

- 2016 Management Observation (MOV) Report with Stack Chart
- ABD-V/FM-005, R2.1, *Basis for Interim Operation for Waste Characterization, Reduction and Repackaging Facility (WCRRF)*, 11/9/2011
- ABD-V/FM-005, R2.1.A, Attachment 1, R1, *WCRRF Support Activities for the Treatment of RNS Waste*, 10/21/2016

- WCRR-PLAN-1387, R1, *WCRRF RNS Waste Operations Startup Plan*, 1/27/2017
- WCRR-PLAN-1388, R0, *Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF),* 10/12/2016

Interviews Conducted

- ADEM Associate Director
- ADEM Deputy Associate Director
- EWMO Deputy Director
- EWMO FOD
- Nuclear Operators (2)
- Operations Center Operators (2)
- PIC, RNS/UNS Treatment (2)
- Procedure Writers (2)
- SSW (2)
- Team Leader, RNS/UNS Treatment
- Waste Operators/Glovebox Operators, RNS/UNS Treatment (3)
- WCRRF Operations Manager
- WCRRF SOM
- WD Division Leader
- WD-WT Group Leader

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Tabletop: AREAG-WO-DOP-1383, R1, *TA-54 Area-G RNS Waste Container Shipment Preparation,* on 1/31/2017
- Pre-Job briefing: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations,* and WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment,* on 1/31/2017
- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations,* section 4.0, *Prerequisite Actions*, initiated 1/31/2017. Stop Work initiated on 1/31/2017
- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, on 2/1/2017
- Demonstration: WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*, on 2/1/2017
- Post-Job briefing: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations,* and WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment,* on 1/31/2017 and 2/1/2017
- Pre-Job briefing: WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling,* and WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes,* on 2/2/2017

- Demonstration: WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling,* and WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes,* on 2/2/2017
- Post-Job: WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling,* and WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes,* on 2/2/2017
- Pre-Job briefing: WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, on 2/2/2017
- Demonstration: WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, on 2/2/2017
- Post-Job briefing: WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, on 2/2/2017
- Demonstration: WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, section 5.1, *Replace Glovebox Gloves*, on 2/3/2017
- Post-Job Briefing: WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance,* section 5.1, *Replace Glovebox Gloves*, on 2/3/2017
- Operational Drill: EWMO-RP-17-008, R0, *Responding to a Glove Failure at the WCG in WCRRF*, on 2/3/2017
- Operations Drill Hotwash: EWMO-RP-17-008, R0, *Responding to a Glove Failure at the WCG in WCRRF*, on 2/3/2017
- Type 3 (Evaluated) Emergency Drill: 2017-EWMO-017, R0, *RNS Thermal Runaway/WCRR*, on 2/7/2017
- Operational Drill: EWMO-RP-17-008, R1, *Responding to a Glove Failure at the WCG in WCRRF*, on 2/8/2017
- Operational Drill Hotwash: EWMO-RP-17-008, R1, *Responding to a Glove Failure at the WCG in WCRRF*, on 2/8/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

Based on document reviews, interviews with key WCRRF, WD, and support personnel, as well as facility walkdowns, reviews of previous assessments and their finding resolutions, and field observations of WCRRF RNS processing evolutions, the CRA team determined that the targeted prerequisites, with the exception of a manageable list of open pre-start issues, as defined in WCRR-PLAN-1388, have been fully met.

This criterion was met.

2. *The WCRRF BIO has identified and documented the SMPs needed to ensure safe accomplishment of work at the WCRRF. The level of knowledge of SMP managers and staff is adequate based on review of examinations and examinations of results, interviews, and observation of operational demonstrations. (DOE O 420.1C, DOE O 440.1, DOE O 414.1D, 10 CFR 830.200, 10 CFR.120, 10 CFR 851)*

WCRRF operates with an approved BIO containing SMPs to reduce the risk of operations. The SMPs were verified to be implemented, and are healthy enough to support the start of RNS

processing. This was determined through the evaluation of the SMPs during assessments performed for each CRA objective applicable to the individual SMP. The CRA team assessed the level of knowledge of personnel supporting WCRRF RNS processing. Assessments were performed through observations of demonstrations and interviews. Level of knowledge is adequate to support restart of WCRRF for RNS processing. A summary of each SMP evaluation is presented below.

5.6.1, Unreviewed Safety Question

Current implementation of the USQ SMP will support safe restart of RNS operations at WCRRF. The USQ program is effectively implemented for facility and procedure changes and supports safe RNS processing. Safety basis and USQ personnel are knowledgeable of their roles and responsibilities for RNS Processing.

The USQ program was evaluated as part of CRAD SB1. There were no findings identified. The objective was met.

5.6.2, Emergency Preparedness

Current implementation of the emergency preparedness SMP will support safe restart of RNS operations at WCRRF. Based on observations of drills, hotwashes, document reviews, facility walkdowns, and interviews, the CRA team concluded that a routine operations drill program and an emergency management drill and exercise program have been established and implemented to support restart of WCRRF RNS operations. Records for each program are adequate to demonstrate the effectiveness of completed drills and exercises, as well as planning for future drills and exercises. When weaknesses or opportunities for improvement are identified in WCRRF operational drills and emergency drills and exercises, corrective actions are developed and implemented.

There were no findings identified. The objective was met.

5.6.3, Conduct of Operations

The WCRRF TSRs identify SMP 5.6.3, Conduct of Operations, as a requirement of the WCRRF ConOps program. Based on documents reviewed, interviews conducted, and evolutions witnessed, the WCRRF ConOps program is in compliance with DOE order and LANL requirements, and is determined to be effective overall. ConOps principles are being applied in the facility through procedures, knowledgeable personnel, and maintained equipment and processes. Both the FOD and WD personnel exhibited ownership and strong adherence to "working to procedures," as evidenced by demonstrations, interviews, and document reviews. Facility operations components including management supervision, work planning, change control, and proper equipment selection are also robust. The ConOps program requires that performance criteria be considered when accepting or authorizing work, identifying the risks to operations, and developing and implementing the controls needed to perform work safely and securely. Observed evolutions demonstrated adequate understanding of ConOps, with few

exceptions, none of which elevated to a concern with readiness to restart. The operators also demonstrated an adequate understanding of criticality controls, even though procedures require improvement, as identified in finding OPS2-PRE-1.

There were no findings identified. The objective was met.

5.6.4, Nuclear Criticality Safety

Results of evolutions, document reviews, and interviews led the CRA team to the conclusion that, while there are areas of improvement necessary, the current level of implementation of criticality safety is sufficient to process the limited RNS waste campaign in the WCRRF WCG. Operator knowledge is sufficient and the procedures are adequate to provide assurance of safe operations for the identified scope covered by this CRA. Support resources (e.g., CSO and CSAs), while sufficient in number, have not had appropriate priority to ensure that the NCS program and its implementation are flawless; however, needed improvements do not constitute a systematic failure of the program, nor was a significant failure found that could result in unacceptable impact on personnel, the facility, the public, or the environment.

There were no findings identified. The objective was met.

5.6.5, Fire Protection

Current implementation of the FP SMP will support safe restart of RNS operations at WCRRF. The level of knowledge of FP managers and staff is adequate, based on review of examinations and examination results, interviews, and observation of operational demonstrations. The FP contract requirements are flowed into institutional and facility-specific procedures and the procedures are effectively implemented in support of the facility. WCRRF has FP exemptions and equivalencies pertaining to their facility. Compensatory measures and conditions of approval associated with them are effectively implemented. There are three exemptions/equivalencies submitted to NA-LA for approval. DOE has not responded or approved these requests and their associated compensatory measures; however, LANL is working to implement these compensatory measures. There are sufficient qualified personnel available to implement the FP program effectively in support of the facility. The level of knowledge of personnel responsible for administering and implementing the FP program is sufficient.

After reviewing pertinent documentation, inspecting the facilities, and through interviews with facility management and FP support personnel, the CRA team has concluded that adequate facilities and equipment are available and are sufficient for safe WCRRF restart and RNS operations with respect to FP. There was one WO associated with the replacement of a FPS sprinkler head in the WCG that was scheduled to be completed after completion of the CRA fieldwork. This WO was reviewed and discussed and no significant issues with this routine maintenance activity were noted or anticipated.

There were no findings identified. The objective was met.

5.6.6, Radiation Protection

Current implementation of the RP SMP will support safe restart of RNS operations at WCRRF. An RPP is established to ensure safe accomplishment of work at WCRRF, while protecting the employees, public, and environment during radiological operations at the facility. RP procedures and RWPs are effectively implemented in support of WCRRF. An adequate number of RPP personnel are available to support WCRRF restart activities. Interviews were conducted with several RP personnel and they were all found to be very knowledgeable about their areas of responsibility.

There were no findings identified. The objective was met.

5.6.7, Maintenance

Current implementation of the maintenance SMP will support safe startup and operations of WCRRF. The maintenance program has demonstrated that there is ownership and deliberate team engagement by the maintenance staff. This fosters improvements in planning and performance of work that is conducted in a safe and compliant manner. Observed work execution demonstrates that “Pause Work” is utilized without regard to schedule pressures. The process for scoping work and performance of walkdowns, hazards and safety evaluations, pre-job and post-job briefs, work planning, and documentation was observed to be effective.

All MSA findings and PFITS actions that can affect WCRRF RNS restart have been verified as closed or are on a manageable list of open pre-start issues, based on review of objective evidence, interviews with WCRRF and support personnel, walkdowns of facilities, and observation of RNS operational and maintenance demonstrations.

EWMO and WD personnel at TA-50-0084 and -0069 have effectively implemented VSSAs, surveillance testing, maintenance operations, and calibration programs to confirm and monitor the condition and operability of programmatic and facility systems associated with or supporting RNS operations. There are adequate facilities, equipment, and commodities available to support safe and sustained WCRRF operations for the duration of the campaign.

While it is recognized that there are deficiencies identified in maintenance training, the staff is knowledgeable with regard to these systems, indicating that system-level training and on-the-job experience has occurred. Review of evidence files by the CRA team verified that IWDs are effectively implemented and the Conduct of Maintenance program is adequate to support WCRRF RNS operations restart. Based on the CRA team’s interviews, operations demonstrations, maintenance evolutions, and documented evidence, current implementation of the maintenance SMP will support safe restart of RNS operations at WCRRF.

There were no findings identified. The objective was met.

5.6.8, Configuration Management

Current implementation of the CM SMP will support safe restart of RNS operations at WCRRF. Based on documents reviewed, interviews conducted, and evolutions witnessed, the CRA team concluded the WCRRF engineering/CM program is in compliance with DOE orders and LANL requirements, and the Conduct of Engineering program is effectively implemented. Facility engineering and programmatic engineering personnel interviewed demonstrated an acceptable level of knowledge of CM principles for maintaining the technical baseline of their assigned SSCs.

For the VSSs for RNS processing at WCRRF, the CRA team has concluded that sufficient processes and procedures have been established for designation of design features and functions credited in the BIO; management of change control; application of technical reviews, including USQDs; determination of system health, including VSSs status and assessment; and control of system modifications to demonstrate the acceptability of the configuration control program for safe WCRRF restart and RNS operations.

Although there are some concerns identified in areas of CM related to consistency of the MEL and MDLs, current implementation of the CM SMP will support RNS processing at WCRRF.

There were no findings identified. The objective was met.

5.6.9, Hazardous Material and Waste Management

Current implementation of the hazardous material and waste management SMP, upon closure of WM1-PRE-1, will support safe restart of RNS operations at WCRRF. The WCRRF facility operations personnel, waste disposition operations personnel, and support personnel have demonstrated sufficient knowledge and ability to commence processing RNS waste safely and compliantly. Procedures implement the requirements of the HWFP and the safety basis, and provide adequate technical direction to perform WCRRF RNS processing safely. There is adequate staffing to process RNS waste safely under current conditions. However, expanding operations to additional shifts will require additional operations staff. Line management has set clear expectations and commitment to comply with public and worker safety, health, and environmental protection requirements. WCRRF facility and support personnel have clearly defined R2A2s within the organization.

There was one finding identified.

WM1-PRE-1: The version of WCATS currently being used is a beta version of the software. The production version must be tested and in use prior to beginning RNS operations.

The objective was met.

5.6.10, Hoisting and Rigging

Current implementation of the hoisting and rigging SMP will support safe restart of RNS operations at WCRRF. LANL procedure P101-25, R5, *Cranes, Hoists, Lifting Devices, and Rigging Equipment,* governs the use of facility-installed cranes and other lifting devices. A review of the WCRRF RNS waste processing equipment determined there were no hoists or cranes needed for RNS processing. There is a drum lifting device for raising the waste drum to mate with the WCG, but an engineering determination was made by the WCRRF CSE and the LANL SME for hoisting and rigging that this lift device is not a hoist or crane and does not need to meet the requirements of P101-25. However, WCRRF does follow some of the inspection criteria for hoists and cranes, and there is documented evidence that the drum lift device has been inspected and load-tested. Further inspection of the device prior to lifting a waste container is also performed per the operating procedure. Based on the limited applicability of this SMP and the actions that are taken to implement relevant portions of P101-25, this SMP is determined by the CRA team to be sufficiently implemented to ensure safe restart of WCRRF.

Based on the limited applicability to WCRRF RNS processing, the CRA IP did not have an objective specifically addressing hoisting and rigging.

5.6.11, Quality Assurance

Current implementation of the QA SMP will support safe restart of RNS operations at WCRRF. With the exception of a manageable list of open pre-start issues, all MSA findings and AIB CAP actions that can affect WCRRF RNS restart have been verified as closed, based on review of objective evidence, interviews with WCRRF and support personnel, walkdown of facilities, and observation of RNS operational demonstrations. Review of evidence files by the CRA team verified that QA procedures have been effectively implemented and the EWMO QA program is adequate to support WCRRF RNS operations restart. WCRRF operations are effectively integrated into the LANL feedback and improvement program, including MSAs that meet contractor assurance program requirements. Software verification and validation processes are adequately understood and implemented, although the beta version functionality of WCATS has not yet been incorporated into the production version required for actual RNS waste processing. M&TE required for WCRRF restart has been calibrated and previously identified issues related to M&TE control in WCRRF have been addressed. Based on the interviews, operations demonstrations, and documented evidence, current implementation of the QA SMP will support safe restart of RNS operations at WCRRF.

There were no findings identified. The objective was met.

5.6.12, Training & Qualification

Current implementation of the training and qualification SMP, upon closure of TQ1-PRE-1 and TQ1-PRE-2, will support safe restart of RNS operations at WCRRF. CRA team interviews and document reviews conducted for all positions in accordance with the EWMO TPP confirm that an effective training and qualification program is developed and appropriately implemented at

WCRRF, with limited exceptions. Interviews conducted demonstrate that WCRRF personnel display personal ownership of the established SMPs including training and qualification. Through interviews and review of training material, procedures, and other relevant documentation, the CRA team determined that the necessary training requirements to support safe work performance are adequately flowed down to the workforce. WCRRF personnel are confident and knowledgeable and demonstrated this during evolutions and interviews. Supervisors, managers, and workers displayed a strong ownership of training and qualification at WCRRF.

WCRRF personnel demonstrated that they understood their functions, roles, and responsibilities in accordance with DOE O 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*, and LANL P781-1, *Conduct of Training*.

There were two findings identified.

TQ1-PRE-1: The current documented basis for determination that FMH certification is not required for process operators in EWMO facilities is inadequate.

TQ1-PRE-2: WCRRF maintenance training has been developed but has not been effectively implemented. Maintenance personnel lack required training on VSSs.

This objective was met.

5.6.13, Procedures Management

The WCRRF TSRs identify SMP 5.6.13, Procedures Management, as a requirement of the WCRRF ConOps program. Upon closure of OPS2-PRE-1, WCRRF operations will have adequate procedures to cover the activities under this restart effort, as evidenced through document reviews and observed evolutions. ISI procedures are in place to ensure operability of TSR-credited systems, and their performance for WCRRF restart has been verified under CRAD SB1. Based on documents reviewed and interviews conducted, the WCRRF ConOps program is in compliance with the DOE order and LANL procedure control requirements, and is determined to be effective overall, as further evidenced through observed evolutions. ConOps principles are being applied in the facility through procedures, and personnel are knowledgeable and competent. The weaknesses observed in the procedures, as identified in CRAD OPS2, can be minimized with additional, thorough field validation with the procedure writers, operators, SMEs, and facility personnel involved. In general, the critical portions of the procedures were able to be executed safely; however, improved validation will drive improved operator execution performance.

There was one finding identified.

OPS2-PRE-1: The operations procedures necessary for WCRRF RNS waste processing operations lacked adequate field validation with appropriate personnel. Additional effort is

necessary to ensure they can be performed as intended and achieve the desired consistency of performance.

The objective was **not** met.

3. *The R2A2s of the WCRRF line operating organization and its relationships with environment, safety, and health support organizations, are clearly defined, understood, and effectively implemented, with line management responsibility for control of safety. (DOE O 422.1)*

Line operating organization R2A2s are defined in EM-AP-10008, R1, *ADEM Roles, Responsibilities, Authorities, and Accountabilities*. These roles and responsibilities have been recently revised based on FE and MSA assessments in order to provide additional clarification. Results of interviews demonstrate that line management is accepting responsibility for control of safety. Based on interactions with the assigned OSH personnel, the CRA team found that they were knowledgeable of the IS and IH hazards associated with RNS processing and were actively involved with the specified controls. Questioning of the occupational health and IS personnel on the technical basis for the hazard analyses (HAs) and the associated controls indicates a high level of competence in their assigned areas, an in-depth understanding of the RNS process, a genuine concern for the safety and health of operations personnel, and evidence that they were involved in development of the procedures and walkdowns of the facilities. Interviewed personnel understood their roles and responsibilities for providing oversight of work activities and for involvement in the planning and safe execution of work. Interviews with OSH management and technical personnel demonstrated an active involvement in work planning and execution. However, it was noted in criterion 3 of OSH1 that changes to the operating procedures and the ARTIC facility may not have been evaluated by the appropriate OSH SMEs; therefore, a fresh walkdown of the facilities, review of the procedures, and comparison with the associated JHAs are warranted.

This criterion was met.

4. *WCRRF's line management and personnel, through their actions, demonstrate an awareness and high-priority commitment to comply with public and worker safety, health, and environmental protection requirements. (48 CFR 952.5223-1, 10 CFR 851.20, 10 CFR 830.120, 10 CFR 830.200)*

The CRA team concluded that the operating organization line management and personnel regularly demonstrated their commitment to maintaining and improving the safety of the facility and the safe performance of work by all parties; examples include MOVs, demonstration of a willingness to pause operations, and willingness to conduct fact-findings that ensure issues are clearly understood. During this review, the line organization encountered several operational and technical challenges, as documented in objectives MG2, OPS2, TQ1, and WM1, that closely approximate the level of intensity that will likely be encountered during startup and operation of WCRRF RNS processing.

As a result of previous issues and questions involving operations, emergency management, and the observed performance on the first operational drill, the CRA team requested an additional operational drill demonstration during the assessment that added a significant level of intensity and additional scrutiny to the process. Throughout those challenges and the responses to them, the leadership and functional personnel responded in a manner that clearly articulated their awareness and commitment to comply with public and worker safety, health, and environmental protection requirements.

This criterion was met.

5. *Management frequently monitors field activities for safe operations and promptly stops work when unsafe conditions arise. (DOE O 422.1)*

Interviews with operators reflected the involvement of the WD-WT team leader, group leader, and WD division leader in demonstration of RNS waste processing procedures. As discussed in CRAD OPS1, the PICs and operators did not hesitate to initiate a pause/stop work if the need arose. This reflected an environment where stopping work when unsafe or uncertain conditions arise is encouraged by management.

A review of the 2016 MOV Report with Stack Chart reflects that, in calendar 2016, a total of 238 MOVs were performed in the areas of maintenance; environment, safety, and health (ESH); FOD, operations report, engineering, waste disposition, and QA. This reflects a management commitment to monitor WCRRF activities. However, a review of the MOV summaries from 2016 show that there were a number of months where MOVs documented were less than the target of two MOV per month (several months had a large number of the managers performing no MOVs for that month). This calls into question if MG1-OFI-1 from the MSA should have been closed without additional action being taken.

This criterion was met.

6. *The SBDL accurately reflects the approved safety envelope for the facility and RNS activities.*

BIO and TSRs have been developed by LANL to reflect WCRRF operations, and have been approved by NA-LA and DOE Office of Environmental Management (DOE-EM). The most recent approval is documented in OPS:57JO-710844, *Approval of ABD-WFM-006, Rev 2.5.1*, dated 12/20/2016. The SBDL correctly includes the BIO and TSR documents developed by LANL for WCRRF waste operations and approved by NA-LA and DOE-EM, which are:

- ABD-WFM-005, R2.1, *Basis for Interim Operation for Waste Characterization, Reduction, and Repackaging Facility* (WCRRF), 12/7/2011
- ABD-WFM-005, R2.1.A, Attachment 1, R1, *WCRRF Support Activities for Treatment of RNS Waste*, 12/14/2016
- ABD-WFM-006, R2.5.1, *Technical Safety Requirements (TSRs) for Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, 12/20/2016

- SA-SBD-452, R1, *Analysis of Remediated Nitrate Salt (RNS) Accidents with Mitigated Consequence Estimate over the EG Based on DOE Standard 3009-2014 Criteria for Area G BIO and WCRRF BIO RNS Attachments,* 10/19/2016

This criterion was met.

CONCLUSION

WCRRF line management has clearly identified, documented, and integrated the WCRRF BIO SMPs with LANL's ISMS and QAP. The CRA team concluded that all SMPs are adequately implemented. The CRA team noted issues within management, operations, training and qualification, and waste management functional areas; specific issues involved the startup plan's lack of sufficient detail (MG2-PRE-1), operations procedures lack of adequate field validations (OPS2-PRE-1), inadequate documentation that FMH certification was not required (TQ1-PRE-1), ineffective implementation of maintenance training (TQ1-PRE-2), and utilization of the beta version of WCATS (WM1-PRE-1).

Facility leadership demonstrates a commitment to ConOps, and regularly reinforces the expectation that every employee must strive for compliant execution and continuous improvement in all facets of WCRRF operations and support. The management functional area has been determined to be capable of supporting the safe operation of WCRRF upon closure of identified pre-start findings.

This objective was met. No findings were identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	C. Eric Shogren **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Management**	Objective: MG2 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

MG2: An adequate startup or restart program has been developed that includes plans for graded operations and testing after startup or resumption to confirm simultaneously the operability of equipment, the viability of procedures, and the performance and knowledge of the operators. The plans should indicate validation processes for equipment, procedures, and operators after startup or resumption of operations, including any required restrictions and additional oversight. Any compensatory measures required during the approach to full operations are described. (CR11)

CRITERIA

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. The startup plan has been developed and approved. (DOE O 425.1D, DOE-STD-3006-2010)
3. The startup plan reflects deliberate, controlled actions, including criteria for escalation and exit from the plan requirements. (DOE O 425.1D, DOE-STD-3006 2010)
4. Management oversight has been specifically required in the plan. Specific expectations for the management oversight are defined. Hold points are specified. (DOE O 425.1C, DOE-STD-3006-2010)
5. Compensatory measures are defined and implemented with provisions for phase-out as confidence is gained. (DOE O 425.1C, DOE-STD-3006-2010)
6. Required documentation is identified to demonstrate effective implementation of the plan. (DOE O 425.1C, DOE-STD-3006-2010)
7. The level of knowledge of personnel concerning their roles and responsibilities with respect to the startup plan is adequate. (DOE O 425.1C, DOE O 426.2)
8. The startup plan adequately reflects a measured, deliberate, and graded approach to resuming operations at WCRRF. (DOE-STD-3006-2010).

APPROACH

Records Reviewed

- Memorandum, EM2016-5350, from Sisson to Contreras and Osborn, Subject: *Assignment as a Senior Supervisory Watch (SSW) for the Restart of Waste Characterization, Reduction, and Repackaging Facility (WCRRF) Operations and Startup of Remediated Nitrate Salt (RNS) Waste Processing and Treatment Activities,* 11/28/2016
- Memorandum, EM2016-5359, from Sonnenberg to Hohs, et al., Subject: *Assignment as Member of the Management Oversight Team (MOT) for the Restart of Waste Characterization, Reduction, and Repackaging Facility (WCRRF) Operations and*

Startup of Remediated Nitrate Salt (RNS) Waste Processing and Treatment Activities, 12/2/2016
- WCRR-PLAN-1387, R1, *WCRRF RNS Waste Operations Startup Plan*, 1/27/2017
- WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, 1/11/2017
- WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, 1/27/2017
- WCRR-WO-DOP-1381, R1, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*, 1/11/2017
- WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*, 1/27/2017

Interviews Conducted

- ADEM Associate Director
- ADEM Deputy Associate Director
- EWMO Deputy Director
- EWMO FOD
- SSW (2)
- WD Division Leader

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Tabletop: AREAG-WO-DOP-1383, R1, *TA-54 Area-G RNS Waste Container Shipment Preparation*, on 1/31/2017
- Pre-Job briefing: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, and WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, on 1/31/2017
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- Demonstration: WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*, on 2/1/2017
- Post-Job briefing: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, and WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, on 1/31/2017 and 2/1/2017
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- Demonstration: WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling,* and WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes,* on 2/2/2017
- Post-Job: WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling,* and WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes,* on 2/2/2017
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- Operations Drill Hotwash: EWMO-RP-17-008, R0, *Responding to a Glove Failure at the WCG in WCRRF*, on 2/3/2017
- Type 3 (Evaluated) Emergency Drill: 2017-EWMO-017, R0, *RNS Thermal Runaway/WCRR*, on 2/7/2017
- Operational Drill: EWMO-RP-17-008, R1, *Responding to a Glove Failure at the WCG in WCRRF*, on 2/8/2017
- Operational Drill Hotwash: EWMO-RP-17-008, R1, *Responding to a Glove Failure at the WCG in WCRRF*, on 2/8/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

Based on document reviews, interviews with key WCRRF, WD, and support personnel, as well as facility walkdowns, reviews of previous assessments and their finding resolutions, and field observations of WCRRF RNS processing evolutions, the CRA team determined that the targeted prerequisites, with the exception of a manageable list of open pre-start issues, as defined in WCRR-PLAN-1388, have been fully met.

This criterion was met.

2. *The startup plan has been developed and approved. (DOE O 425.1D, DOE-STD-3006-2010)*

WCRR-PLAN-1387, R1, *WCRRF RNS Waste Operations Startup Plan,* was developed, issued, and approved with an effective date of 1/27/2017. The plan is similar to those used for prior LANL startup operations and is sufficient to support the safe restart of nuclear operations for WCRRF RNS processing.

This criterion was met.

3. The startup plan reflects deliberate, controlled actions including criteria for escalation and exit from the plan requirements. (DOE O 425.1D, DOE-STD-3006 2010)

WCRR-PLAN-1387, R1, describes the deliberate, controlled operations that line management will follow after authorization to restart nuclear operations following the readiness assessment of RNS waste treatment operations at WCRRF. This does not include operations in Area G. The scope is limited to the actual treatment operations defined in in Appendix A of the startup plan, and evaluation results are to be documented on the startup checklists. The startup plan describes the approval process for returning to normal operations. Operations not subject to the requirements of the startup plan are shown in Appendix B, and are primarily the normal routine surveillance and maintenance processes incidental to WCRRF operations.

Roles and responsibilities and a description of the activity are provided in the startup plan. Two operating crews are responsible for the receipt of the RNS waste containers at WCRRF and for RNS waste treatment operations in the WCG. For RNS waste treatment operations, a Monday through Friday, split overlapping shift utilizing two crews will be implemented to maximize the amount of time available each day to treat the RNS waste within the WCG and reduce the campaign duration.

Upon satisfactory completion of RNS waste treatment evolutions for four consecutive RNS waste containers (including at least one RNS POC waste drum), the MOT will recommend to the WD division leader and EWMO FOD that RNS waste treatment operations be released to routine operations. For all other evolutions covered under Appendix A, after completion of two consecutive satisfactory evolutions, the MOT will recommend to the WD division leader and EWMO FOD that a specific activity be released to normal routine operations.

Proposed RNS waste treatment sequence for startup:

Note: The number of batches and daughter drums are provided as relative indications. The actual numbers may vary based on the actual field conditions encountered.

1. Surrogate, POC with liquids, debris, and surrogate NS, 1 daughter drum of treated NS waste
2. Surrogate, POC with liquids, debris, and surrogate NS, 1 daughter drum of treated NS waste
3. 92669 – MAR 2.0 PE-Ci, 31 batches, 1 daughter drum of treated NS
4. 69618 – MAR 4.1 PE-Ci, 92 batches, 3 daughter drums of treated NS
5. 68685 – MAR 8.5 PE-Ci, 98 batches, 3 daughter drums of treated NS {requires sampling}
6. 69079 – MAR 21.1 PE-Ci, 117 batches, 4 daughter drums of treated NS
7. 69445 – MAR 5.1 PE-Ci, 97 batches, 4 daughter drums of treated NS
8. 68540 – MAR 0.3 PE-Ci, 1 batch, 1 daughter drum of treated NS
9. 68638 – MAR 0.41 PE-Ci, 1 batch, 1 daughter drum of treated NS
10. 69208 – MAR 39.1 PE-Ci, 161 batches, 4 daughter drums of treated NS

General instructions are provided for the MOT, including relationships, feedback, lessons learned, and selection of team members. Their scope includes observing:

- Verification of equipment operability
- Oversight of procedure viability
- Oversight of operator performance

The letter assigning SSWs for the restart of operations was issued on November 28, 2016. Currently, there are two SSWs assigned; the original intent was to have three SSWs available to support startup activities. During the course of interviews, management has stated they intend to add a third SSW prior to implementation of the startup plan.

The startup plan contains Attachment 1, *Startup Checklist for WCRRF RNS Waste Processing*, which identifies the steps necessary to start operations in WCRRF. The checklist refers to section 6 for the prerequisites as follows:

> The following prerequisites must be verified prior to commencing RNS waste treatment operations.
>
> [1] Completion of the Federal Readiness Assessment (FRA).
> [2] Formal appointment of the MOT members and the SSW by the EWMO FOD and WD DL.
> [3] Closure of all FRA Pre-Start Findings and an approved Corrective Action Plan to address any Post-Start Findings.
> [4] Receipt of DOE Headquarters approval of the RNS Treatment Facility (WCCRF) and the RNS Waste Treatment Process, WCRR-WO-DOP-1376, WCRRF RNS Waste Treatment.
> [5] Authorization to restart nuclear operations received from the Startup Approval Authority – National Nuclear Security Administration Los Alamos Field Office Manager.

The checklist goes on to identify a number of radiation safety practices to be observed during the performance of the evolutions observed. These performance expectations were not demonstrated for the CRA during the review in WCRRF, but rather on the ARTIC mockup. The gaps that exist between the procedure execution in ARTIC and the actual facility in terms of procedure execution have not been demonstrated.

The acceptance criteria for the processing of two surrogate drums are not clearly identified in the startup plan. How these activities are observed, the level of performance, and the workability of procedures in WCRRF will need to be verified prior to commencing hot operations. This includes taking the facility from cold to warm standby mode, and removing the “waste” drum presently installed in WCRRF on the parent port of the WCG.

MG2-PRE-1: The startup plan lacks sufficient definition in terms of acceptable operational performance with surrogate materials before commencing actual RNS waste operations in WCRRF; it does not adequately address transition from ARTIC to WCRRF prior to

authorization to startup; and it does not include sufficient acceptance criteria for stepping out of management oversight and SSWs.

This criterion was **partially** met.

4. *Management oversight has been specifically required in the plan. Specific expectations for the management oversight are defined. Hold points are specified. (DOE O 425.1C, DOE-STD-3006-2010)*

The startup plan requires MOT observation of each of the defined operations. Though appointed by separate memoranda, the MOT is comprised line managers and SSWs; the SSWs lead the MOT. The approved startup plan for WCRRF RNS processing defines and specifies expectations for the MOT. Appropriate hold points, including the designation of MOT personnel necessary for initial operations oversight, are addressed. The startup plan requires the MOT to be formally identified by memorandum and approved by EWMO FOD and WD division leader upon authorization to restart nuclear operations from the Startup Authorization Authority.

The startup plan specifies that each of the following operational evolutions will be observed as part of the MOT review:

1) RNS waste container receipt at WCRRF and placement into refrigerated storage (WCRR-WO-DOP-1378);
2) RNS waste container (parent drum) removal from refrigerated storage and bag-on to the WCRRF WCG (WCRR-WO-DOP-1380);
3) Opening of the RNS waste container and treatment of RNS waste (WCRR-WO-DOP-1376, WCRR-WO-DOP-1396);
4) Replacement of a daughter drum (bag-on and bag-off) (WCRR-WO-DOP-1381); and
5) Bag-off and overpack of an emptied RNS waste container (parent) (WCRR-WO-DOP-1380).

The startup plan specifies that a minimum of two consecutive satisfactory evolutions (four consecutive satisfactory evolutions for RNS waste treatment) will be observed by the MOT utilizing Attachment 1. The startup plan goes on to state:

> Upon the satisfactory completion of RNS waste treatment evolutions for four consecutive RNS waste containers (including at least one RNS POC waste drum), the MOT will recommend to the WD DL and EWMO FOD that RNS waste treatment operations (WCRR-WO-DOP-1376) be released to routine operations. For all other evolutions covered under Appendix A, after completion of two consecutive satisfactory evolutions, the MOT will recommend to the WD DL and EWMO FOD that a specific activity be released to normal routine operations.

However, during interviews with the SSWs, the WD division leader and the Deputy Associate Director for ADEM all admitted that the startup plan was unclear as to what constituted an evolution.

This criterion was met.

5. *Compensatory measures are defined and implemented with provisions for phase-out as confidence is gained. (DOE O 425.1C, DOE-STD-3006-2010)*

The compensatory measure required and specified in the startup plan is the appointment and establishment of MOT members and that all operations be performed in the presence of the MOT or a line manager, as applicable, with associated evaluation and documentation. Phase-out of the compensatory measure is specified in the startup plan. The startup plan provides that once the exit criteria are met for each of the two consecutive satisfactory evolutions (four consecutive satisfactory evolutions for RNS waste treatment), the exit process may be conducted on an individual operation or any group of operations.

This criterion was met.

6. *Required documentation is identified to demonstrate effective implementation of the plan. (DOE O 425.1C, DOE-STD-3006-2010)*

Documentation required by the WCRRF RNS processing startup plan includes: the startup plan Attachment 1: *Startup Checklist for WCRRF RNS Waste Processing*; Attachment 2: *Startup Checklist for WCRRF Waste Processing – Post Satisfactory Evolutions Plan Post-Job Review Forms*; and supporting conclusion documents, reports, lessons learned, and recommendations. The documentation contains sufficient detail and rigor to demonstrate effective implementation of the startup plan.

This criterion was met.

7. *The level of knowledge of personnel concerning their roles and responsibilities with respect to the startup plan is adequate. (DOE O 425.1C, DOE O 426.2)*

WCRR-PLAN-1387, R1, section 4.0, identifies the roles and responsibilities of various members of the operating staff, including the MOT, ADEM, ADNHHO, EWMO FOD, WD division leader, line managers (e.g., operations manager, SOM, group leader/team leader), waste operators/glovebox operators/nuclear operators, and SSWs. The CRA team interviewed the EWMO FOD, EWMO Deputy FOD, ADEM, WD division leader, and SSWs regarding the MOT process, and verified that they were knowledgeable and experienced with the process.

This criterion was met.

8. *The startup plan adequately reflects a measured, deliberate, and graded approach to resuming operations at WCRRF. (DOE-STD-3006-2010).*

As addressed in criterion 3 above, the *WCRRF RNS Waste Operations Startup Plan*, WCRR-PLAN-1387, R1, provides a measured, deliberate and graded approach for RNS waste processing.

This criterion was met.

CONCLUSION

The WCRRF startup plan contains the required elements as defined by DOE O 425.1D Admin Chg 1, DOE-STD-3006-2010, and FSD-115-001. The scope, extent, and controls of the startup plan will provide a controlled approach to normal operations with adequate management attention, review, and approval for release to full operations. MOT members are designated in accordance with the startup plan, and SSW personnel on the MOT are designated in accordance with the WCRRF startup plan.

This objective was met. One finding was identified.

FINDINGS

Pre-Start
MG2-PRE-1: The startup plan lacks sufficient definition in terms of acceptable operational performance with surrogate materials before commencing actual RNS waste operations in WCRRF; it does not adequately address transition from ARTIC to WCRRF prior to authorization to startup; and it does not include sufficient acceptance criteria for stepping out of management oversight and SSWs.

Post-Start
None

Assessed by:	C. Eric Shogren **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Maintenance**	Objective: MN1 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

MN1: Line management has established a maintenance SMP for WCRRF to ensure safe accomplishment of work for the anticipated period of the operations. The level of knowledge of maintenance is adequate based on review of records, interviews, and observations of operational demonstrations. (CR1, CR3, CR4, CR5, CR6, CR7, CR8)

CRITERIA

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. The LANL maintenance program is established in accordance with the contract requirements and has been extended to support maintenance requirements of WCRRF operations fully. The maintenance implementation plan has been updated to reflect WCRRF operations requirements and commitments. (DOE O 433.1B)
    - WCRRF operations surveillance and preventive maintenance program implements BIO/TSR commitments.
    - MEL addressing WCRRF operations is current and effective.
    - System and component calibrations are current and all equipment required to support activities within the scope of the CRA are operational.
    - The maintenance organization supporting WCRRF operations is defined. Adequate numbers of appropriately cleared, trained, and qualified personnel are available to support the WCRRF operations maintenance.
3. Surveillance tests are developed that verify all commitments from the WCRRF BIO and TSR have been completed, demonstrate operability, and are effectively tracked for WCRRF operations. (10 CFR 830.200, SER, DOE O 433.1B)
4. Completed surveillances and tests, including post-construction acceptance tests, are verified and follow-up actions are documented for WCRRF operations. (DOE O 433.1B, and 10 CFR 830.120)
5. Issues from previous assessments of the maintenance program as related to WCRRF operations have been effectively tracked and resolved. (DOE O 226.1B, DOE O 414.1D)
6. Appropriate lessons learned attributes have been incorporated into WCRRF operations work packages/work instructions. (DOE P 450.4)
7. The level of knowledge of maintenance managers and staff concerning their roles and responsibilities for WCRRF operations maintenance is adequate. (DOE O 426.2)
8. Sufficient qualified programmatic personnel are available to implement the maintenance program effectively. (DOE O 426.2)

APPROACH

Records Reviewed

- ABD-WFM-005, R2.1, *Basis for Interim Operation for Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, 11/4/2011
- AP-341-403-FM02-EWMO, R0, *Master Document List Action Request*, 8/3/2015
- AP-341-516, R3, *Operability Determination*, 5/24/2014
- AP-341-801, R2, *Post Modification / Post Maintenance Testing*, 8/23/2017
- AP-341-802-TMP01, R4, *System Health Report*, 3/24/2015
- AP-WORK-001, R9.9, *Work Initiation, Screening, and Acceptance*, 1/9/2014
- AP-WORK-002, R18, *Work Planning*, 10/1/2016
- AP-WORK-003, R5, *Work Scheduling*, 3/7/2014
- AP-WORK-004, R15, *Work Performance*, 12/15/2016
- AP-WORK-005, R13, *Work Closeout*, 5/3/2015
- AP-WORK-006, R8, *Davis Bacon Determinations*, 9/21/2016
- Completed EP-WCRR-FO-DOP-1192, *WCRRF Building TA-50-69 Structural Design Integrity Inspection*, 12/10/2015
- Completed MLDC-50-0069-115, R0, *Component or Part Management Level Determination for Building Confinement System and Slab Assembly*, 2/1/2017
- Completed Surveillance *EP-WCRR-FO-DOP-1192 Structural Design*, 2/1/2017
- DCF-12-TA50-0069-001, *WCRRF Sump Cover Plate Anchors*, 10/5/2011
- DCF-16-50-0069-1460, R0, *WCRRF DRE-001 and 002 Electrical Control Upgrade*, 8/15/2016
- DOE O 433.1B, *Maintenance Management Program for DOE Nuclear Facilities*, 3/12/2013
- FORM 1563, *Spark- Or Flame-Producing Operations Permit*, 1/2015
- FSD-115-001, R1, *Verification of Readiness to Start Up or Restart LANL Nuclear Facilities, Activities, and Operations*, 6/24/2016
- *Master Equipment List*, 2/6/2017
- NCR-2017-050, *TA-54-0375 Pressure Differential Indicator Controller Outside Calibration Tolerance*, 1/13/2017
- OS-DO-RA-17-001P, *Implementation Plan (IP) restart of the Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, 1/27/2017
- P101-13, R3, *Electrical Safety Program*, 8/1/2016
- P101-26, R4, *Welding, Cutting, and other Spark- or Flame-Producing Operations*, 1/28/2016
- P300, R8, *Integrated Work Management*, 6/16/2016
- P315, R6, *Conduct of Operations Manual*, 7/8/2015
- P950, R5, *Conduct of Maintenance*, 12/10/2014
- SB-DO:CALC-09-011, *TA-50-69 Probability of Seismically Induced Failure*, 10/13/2009
- SHR-50-0069-01021, *Waste Characterization Glovebox Drum Lift Fixture*, 10/10/2014
- SHR-50-0069-0109, *Confinement Ventilation System (CVS)*, 2/3/2017

- SHR-50-0069-01148, *Building Structural Integrity*, 8/3/2015
- SHR-50-0069-01258, *Waste Characterization Glovebox (WCG*), 7/29/2016
- SHR-50-0069-01270, *Building Structural Integrity*, 8/1/2016
- WCRRF-FP-DOP-1226, R1, *WCRRF Fire Suppression System Alignment Checklist*, 11/28/2016
- WCRR-FO-DOP-1192, *WCRRF Building TA-50-69 Structural Design Integrity Inspection* R0, 12/07/2015
- WCRRF-VS-DOP-1358, R1, *WCRRF TA-50-69 Confinement Ventilation System Alignment Checklist*, 11/28/2016
- WO #00562369-01, *50-69 (Q) HVA-001 Supply Air Train and Replace Filters*, 12/7/2016
- WO #00565500-01, *50-69 Change out Magnehelic*, 11/22/2016
- WO #00573789-01, *50-69 Re-Mount floor plate on Sump*, 2/1/2017
- WO #00573975-01, *Inspect and Lube Wire Rope on Drum Lift-02 at 50-57 (ARTIC) Facility*, 1/31/2017

Interviews Conducted

- CSEs (5)
- Engineering Manager
- Maintenance and Work Control Manager
- Maintenance Coordinator (2)
- Maintenance Superintendent (4)
- Nuclear Operator (2)
- Quality Assurance Manager
- WCRRF Level B Storage Coordinator (2)
- WCRRF Operations Center Operator (2)
- WCRRF SSW
- WCRRF SOM
- WD-WT Group Leader
- Work Control Team Lead
- Work Execution Team Lead
- Work Planner

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Observation: WO #573975, *Inspect and Lube Wire Rope on Drum Lift-02 at 50-57 (ARTIC) Facility*, 1/31/2017
- Demonstration: WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, on 2/2/2017
- Demonstration: WCRRF-FP-DOP-1226, R1, *WCRRF Fire Suppression System Alignment Checklist*, 2/3/2017

- Demonstration: WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, section 5.1, *Replace Glovebox Gloves*, on 2/3/2017
- Post-Job Briefing: WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, section 5.1, *Replace Glovebox Gloves*, on 2/3/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

WCRR-PLAN-1388 identifies implementation of the WCRRF maintenance SMP as a prerequisite for WCRRF restart. Through document reviews, observations, and interviews with key personnel, the CRA team has confirmed that the maintenance program, as documented in P950, *Conduct of Maintenance*, and implemented through AP-WORK level procedures, has been effectively implemented and is compliant with the DOE orders and standards to support safe maintenance and operation of WCRRF. TSR R2.5.1, administrative control 5.6.7 specifies that the WCRRF maintenance program be managed in accordance with the policy using a graded approach. The prerequisites are met for this SMP. No findings were identified from the MSA.

PFITS item 2017-86, Action 1, SMP 5.6.7, *Pre-Start: Procure and install ML-2 sprinkler for WCG (note- receipt of procured item was not achieved prior to CRA, but item will continue to be treated with pre-start significance)*, has a due date of 2/15/2017 and has not been closed at the time of the CRA; installation of the sprinkler was not achieved prior to the completion of the CRA (see CRAD FP1 for additional detail). This item is specific to the SSC functional classification management level (ML)-2 WCG FP system sprinkler nozzle, and although impaired, its condition does not make it inoperable. This pre-start item is being tracked as part of the manageable list of open pre-start issues.

The pending closure of these items does not affect the facility's ability to operate safely. Refer to criterion 2 and criterion 5 of this CRAD for additional details. All TSR SRs are current, as evidenced by the data in the CRA evidence files; simulated completions of mode-applicable SRs were performed in real time as a function of this CRA.

This criterion was met.

2. *The LANL maintenance program is established in accordance with the contract requirements and has been extended to support maintenance requirements of WCRRF operations fully. The maintenance implementation plan has been updated to reflect WCRRF operations requirements and commitments. (DOE O 433.1B)*
    - *WCRRF operations surveillance and preventive maintenance program implements BIO/TSR commitments.*

The EWMO division, is responsible for the WCRRF and equipment maintenance where operations surveillance and preventive maintenance programs implement BIO/TSR commitments. The P950, *Conduct of Maintenance*, document serves as LANL's nuclear

maintenance management program as required by DOE O 433.1B, Admin Chg 1, *Maintenance Management Program for DOE Nuclear Facilities.*

This organization performs maintenance on WCRRF VSSs and associated equipment, including the building structure, gloveboxes and their associated stands, ventilation system, electrical system, FP systems, and the drum lift. Activities include both preventive and corrective maintenance, which are tracked in the computerized maintenance management system in accordance with P950. WCRRF has established processes and programs for safety function definition, surveillance, testing, and evaluation of maintenance activities to maintain configuration management and equipment operability. These are in accordance with P300, *Integrated Work Management*, P950 and associated AP-WORK documents, and specifically, P950 section 3.7.1, Maintenance Organization and Administration Conventional Maintenance. In addition to work performed by maintenance personnel, operations personnel perform ISI and other rounds, filter installations, calibrations with maintenance assistance, and other activities that are considered operator-based maintenance. For activities that operations personnel perform, the work is executed using operations procedures. Maintenance personnel work to IWDs.

- *MEL addressing WCRRF operations is current and effective.*

AP-341-404, *Master Equipment List*, requires VSS components and ML-1 and ML-2 components to be in the MEL. There are open PFITS items resulting from a previous FE, QAP-DOP-16-067. These open items (2016-2042-7 and 2016-2042-11 through -16) are associated with correcting discrepancies that have been identified with the MEL, which have a due date of 3/15/2017. WCRRF systems pending review/correction include the vehicle barriers, FSS, CVS, UPS, TRU waste containers, and the WCG. Some examples of MEL discrepancies are described in the following paragraphs.

During walkdown of the WCRRF, a visual inspection of equipment was conducted to determine if there was equipment that had open or pending maintenance activities identified, and if the equipment status was in alignment with the MEL. Four magnehelic pressure gages (PDI-19, 20, 21, and 22) that were mounted on the wall next to the Allan-Bradley digital OIT were questioned due to an installed condition tags and “Inactive” labels that were applied to equipment that appeared to be functional. When operations personnel were asked about calibration of the gages, the response was that calibrations were not performed on that equipment because they were replaced by the OIT. The assessment team noted that the condition tag associated with the gages only specified that PDI-19 (ML-3) was out of service, and the face of the gauge was also marked with an “Inactive” sticker. PDI-20 and 21 (ML-2) were not identified on the condition tag but were also marked with “Inactive” stickers, although they appeared to be functioning. Upon further examination of the MEL, all four gages were identified as “Active” equipment, which is inconsistent with WCRRF operations personnel understanding and field labels for PDI-19, 20, and 21. Since PDI-20 and PDI-21 are both documented as ML-2 equipment, this is a deficiency that needs to be corrected. PDI-22 is included in the calibration work package. Interviews with engineering personnel concluded that the gauges in question do not require calibration, and that valving out the equipment and making the change to the MEL to “Inactive” will require additional evaluation.

For the fire suppression and ventilation systems, the MEL was reviewed against the system alignment checklists. It was noted that multiple safety-significant components were incorrectly identified in the MEL. There were ML-2 components listed in the system alignment checklist that were missing from the MEL or were listed with a status other than "Active."

In reviewing the *Critical and Essential Spare Parts* list, it was noted that there are two ML-2 fan motors that were identified as critical that have NCR-2017-018 written against them due to inadequate Level B storage requirements. The motors have not been dispositioned for use at the time of this assessment, and based on documentation, the motors have not had preventative maintenance performed on them since they were procured and stored. Closure of PFITS 2016-2041-2 included adding the preventative maintenance requirements in the MEL, and the model preventative maintenance is currently in the planning phase. However, the NCR does not include that preventative maintenance has not been performed while in storage to ensure that preventive maintenance is a consideration for release of the equipment. During interviews with the CRA team, the engineering systems manager and systems engineers stated that there are issues with availability of spare parts for the drum lift, building ventilation controller card, and glovebox gaskets.

These issues will not preclude safe WCRRF RNS startup, but have the potential to impact mission completion if equipment failures occur.

- *System and component calibrations are current and all equipment required to support activities within the scope of the CRA are operational.*

M&TE required for WCRRF restart has been calibrated, and previously identified issues related to M&TE control in WCRRF have been addressed. Replacement and calibration of WCG magnehelic gages were performed in December 2016 as a follow-up to PFITS item 2017-90 per WO #565500-01. However, upon review of the work documentation, the team found that there are cases in which post-maintenance readings that were taken were not acceptable. Step 2.3 of the documentation states to ENSURE gauges are in the appropriate ranges that are specified. The discrepant gauges and ranges are as follows:

- PDI-001: Reading was "0" which is outside of Min/Max range (>0.1"wc-1.0"wc) and Acceptability was marked "N/A."
- PDI-009: Reading and Acceptability were marked "N/A" and no reading was taken but there was no justification to support why it was not included.
- PDI-015: Reading was "0" which is outside of Min/Max range (>0.0"wc-1.0"wc) but was marked "yes" for Acceptability.

Additionally, Step 3.1 of the same work package which performs the post-maintenance testing (PMT) states to ENSURE each gauge measurement in step 2.3 is correct and, in the event that a gauge fails PMT, work steps are to be repeated until deficiencies are corrected. The PMT verifier performed the PMT incorrectly or incorrectly documented the results. Specifically, if calibrations or replacement of gauges were accomplished, they were not documented in the work package. Incorrectly performed PMTs applied to the following:

- PDI-001: Marked as "FAIL" but no additional action appears to have been taken.

- PDI-009: Not completed.
- PDI-015: Marked as "PASS" but the reading was outside the limit.
- PDI-022: Not completed.
- PDI-030: Not completed.
- PDI-032: Not completed.
- PDI-033: Not completed.

Additional actions are required to ensure that calibrations are performed correctly if they are still determined to be active. See CRAD QA1 criterion 2.b for quality and records-related detail associated with this issue.

- *The maintenance organization supporting WCRRF operations is defined. Adequate numbers of appropriately cleared, trained, and qualified personnel are available to support the WCRRF operations maintenance.*

The EWMO maintenance and work control groups are cleared, trained, and are in the process of qualification. Staffing levels have supported adequate maintenance of safety-related items within WCRRF in accordance with schedule commitments. However, there are exceptions related to training, as made evident in UTrain (see criterion 8 and CRAD TQ1 criterion 2).

This criterion was met.

3. Surveillance tests are developed that verify all commitments from the WCRRF BIO and TSR have been completed, demonstrate operability, and are effectively tracked for WCRRF operations. (10 CFR 830.200, SER, DOE O 433.1B)

WCRRF TSR surveillances and ISIs are developed and tracked in the "WCRRF TSR Surveillance & In-Service Inspection Tracking" database maintained in the operations center. If, during an ISI, any conditions are identified that are noncompliant or unsatisfactory in the inspection criteria, the inspector/operator annotates the deficient condition on the inspection form, per the ISI procedure being implemented. Recorded deficiencies result in the initiation of either an FSR or an engineering service request, per the direction of the ISI. These are tracked, scheduled, and worked depending on the need and priority of the condition and at the direction of the FOD, as defined by the maintenance program and procedure AP-WORK-003, *Work Scheduling*. Additionally, any SRs that are unsatisfactory by performance or lack of performance will drive execution of AP-341-516, *Operability Determination*. This methodology will ensure facility operation remains within the documented facility design basis safety envelope.

The CRA team observed performance of WCRRF-FP-DOP-1226, *WCRRF Fire Suppression System Alignment Checklist*. A pre-job briefing was conducted by the SOM with a full operations complement of nuclear field and operations center operators, the SSW, operations manager, waste personnel, and an RCT present. Emphasis was placed on proper verification techniques to ensure TSR SRs 4.2.3 and 4.2.4 were properly performed. Security protocols were also required to be exercised due to the proximity of the firewater valve to the TA-55 security perimeter intrusion detection alarm system. Labeling deficiencies were noted, as well as an up-ended

identification marker post. All noted deficiencies were reported during the post-job briefing. The SOM directed the initiation of FSR from the operations center operator. Operations maintenance demonstrated competency individually and as a whole to perform these SRs.

This criterion was met.

4. *Completed surveillances and tests, including post-construction acceptance tests, are verified and follow-up actions are documented for WCRRF operations. (DOE O 433.1B, and 10 CFR 830.120)*

A review of the completed ISIs and recent printout from the tracking database indicates that all ISIs have been completed and have been properly documented. The recent ISIs reveal that system deficiencies are being documented and corrected upon discovery, and the surveillances being performed are adequate for determining the condition of the system.

However, there is an exception with the structural design integrity inspection performed for the building. EP-WCRR-FO-DOP-1192, *WCRRF Building TA-50-69 Structural Design Integrity Inspection*, was completed on 8/10/2016, 9/30/2016, 10/26/2016, and again on 2/1/2017 following a corrective maintenance work package. Each surveillance indicated a significant number of unsatisfactory conditions, including visible wall cracks and deterioration of interior and exterior walls and roof, visible air gap beneath the airlock door, DRE-001 (roll-up door), and evidence of roof leaks. The CSE has issued a discovered condition evaluation DCE-50-0069-01300 and pending corrective maintenance request FSR 160450 based on the UNSAT conditions identified. These activities are being tracked but are not currently scheduled for correction prior to restart. SHRs also indicate the structure continues to degrade. Additionally, EP-WCRR-FO-DOP-1192 does not require performance of an inspection of the floor or other ML-2-related SSCs associated with the building floor. Based on interview with the CSE, the floor is typically inspected as a best practice, although the ISI does not require it to be performed or documented. Further discussion is contained in CRAD SB1, criterion 5.

Based on the plan that the pending RNS waste processing operations campaign has a short duration, the facility risks identified above are low with respect to safety and operability of the facility. Records indicate that all required surveillances for the current facility mode are up-to-date, and the existing facility configuration can satisfactorily meet the warm standby and operation modes. The current personnel staffing will support the startup plan.

This criterion was met.

5. *Issues from previous assessments of the maintenance program as related to WCRRF operations have been effectively tracked and resolved. (DOE O 226.1B, DOE O 414.1D)*

A thorough review of the previous MSA and the most recent FE action items was performed. The results of this assessment noted that there are still pending open items, but those that were scheduled to be closed have been effectively dispositioned. Open items have been described in more detail in criterion 1 and 2 above.

Closure of PFITS 2016-2041-2 included adding the preventative maintenance requirements for critical spare parts that are identified in the MEL. While this has been completed and the PFITS issue has been closed, the model preventative maintenance for motors that are in storage is currently in the planning phase. This pending preventative maintenance is not determined to be critical for safe facility startup.

This criterion was met.

6. *Appropriate lessons learned attributes have been incorporated into WCRRF operations work packages/work instructions. (DOE P 450.4)*

Interviews with the maintenance planner and work planning team lead indicated that the ISM process of gathering feedback from post-job briefings adequately captures lessons learned. These lessons learned are subsequently reviewed during work package closure and incorporated into future work packages and/or procedures. In addition, lessons learned are incorporated into work packages based on complex-wide lessons learned, as well as previous post-job briefs and feedback from workers. Objective evidence of documented post-job brief lessons learned incorporation was observed during both maintenance and operations pre-job briefings. Additionally, completed work packages included documentation of completed post-job briefing forms as required by AP-WORK-002, *Work Planning,* AP-WORK-004, *Work Performance, and* AP-WORK-005, *Work Closeout.*

Completion of AP-WORK-002, Attachment 11, which was included in WO #573789-01, illustrates compliance with AP-WORK-004. This completed attachment documented the need for procuring appropriate radiological protective clothing that would be suitable for welding. These reviews become documented history, and if warranted, will be incorporated in to a procedure revision or work package closure review, thereby improving and strengthening the maintenance process operational effectiveness and efficiency.

This criterion was met.

7. *The level of knowledge of maintenance managers and staff concerning their roles and responsibilities for WCRRF operations maintenance is adequate. (DOE O 426.2)*

Interviews with work execution superintendents, maintenance coordinators, and work control team lead and planner indicated an acceptable level of knowledge of their roles and responsibilities and a good understanding of division of responsibility between the programmatic and facility maintenance personnel. Interviews with maintenance personnel as well as engineering and operations personnel indicated a strong level of knowledge and experience and overall cross-discipline engagement during the planning process. This has a direct benefit in scoping determination and hazards identification process, as well as improving the efficiency of planning and execution of work.

An item of concern is that there is graded approach applied to the performance and adherence to IWDs related to working steps out of order, and the application of hold points within IWDs. This

was not determined to have immediate safety implications but is not typical of the standard use for hold points. This is discussed in further detail in CRAD MN2, criterion 6.

This criterion was met.

8. *Sufficient qualified programmatic personnel are available to implement the maintenance program effectively. (DOE O 426.2)*

Based on CRA team interviews, maintenance and work control managers are confident that the current qualification and staffing levels are adequate to support the WCRRF RNS startup activities as well as production operations. The precautions/limitations/prerequisites sections of reviewed work packages, as well as the pre-job briefings for them, assure that work is not executed without the proper credentials and qualifications as defined by the latest approved training and qualification program.

Although the knowledge level of personnel and implementation of SMP requirements was satisfactory, DOE O 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*, states that maintenance personnel must be qualified to perform the tasks associated with their specialty, or work under the direct supervision of personnel qualified to perform the activity or task. For maintenance worker training at WCRRF, the training requirements are not adequately assigned to WCRRF maintenance personnel in UTrain. This is discussed in more detail in CRAD TQ1, criterion 2, pre-start finding (TQ1-PRE-2).

This criterion was **not** met.

CONCLUSION

Current implementation of the maintenance SMP will support safe startup and operations of WCRRF. The maintenance program has demonstrated that there is ownership and deliberate team engagement by the maintenance staff. This fosters improvements in planning and performance of work that is conducted in a safe and compliant manner. Observed work execution demonstrates that “pause work” is utilized without regard to schedule pressures. The process for scoping work and performance of walkdowns, hazards and safety evaluations, pre-job/post-job briefs, work planning, and documentation was observed to be effective.

All MSA findings and PFITS actions that can affect WCRRF RNS restart have been verified as closed or on a manageable list of open pre-start issues based on review of objective evidence, interviews with WCRRF and support personnel, walkdowns of facilities, and observation of RNS operational and maintenance demonstrations.

While it is recognized that there are deficiencies identified in maintenance training, the staff is knowledgeable with regard to these systems, indicating that system level training and on-the-job experience has occurred. Review of evidence files by the CRA team verified that IWDs are effectively implemented and the Conduct of Maintenance program is adequate to support

WCRRF RNS operations restart. Based on the CRA team's interviews, operations demonstrations, maintenance evolutions, and documented evidence, current implementation of the maintenance SMP will support safe restart of RNS operations at WCRRF.

This objective was met. No findings were identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	William Mathison **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Maintenance**	Objective: MN2 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

MN2: A program is in place to confirm and periodically reconfirm the condition and operability of VSSs. This includes examinations of records of tests and calibration of these systems. The material condition of all safety, process, and utility systems is adequate to support the safe conduct of work. (CR7)

CRITERIA

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. The scope of work is described in sufficient detail to allow the work planning process to identify hazards associated with the work and to develop necessary schedules, priorities, and work instructions. (48 CFR 970.5223-1)
3. Personnel involved in work planning activities have the appropriate technical and operational backgrounds and expertise given the work to be performed and the hazards associated with the work. SMEs and system engineers are used where appropriate, workers are involved in hazard identification. (48 CFR 970.5223-1)
4. All hazards that could potentially adversely impact workers, the public, the environment, the facility, and its equipment are documented and analyzed for severity/significance. “What if” and error-likely scenarios are analyzed to determine if additional protective measures are appropriate. Walkdowns are used where appropriate to identify hazards associated with both the work tasks and the work environment. Over-reliance on automated job hazard analysis tools, permits, generic work documents, etc. is not used as a substitute for thorough hazard evaluation and analysis. (48 CFR 970.5223-1)
5. Appropriate controls are identified for all hazards associated with the work activity using a hierarchy of controls methodology that seeks to eliminate the hazards, reduce the level of hazards, and control the hazards, first through the use of engineered controls, then through administrative controls, and lastly through personal protective equipment (PPE). Unnecessary controls are avoided.
6. The work document clearly defines the work scope and boundaries, and is written in a clear, concise, and worker friendly manner with properly sequenced work steps and clearly identified hazard controls. Hazard controls are adequately designed and implemented to remain in effect as long as the hazards pose a health or safety threat. The work document includes necessary prerequisites, precautions, limitations, features, controls, warnings, cautions, notes, hold points, and independent verifications to ensure worker safety, protection of critical equipment, and continuity of operations. Appropriate SMEs and system engineers concur with the work document.

APPROACH

Records Reviewed

- ABD-WFM-006, R2.4, *Technical Safety Requirements (TSRs) for Waste Characterization, Reduction, And Repackaging Facility (WCRRF)*, 9/23/2016
- AP-341-403-FM02-EWMO, R0, *Master Document List Action Request*, 8/3/2015
- AP-341-516, R3, *Operability Determination*, 5/24/2014
- AP-WORK-001, R9.9, *Work Initiation, Screening, and Acceptance*, 1/9/2014
- AP-WORK-002, R18, *Work Planning*, 10/1/2016
- AP-WORK-003, R5, *Work Scheduling*, 3/7/2014
- AP-WORK-004, R15, *Work Performance*, 12/15/2016
- AP-WORK-005, R13, *Work Closeout*, 5/3/2015
- AP-WORK-006, R8, *Davis Bacon Determinations*, 9/21/2016
- Completed MLDC-50-0069-115, R0, *Component or Part Management Level Determination for Building Confinement System and Slab Assembly*, 2/1/2017
- DCF-16-50-0069-1460, R0, *WCRRF DRE-001 and 002 Electrical Control Upgrade*, 8/15/2016
- DOE O 433.1B, *Maintenance Management Program for DOE Nuclear Facilities*, 3/12/2013
- EP-WCRR-VS-DOP-1359, R0, *TA-50-69 Ventilation System TE/TI-001 and TE/TI-002 Loop Verification and Interlock Test*, 12/16/2016
- EWMO (F05), *Master Equipment List*, 11/28/2016 printout
- FORM 1563, *Spark- Or Flame-Producing Operations Permit*, 1/2015
- FSD-115-001, R1, *Verification of Readiness to Start Up or Restart LANL Nuclear Facilities, Activities, and Operations*, 6/24/2016
- IDED-08-TA50-0069-002, *WCG Ground Clamp Assemblies*, 11/28/2007
- Memorandum, Symbol ADEM-17-0019, from Sonnenberg to Cabbil, Subject: *Readiness to proceed with the Waste Characterization Reduction and Repackaging Facility Remediated Nitrate Salt Waste Drum Processing CRA*, 1/27/2017
- OS-DO-RA-17-001P, R1, *Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF) Contractor Readiness Assessment*, 2/6/2015
- P101-13, R3, *Electrical Safety Program*, 8/1/2016
- P101-26, R4, *Welding, Cutting, and other Spark- or Flame-Producing Operations*, 1/28/2016
- P101-3, R8, *Lockout/Tagout for Hazardous Energy Control*, 9/2/2016
- P300, R7, *Integrated Work Management*, 12/9/2015
- P950, R5, *Conduct of Maintenance*, 12/10/2014
- WCRR-FO-DOP-1192, R0, *WCRRF Building TA-50-69 Structural Design Integrity Inspection*, 12/10/2015
- WCRR-FO-DOP-1193, R0, *WCRRF Waste Characterization Glovebox Annual Drum Lift Surveillance*, 8/29/2016
- WCRR-FO-DOP-1338, R1, *WCRRF Fire Patrol / Stationary Fire Watch*, 11/18/2016

- WCRR-FP-DOP-1322, R1, *WCRRF Monthly Fire Suppression Supply Valve Alignment Check,* 11/28/2016
- WCRR-FP-DOP-1333, R0, *WCRRF Fire Suppression Supply Pressure Gauge Calibration, 7/28/16*
- WCRR-VS-DOP-1353, R0 IPC-1, *WCRRF HEPA Filter Test*, 8/29/2016
- WCRR-VS-DOP-1354, R0 IPC-1, *WCRRF Confinement Ventilation System In-Service Inspection,* 1/23/2017
- WCRR-VS-DOP-1355, R1 IPC-3, *TA-50-69 Annual Confinement Ventilation System Instrument Calibration Surveillance,* 12/20/2016
- WCRR-VS-DOP-1356, R1 IPC-1, *WCRRF Uninterruptible Power Supply Load Test,* 1/24/2017
- WCRR-VS-DOP-1357, R1, *Building TA-50-69 and WCG Quarterly Static Pressure Channel Functional Surveillance,* 12/8/2016
- WCRR-VS-DOP-1360, R0, *WCRRF Confinement Ventilation System HEPA Filter Replacement,* 8/12/2016
- WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, 1/11/2017
- WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, 1/11/2017
- WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations,* 1/27/2017
- WCRR-WO-DOP-1390, R2, *WCRRF RNS Container Monitoring and Refrigerator Rounds*, 1/25/2017
- WCRR-WO-DOP-1397, R1, *WCRRF Operator Rounds,* 11/28/2016
- WO #573789-01, *Re-Mount Floor Plate on Sump Floor*, 2/1/2017
- WO #573975-01, *Inspect & Lube Wire Rope on Drum Lift-02 at 50-37*, 1/31/2017

Interviews Conducted

- CSEs (5)
- Engineering Manager
- Maintenance and Work Control Manager
- Maintenance Coordinators (2)
- Maintenance Superintendent
- Maintenance Superintendents (4)
- Nuclear Operators (2)
- QA Manager
- SSW
- SOM
- WD-WT Group Leader
- WCRRF Level B Storage Coordinators (2)
- WCRRF Operations Center Operators (2)
- Work Control Team Lead

- Work Execution Team Lead
- Work Planner

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Pre-job briefing, work execution and post-job briefing for WO #573975, *Inspect and Lube Wire Rope on Drum Lift-02 at 50-57 (ARTIC) Facility*, 1/21/2017
- Pre-Job Briefing and work execution for emergent corrective maintenance WO #573798, *Re-mount Floor Plate on Sump in the 50-69 WCRRF*, 2/1/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

CR7 in WCRR-PLAN-1388 requires that a program be in place to confirm on a periodic basis the condition and operability of VSSs. VSSs for the TA-50-0069 WCRRF are listed in ABD-WFM-005, *Basis for Interim Operation for Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, sections 4.3 and 4.4, and recorded on form AP-341-101-R3-RM01.R4: VSS-50-0069-0000. VSSs include:

Safety-Class:

1. Vehicle barriers

Safety-Significant:

1. CVS
2. TA-50-0069 building and WCG FSS
3. EDS
4. UPS
5. Drum lift fixture
6. WCG
7. TRU waste containers
8. TA-50-0069 building structural integrity

Defense-In-Depth:

1. Diesel generator and automatic transfer switch

It should be noted here that the PRDwSF is not included in the list above due to the fact that there is an exemption for this item at WCRRF based on its function and brief service life in the facility. Items identified during the recent MSA, other reviews, interviews, evolution and work observations of SRs, and facility rounds were evaluated and actioned as WCRRF restart prerequisite items, and statused as follows in PFITS:

- PFITS 2017-85 Action 2, SMP 5.6.7 pre-start: Replace leg on the WCG. Deliverable: work package showing replacement activity. The leg was replaced per WO #544742-01-50-69 *REMOVE LEG OF WCG over drainage sump*, Closed 1/23/2017

- PFITS 2017-86 Action 1, SMP 5.6.7, *Pre-Start: Procure and install ML-2 sprinkler for WCG (note - receipt of procured item will not be completed prior to CRA, but item will continue to be treated with Pre-start significance),* Open-Due Date 2/15/2017. Although the sprinkler is impaired, its condition does not make it inoperable. This action has not been closed at the time of the CRA; installation of the sprinkler was not achieved prior to the completion of the CRA (see CRAD FP1 for additional detail).
- PFITS 2017-90 Action 4, SMP 5.6.3, *Pre-Start: Complete replacement of ventilation Magnehelic gauges*. Deliverable: documentation reflecting completion of gauge installation in WCRRF. The WOs under which the gauges were installed and inspected for labeling, with concurrence from the CSE, are 565500-01 and 572827-01, Closed 1/25/2017
- PFITS 2017-132 Action 1: Update the contact information on the exterior side of the door to the Area L controlled storage used by maintenance personnel. Deliverable: email confirming contact information updated and posted, Closed by Maintenance Work Control Manager, 1/18/2017
- PFITS 2017-133 Action 1: Compile documentation indicating disposition of NCR-# EP-DSA-NCR-09-0021. NCR satisfactorily closed, Closed by M. Barry Walker, 1/18/2017

Additionally, all TSR SRs and ISIs are current, as evidenced by the data in the CRA evidence files or completed in real time during this CRA. No other issues have been identified that would impact the operability of any VSS. Although an issue was found by the CRA team regarding PFITS item 2017-90 Action 4 closure, safe WCRRF restart will not be impacted. This is further explained in CRAD MN1, criterion 2.j. Therefore, identified prerequisites in the WCRR-PLAN-1388 are met for this functional area.

This criterion was met.

2. *The scope of work is described in sufficient detail to allow the work planning process to identify hazards associated with the work and to develop necessary schedules, priorities, and work instructions. (48 CFR 970.5223-1)*

The WCRRF maintenance organization follows the P950, *Conduct of Maintenance*, work planning process, which is implemented through the following procedures:

- AP-WORK-001, *Work initiation*
- AP-WORK-002, *Work Planning*
- AP-WORK-003, *Work Scheduling*
- AP-WORK-004, *Work Performance*
- AP-WORK-005, *Work Closeout*
- AP-WORK-006, *Davis Bacon Determinations*

These procedures ensure adherence to the requirements of P950, which in turn implement the requirements of DOE O 433.1B, *Maintenance Management Program for DOE Nuclear Facilities*, as well as incorporate the principles of the LANL ISMS.

For the WOs reviewed, the EWMO maintenance and work control organization had consistently following the guidelines and requirements of their procedures and internal directives. When handling critical emergent work that occurred during execution of this CRA, WO #573789-01 had all the required elements of a standard work package. Additionally, the prepared package included anticipated contingency steps within the work instructions to expedite work progression in the event that confined space work was needed, radiological contamination was discovered in a supposed radiologically clean area, or anchoring was required that would impact the ML-2 floor structural integrity. These extra work package sections became a challenge from an administrative perspective, as they added additional paperwork that was not otherwise required based on the anticipated scope of work. This subsequently led to inadequately completed records for those items that were not required.

The scope, hazards, and controls in work packages are clearly identified and of sufficient detail to perform the work effectively and safely. Observation of work planning activities by the CRA team, as mandated by AP-WORK-002 procedure requirements, verified that work scope, hazards, and hazard controls for each separate work scope in the work package were determined through field walkdown by all stakeholders (i.e. planner, CSE, maintenance mechanic/ technician, radiological controls, operations, FSR initiator, etc.). The CRA team verified that maintenance work is planned and executed based on assigned work priorities, which drives scheduling via a standard T-8 work schedule. Work is locked in when it is task ready, and in the event of emergent critical work, the work is assigned heightened priority by the FOD and added onto the current T-0 work schedule. Based on observations, interview of maintenance personnel, and review of work documents, the requirements of P300, *Integration Work Management*, and P950 are met.

This criterion was met.

3. *Personnel involved in work planning activities have the appropriate technical and operational backgrounds and expertise given the work to be performed and the hazards associated with the work. SMEs and system engineers are used where appropriate, workers are involved in hazard identification. (48 CFR 970.5223-1)*

Interviews of maintenance personnel, review of work documents, and observation of a sample of fieldwork indicates that personnel involved in work planning activities have the appropriate technical, maintenance, and operational backgrounds. All maintenance supervisors interviewed were fully cognizant of their training and qualifications and the qualification status of their direct reports, as defined in UTrain. The maintenance and work control managers and staff interviewed were either qualified or working toward position qualification. Regardless of qualification status, personnel interviewed had broad and detailed knowledge and experience in work control methodologies and WCRRF process knowledge. Within the programmatic process area, CSE knowledge is leveraged by the maintenance planners. The CSEs have full cognizance of their respective assigned systems and are the system experts regarding design, operation, and associated hazards for work on those systems. Each CSE maintains their respective assigned system s and document status during periodic SHRs. CSEs are fully engaged in all aspects of the work planning and execution processes. They provide assistance to planners, operators, workers,

and PICs to help identify and mitigate any potential hazards involved. Additioanlly, CSEs are involved in performing troubleshooting and determining how best to diagnose and correct malfunctions, implementing new designs, and suggesting repairs on WCRRF systems. Competent personnel complete work planning activities, and work is executed safely in WCCRF as defined by the program requirements.

This criterion was met.

4. *All hazards that could potentially adversely impact workers, the public, the environment, the facility, and its equipment are documented and analyzed for severity/significance. "What if" and error-likely scenarios are analyzed to determine if additional protective measures are appropriate. Walkdowns are used where appropriate to identify hazards associated with both the work tasks and the work environment. Over-reliance on automated job hazard analysis tools, permits, generic work documents, etc. is not used as a substitute for thorough hazard evaluation and analysis. (48 CFR 970.5223-1)*

Worker safety and health requirements cascade down to the activity level through the integrated work management process, employing LANL ISMS principles. Hazard hierarchy is consistent with ML SSCs classification for safety-class ML-1, safety-significant ML-2. Comprehensive exposure assessments have been performed to ensure adequate workplace monitoring is in place for radiological work environments within WCRRF. Knowledge levels of managers, PICs, team leads, superintendents, operators, maintenance, work control, engineers, and support personnel are adequate to support restart as verified through interviews and observation of work activities. As required by AP-WORK-002, a team job-scoping walkdown is performed during the planning phase of each work package to identify work scope and hazards adequately and efficiently. During observation of planning activities for WO #573789-01, the scoping team identified multiple foci from different disciplines, and identified contingencies to accommodate work progression in the event of encountering radiological, confined space, or structural integrity work scope amalgamation. This ensured the maintenance superintendent was provided a quality package to perform an adequate pre-job briefing in accordance with AP-WORK-004. The observed WO #573789 pre-job briefing thoroughly covered the potential job hazards, their respective control(s), and associated contingencies. Additionally, the superintendent performed a job site situational awareness walkdown to identify any changes that may have introduced new hazards since the job-scoping meeting/walkdown. Observation of routine work implementation revealed no deviations or deficiencies from the requirements. Critical emergent WOs #573975-01 and #573789-01 were monitored through package closure. Both packages were developed utilizing the CSE and area specific SMEs including safety engineering.

During interviews, a concern emerged associated with the potential failure of the mechanical roll-up doors. Based on previous experience of the mechanical craft personnel, it was determined that a failure to operate the manual chain hoist correctly and/or a failure in the nesting door panels that causes binding could result in the cable winding completely off of the cable drum and the door failing in the closed position. Per the *Armor Door Technical Manual*, page I-25, as found on page 85 of 110 of DCF-16-50-0069-1460, the vendor recognizes this as a likely problem. The vendor recommends operator training regarding proper use during manual

operation to reduce the likelihood of this failure. There is no evidence that this training has been covered for personnel that will be required to operate the doors. After further evaluation of this failure scenario, it was also determined that there has been no contingency or response plan developed for a scenario in which either one or both of the doors fail during a drum transfer.

It was noted by the CRA team that there was no drum grounding strap attached to the WCRRF WCG, as required and observed during demonstration of WCRR-WO-DOP-1378, *WCRRF RNS Waste Container Receipt and Handling*, in the ARTIC facility. Subsequently, during the second operational drill in the WCRRF, the team witnessed that the grounding strap had been attached to the WCRRF WCG. Upon evaluation of component level identification in the MEL, drawing reviews, item dedication forms and acceptance tests, and procedure reviews, the CRA team concluded that a work package was not needed to perform the attachment of the grounding strap. Conversely, because there are few details regarding the specific placement of the strap, it is not evident that there is a clear expectation for the location and orientation of the strap placement. The strap that was observed to be installed in WCRRF was found to be in a different orientation than the one installed in ARTIC, and was connected to a painted portion of the glovebox rather than on visible metal surface. Although the placement of the strap is not a credited TSR control for RNS waste, it is a requirement of operating procedure WCRR-WO-DOP-1380, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, section 5.2 step 37. The CRA team reviewed a grounding strap dedication package (IDED-08-TA50-0069-002, *Item Dedication for WCG Ground Clamp Assemblies*, 11/28/2007), which caused confusion regarding the ML for the strap, and the need to address and clarify the strap's purpose, placement, and use.

Based on observations, interviews, and documents reviewed, the maintenance and work control organization is compliant with their approved requirements, and meet the intent of this criterion.

This criterion was met.

5. *Appropriate controls are identified for all hazards associated with the work activity using a hierarchy of controls methodology that seeks to eliminate the hazards, reduce the level of hazards, and control the hazards, first through the use of engineered controls, then through administrative controls, and lastly through PPE. Unnecessary controls are avoided.*

Hazard controls use a hierarchal approach to eliminate or mitigate hazards by eliminating the hazard if possible, then by engineering control, administrative control, and finally by use of PPE. As required by AP-WORK-004, pre-job briefings were observed to cover job hazards and their respective control(s) thoroughly. Hazardous energy control, as performed in accordance with P101-3, *Lockout/Tagout for Hazardous Energy Control*, is effectively implemented into work-level procedures to eliminate hazardous energy. No work packages were observed during the CRA that employed the use of lockout/tagout. Engineered controls are incorporated through the TSR SRs ensuring that all ML-1 (safety-class) and ML-2 (safety-significant) SSCs are operational for the TSR mode applicability. Other administrative controls such as barricades were also observed to be in use and appropriately applied. In the event that hazards could not be eliminate by these means, PPE was prescribed for each associated uncontrolled hazard. Controls are documented on the work package and briefed with all participants. Based on observations

and evidence reviewed, the maintenance and work control organization is compliant with the approved requirements and meets the intent of this criterion.

This criterion was met.

6. *The work document clearly defines the work scope and boundaries, and is written in a clear, concise, and worker friendly manner with properly sequenced work steps and clearly identified hazard controls. Hazard controls are adequately designed and implemented to remain in effect as long as the hazards pose a health or safety threat. The work document includes necessary prerequisites, precautions, limitations, features, controls, warnings, cautions, notes, hold points, and independent verifications to ensure worker safety, protection of critical equipment, and continuity of operations. Appropriate SMEs and system engineers concur with the work document.*

On Tuesday, January 31, 2017, a walkdown for emergent corrective maintenance, WO #573975, *Inspect and Lube Wire Rope on Drum Lift-02 at 50-57 (ARTIC) Facility*, was observed. In attendance were the CSE, the WD division leader, the work execution superintendent, and a mechanic. During the drum lift evolution earlier that day, the operations team lead exercised a stop work due to a potentially unsafe condition specific to the winch cable making physical contact with the drum lift catch pan. An FSR was initiated in accordance with procedure AP-WORK-001. The job was walked down, and incorporated excellent discussions between operations, maintenance, and engineering, assimilating the ISMS principles of identifying work scope, associated hazards, and mitigating controls, thereby allowing for adequate work planning, in accordance with procedure AP-WORK-002. Work was scheduled as emergent and added to the Work Week 7 schedule as specified in AP-WORK-003. The CSE explained the operation, physics, and required cable integrity criteria, and recommended that a quarterly drum winch cable lubrication and inspection be performed. WO #573975 was generated and issued to the superintendent, who subsequently reviewed it and received authorization from the SOM to perform that work scope. A briefing was performed in accordance with P300 form 2103, and work was safely and effectively performed as delineated in the requirements of AP-WORK-004. The cable inspection was completed satisfactorily and without incident. Additionally, it was determined that the winch cable did not rub the catch pan when the winch motor was exercised due to the cable straightening when it is put under load. Work was completed, and the package closed out in accordance with AP-WORK-005 requirements. The drum loading demonstration resumed the following day and was completed satisfactorily.

On Wednesday, February 1, 2017, a pre-job briefing for emergent corrective maintenance WO #573798, *Re-mount Floor Plate on Sump in the 50-69 WCRRF*, was conducted in accordance with P300 form 2103. The briefing delineated the work scope, associated hazards, and mitigating controls, thus allowing for the workers to be well informed to perform the prescribed work scope safely in accordance with procedure AP-WORK-004. The work execution superintendent emphasized the uncommon hazards and controls associated with confined space and hot work elements of this scope, in addition to the radiological and common industrial hazards associated with working in the facility. The work execution supervisor presented the briefing to the attendees, which included an RCT and two maintenance mechanics. The work was scheduled as

emergent and added to the Work Week 7 schedule as specified in AP-WORK-003. The fieldwork was completed effectively, and the PMT was scheduled for the following morning at 0700. The PMT was an ISI performed by the CSE in accordance with WCRR-FO-DOP-1192, *WCRRF Building TA-50-69 Structural Design Integrity Inspection*. The inspection was documented as satisfactory in the comment section of the inspection procedure, because there were no identified criteria within the body of the procedure for the building's floor. The package closed out in accordance with AP-WORK-005 requirements, with some administrative deficiencies as detailed below. The drum loading exercise in TA-50-0069 was subsequently completed satisfactorily.

One concern was noted regarding the use of and adherence to hold point in IWDs. Hold points are intended to impose a stopping point until that step is complete. During the execution of WO #573789-01, a hold point was inappropriately established for the welding inspector. This should have been established as a PMT step. Since a welding inspector was not available to support the evening repair, the work crew removed combustibles in the area and documented this on a later step in the work package. This in effect resulted in the hold point being bypassed. This flexibility is supported by the wording in AP-WORK-002, Attachment 15, Form 2100-WC, in steps 1 and 2 in the precautions/limitations/prerequisites section for all work packages, which states that steps may be worked concurrently and/or performed out of sequence at the discretion of the PIC. In this case, there were no adverse safety implications. This flexibility can potentially impact safety of people, facility equipment, or the environment if erroneous judgement is employed when working steps concurrently or out of sequence, or upon bypassing a hold point.

The work documents associated with WCRRF maintenance and work control discipline clearly implement the ISM principles of defining the work scope, and writing those instructions in a clear, concise, and manner as delineated in AP-WORK-002. The reviewed work documents and procedures properly provide sequenced work steps, clearly identify associated hazards, and implement their respective controls. Operations and necessary prerequisites, precautions, limitations, features, controls, warnings, cautions, notes, hold points, and independent verifications are included to ensure worker safety, protection of critical equipment, and continuity of operations.

Based on the evidence observed and reviewed, the maintenance and work control organization is compliant with their approved requirements, and meet the intent of this criterion.

This criterion was met.

CONCLUSION

Through document reviews, interviews, observations, and evaluation of emergent activities observed, the CRA team concluded that WCRRF line management has implemented a maintenance and work control SMP that will ensure safe RNS treatment operations in the WCRRF. EWMO and WD personnel at TA-50-0084 and -0069 have effectively implemented VSSAs, surveillance testing, maintenance operations, and calibration programs to confirm and monitor the condition and operability of programmatic and facility systems associated with or

supporting RNS operations. There are adequate facilities, equipment, and commodities available to support safe and sustained WCRRF operations for the duration of the campaign.

This objective was met. No findings were identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	William Mathison **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Operations**	Objective: OPS1 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

OPS1: The formality and discipline of operations are adequate to conduct work safely, and programs are in place to maintain this formality and discipline. The level of knowledge of operations personnel (including managers) is adequate based on reviews of records, selected interviews of operations personnel and observations of operational demonstrations. (CR1, CR2, CR3, CR4, CR5 CR7, CR8, CR9, CR10, CR12)

CRITERIA

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. There are adequate and effective procedures, processes, and other work control documents in place to implement the applicable elements of DOE O 422.1. (DOE O 422.1, DOE O 433.1B, 10 CFR 830.120)
3. Performance of ConOps is observed to be adequate (i.e. log keeping, shift turnover, timely orders, equipment labeling, review of surveillance, operational formality, and work control). (DOE O 422.1)
4. A structured assessment program of implementation of ConOps is planned and accomplished, documented, with corrective actions established and tracked to completion. (DOE P 450.4, DOE O 226.1B, 10 CFR 830.120)
5. ConOps commitments from the TSRs have been effectively implemented. (TSR, DOE O 422.1)
6. Operations personnel follow procedures, work control documents and other implementing methods. When procedures cannot be followed, work is stopped until they are corrected. (DOE P 450.4, DOE O 422.1)
7. Sufficient numbers of trained and qualified personnel are available to meet minimum staffing requirements and support WCRRF operations. (FSAR/TSR, P315)
8. The level of knowledge of operations personnel associated with WCRRF operations is adequate to permit safe operations. (DOE O 422.1, DOE O 426.2)

APPROACH

Records Reviewed

- AREAG-WO-DOP-1383, R1, *TA-54 Area-G RNS Waste Container Shipment Preparation*, 1/12/2017
- DOE-STD-1029-92, *DOE Writer's Guide for Technical Procedures*
- DOE-STD-1031-92, Change 1, *Guide to Good Practices for Communication*

- EP-DIV-AP-20039, R2, *EWMO Timely Orders*, 12/21/2015
- EP-DIV-SO-20093, R1, *EWMO New RCRA Permit Requirements*, 9/10/2014
- EP-SO-1716, R0, *WCRRF ML-1 and ML-2 Receipt Inspection Criteria*, 8/2/2011
- EWMO-QS-001, R3, *Environmental Waste Facility Operations (EWMO) Operations Manager Qualification Standard*, 9/23/2016
- EWMO-QS-002, R0, *Environmental Waste Facility Operations (EWMO) Shift Operations Manager Qualification Standard*, 6/20/2016
- EWMO-QS-003, R1, *EWMO Nuclear Operator / Operations Center Operator Qualification Standard*, 1/19/2017
- EWMO-QS-004, R1, *EWMO Operations Center Operations Center Shift Operation Supervisor Qualification Standard*, 1/19/2017
- FSD-115-001, R2, *Verification of Readiness to Start Up or Restart LANL Nuclear Facilities, Activities, and Operations*, 11/8/2016
- FSD-315-16-001, R1, *Technical Procedure Writer's Guide*, 3/8/2016
- Memorandum, EM2016-5359, from Sonnenberg to Hohs, et al., Subject: *Assignment as Member of the Management Oversight Team (MOT) for the Restart of Waste Characterization, Reduction, and Repackaging Facility (WCRRF) Operations and Startup of Remediated Nitrate Salt (RNS) Waste Processing and Treatment Activities*, 12/2/2016
- P101-18, R3, *Procedure for Pause/Stop Work*, 4/26/2016
- P313, R9, *Roles, Responsibilities, Authorities, and Accountability*, 3/4/2015
- P315, R6, *Conduct of Operations Manual*, 7/8/2015
- WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, 11/28/2016
- WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*, 1/5/2017
- WCRR-PLAN-1387, R1, *WCRRF RNS Waste Operations Startup Plan*, 1/27/2017
- WCRR-PLAN-1388, R0, *Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF)*, 10/12/2016
- WCRR-SO-1409, R0, *WCRRF Refrigerator Door Operation*, 1/31/2017
- WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, 1/11/2017
- WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, 1/27/2017
- WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, 1/11/2017
- WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, 1/27/2017
- WCRR-WO-DOP-1381, R1, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*, 1/11/2017
- WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*, 1/27/2017
- WD-QS-001, R1, *WO Waste Operator Qualification Standard*, 1/19/2017
- WD-QS-002, R0, *Waste Disposition Division (WDD) Team Leader Qualification Standard*, 9/26/2016
- WD-QS-004, R0, *WD Glovebox Operator Qualification Standard*, 12/16/2016

Interviews Conducted

- ADEM Associate Director
- ADEM Deputy Associate Director
- EWMO Deputy Director
- EWMO FOD
- Nuclear Operators (2)
- Operations Center Operators (2)
- PIC, RNS/UNS Treatment (2)
- SSW (2)
- Team Leader, RNS/UNS Treatment
- WD Division Leader
- Waste Operators/Glovebox Operators, RNS/UNS Treatment (3)
- WD-WT Group Leader
- WCRRF Operations Manager
- WCRRF SOM

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Tabletop: AREAG-WO-DOP-1383, R1, *TA-54 Area-G RNS Waste Container Shipment Preparation,* on 1/31/2017
- Pre-job briefing: WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling,* on 1/31/2017
- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations, section 4.0, Prerequisite Actions*, initiated 1/31/2017. Stop Work initiated on 1/31/2017
- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations,* on 2/1/2017
- Demonstration: WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment,* on 2/1/2017
- Demonstration: WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment,* on 2/1/2017
- Demonstration: WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes,* on 2/2/2017
- Demonstration: WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds,* on 2/2/2017
- Demonstration: WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, section 5.1, *Replace Glovebox Gloves,* on 2/3/2017
- Operational Drill: Punctured Glovebox Glove on 2/3/2017
- Operational Drill: Punctured Glovebox Glove on 2/8/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

Through procedure reviews, observations, and interviews with key personnel, the CRA team confirmed that the ConOps program as documented in P315, *Conduct of Operations*, and P313, *Roles, Responsibilities, Authorities, and Accountability*, has been effectively flowed down from higher-level DOE orders and standards and is being implemented by WCRRF. The processes for maintaining and evaluating the integrated formality of operations program at LANL, including operations at WCRRF, were determined to be adequate.

Overall, WCRRF has established a ConOps program that flows from LANL P315 and, in many cases, it is evident that the program is being embedded into the applicable procedures and processes associated with WCRRF. There were deviations identified with some of the WCRRF procedures, which are discussed in CRAD OPS2 criterion 2.

ConOps issues are identified through formal assessments and field observations such as MOVs, SSWs, ConOps coaching, etc. Any significant issues related to ConOps are entered into PFITS, where they are tracked to closure. The FOD and WD division leader described their ConOps improvement activities during interviews. Review of the MOV summaries from 2016 show that there were a number of months where MOVs documented were less than the target of two MOVs per month (several months had a large number of the managers performing no MOVs for that month). This calls into question if MG1-OFI-1 from the MSA should have been closed without additional action being taken.

With the exception of TQ1-PRE-1 (the current documented basis for determination that FMH certification is not required for process operators in EWMO facilities is inadequate), it was verified that all personnel assigned to perform operations in WCRRF were adequately trained and qualified, per the latest approved training requirements for the task, and have also been exposed to WCRRF ConOps training. Response to emergency/off normal events and the participation in emergency drills have been incorporated into the qualification standards for WCRRF operations personnel.

In most instances, operators demonstrated ALARA (as low as reasonably achievable) principles and satisfactory RP practices by checking glovebox gloves for degradation frequently throughout the performance of the procedures and monitoring for contamination each time they exited gloves or touched process equipment. Additionally, during the witnessed operational demonstrations, facility personnel consistently reminded unfamiliar assessors and others to stay clear of areas in the rooms that had higher radiation exposure concerns. It was clear that the WCRRF team, both FOD and WD personnel, had practiced these procedures numerous times. It was evident that they had the requisite skills and knowledge to perform RNS processing activities safely and within the confines of the WCRRF requirement documents, as displayed during pre-job briefings and procedure performance.

DOE-STD-1029-92, *Writer's Guide for Technical Procedures*, addresses the content, format, and style of technical procedures that prescribe production, operation of equipment and facilities, and maintenance activities. While these requirements, along with the requirements of DOE O 422.1, *Conduct of Operations*, have been generically met, there are still fundamental inconsistencies between these requirements and the contents of the WCRRF procedures. See CRAD OPS2 criterion 2, for further discussion.

This criterion was met.

2. *There are adequate and effective procedures, processes, and other work control documents in place to implement the applicable elements of DOE O 422.1. (DOE O 422.1, DOE O 433.1B, 10 CFR 830.120)*

The CRA team determined that procedures such as P315 and FSD-315-16-001, *Technical Procedure Writer's Manual*, effectively implement the requirements of DOE O 422.1 and DOE-STD-1029-92. EP-AP-10007, *Technical Procedure Development*, adequately addresses configuration management of procedures. Based on interviews and review of documents, the procedure development and maintenance process appears well understood by those responsible for the development and control of the procedures. Although there are programs in place to identify the procedural requirements effectively, some requirements have not been enforced at the WCRRF process level. There are several examples from WCRRF procedures that do not comply with the requirements of P315 and FSD-315-16-001 provided in CRAD OPS2 criterion 2 and OPS2-PRE-1.

This criterion was met.

3. *Performance of ConOps is observed to be adequate (i.e. log keeping, shift turnover, timely orders, equipment labeling, review of surveillance, operational formality, and work control). (DOE O 422.1)*

Resolution of NCR-2017-043, *WCRRF Fridge Temp Modification Installation*, was accomplished through issuance of standing order WCRR-SO-1409, *WCRRF Refrigerator Door Operation*, as justification for a conditional release. The steps called out in the standing order appear to be better suited for insertion in the WCRRF operating procedures as caution statements, regardless of the final disposition actions to close the nonconformance. Justification for inclusion of the cautions in a standing order was that they were addressed in the applicable procedure pre-job briefings. At least one witnessed evolution pre-job brief did not cover the standing order steps required when closing the refrigerator door. A complete review of the active WCRRF standing orders identified an additional order, EP-DIV-SO-20093, *EWMO New RCRA Permit Requirements*, as also containing a set of actions that should be a separate procedure. SO-20093 has been in place since 2014. EP-SO-1716, *WCRRF ML-1 and ML-2 Receipt Inspection Criteria*, on ML-1 and ML-2 receipt criteria has been in place since 2011. Timely orders to operators shall not be a substitute for procedures, per EP-DIV-AP-20039.

The following addresses the performance observed during the course of the demonstrations.

WCRR-WO-DOP-1380, *WCRRF Waste Characterization Glovebox Parent Drum Operations*

- During demonstration of the prerequisites for procedure WCRR-WO-DOP-1380, the team noted that step 4.2.1, Special Tools and Equipment, [1] states: "**ENSURE** that the following special tools and equipment are available, as required:" The team observed that several of the items were checked off by the PIC without the PIC or an operator under his direction physically locating the item.

- While preparing to bag-on a parent drum, the team noted that procedure WCRR-WO-DOP-1380, step 4.3[4][A] (a marked criticality safety step) states: "**ENSURE** that the parent drum, all daughter drums from the parent, and all waste (including samples) are removed from the glovebox before a new parent drum or waste is introduced to the glovebox." The team observed two instances where operators failed to execute this criticality safety step correctly: the operator performing this step at Station #1 of the WCG did not identify residual material in the sieve tray because the holes on the perimeter of the sieve tray are partially covered on the inside of the tray frame, allowing RNS waste holdup to collect; and the operator and the PIC failed to evaluate the sump under the sieve tray to be clear of residual material. Once the parent drum was bagged on, performance of procedure WCRR-WO-DOP-1376, *WCRRF RNS Waste Treatment,* commenced. It was during the performance of the prerequisites for WCRR-WO-DOP-1376 that residual material was identified still in the sieve.

- While performing procedure WCRR-WO-DOP-1380, step 4.3[4][C], which states: "**INSTALL** pre-filter material over the ports for the WCG outlet HEPA filters," the operator installing the pre-filter material did not ensure that the pre-filter was in contact with the entire perimeter of the WCG exhaust port. After installation of the pre-filter the team observed two gaps between the pre-filter and the exhaust port that provided a leak path around the pre-filter. The operators were unaware of these leak paths around the pre-filter until it was brought to their attention by the CRA team. This was performed in the mockup in the ARTIC facility where the glovebox ventilation does not create a negative pressure necessary for actual glovebox operations. This would be less likely in the WCRRF WCG, but the procedure does not give specific instruction for verifying a proper seal.

- During the performance of procedure WCRR-WO-DOP-1380, step 5.2[15], to loosen the bottom PRDwSF pipe nipple, two observations were made. First, it was difficult for the operator to get the nonsparking pipe wrench onto the lower nipple. The nipple is a short section of pipe that connects the bung flange on the drum side to the bottom of the PRDwSF assembly. Based on discussions with the operators and MOT member, drums vary on how much of the nipple is exposed between the bung flange and bottom of the PRDwSF. Second, once the operator started to loosen the nipple from the bung flange, the nipple did not unscrew from the bung flange, rather the bung flange started backing out from the drum. The operator stopped and notified the PIC. The PIC called a work

pause and notified the RNS/UNS treatment team leader. The PIC received a report back from the RNS/UNS treatment team leader indicating the PrE had determined the bung flange and nipple were all part of the PRDwSF assembly, and it was acceptable to remove the entire assembly at once. The PRDwSF assembly was removed and subsequent procedure steps were performed without incident. Discussions with the MOT member indicated that this was the first time the nipple had not unscrewed from the bung flange. Step 5.2[15] is identified as both a TSR step ($ step) and a RCRA (Resource Conservation and Recovery Act) step (& step). Section 3.2 of this procedure specifically states that $ steps ". . . may not be changed without engineering approval to ensure that the Technical Safety Requirements (TSRs) and other associated requirements are maintained." Section 3.4 of this procedure specifically states that & steps "…may not be changed without Environmental Compliance Programs (EPC-CP) approval to ensure that applicable limits are maintained." While the team was aware that the process engineering was contacted about this procedural issue during the work pause, it was not apparent that the environmental compliance programs group was contacted. Additionally, if it is acceptable to remove the PRDwSF, nipple, and bung flange as a unit, the procedure should be revised to be more generic (i.e. remove PRDwSF) or contain a note clarifying that removing all three is acceptable.

- During the performance of procedure WCRR-WO-DOP-1380, Attachment 2, WCRRF WCG DRUM LIFT INSPECTION DATA SHEET, the operator failed to identify that the lower drum lift mechanism wire rope was in contact with the catch pan at the back of the lift during inspection of the lower wire rope for damage as required by the procedure. This was identified by an observer from the DOE Office of Enterprise Assessment. The Spotter observed the condition, informed the PIC, who then declared a work pause. The PIC discussed the situation with the MOT member. The PIC stated to the MOT member that they would have to adjust the catch tray so it was not in contact with the upper cable. The MOT member asked the PIC when this would be performed. When the PIC did not respond immediately, the MOT member followed up with a question as to what procedure would govern the adjustment. Having not received a satisfactory response to either question, the MOT member declared a stop work. Subsequently, the CSE performed an evaluation of the lower wire rope along the length that could contact the catch tray. A portion of the quarterly inspection was performed and determined that the lower wire report was not damaged and could safely perform its function. Even though it was concluded that contact between the lower wire rope and the catch tray was not significant, the catch tray was removed and subsequent demonstrations simulated its presence. As noted by the MOT member, the FOD released the drum hoist for operation and the RNS work demonstration was resumed the following day.

WCRR-WO-DOP-1376, *WCRRF RNS Waste Treatment*

- During the demonstration of procedure WCRR-WO-DOP-1376, the team noted that step 4.1[9] states: "**ENSURE** that BUILDING TA-50-0069 is in the OPERATION MODE and **DOCUMENT** on Attachment 1." This activity followed performance of procedure WCRR-WO-DOP-1380, and the PIC concluded that he had "ensured" the facility was in

the operation mode in the morning while performing procedure WCRR-WO-DOP-1380. The PIC did not take action to ensure the facility was still in operation mode. While WCRRF is and has been in cold standby for some time, once operations are resumed, mode changes will be subject to more changes and should be verified each time prior to commencing glovebox operations.

- During the demonstration of procedure WCRR-WO-DOP-1376, the team noted that step 4.2.1[1] states "**ENSURE** that the following tools and equipment are available and if inside the WCG, are marked with blue tape." When performing this step, the crew noted that the mixer bowl chute and lead/lead-equivalent/tungsten blankets were not marked with blue tape. A work pause was initiated and, in consultation with the group leader and team leader, the decision was made to cut blue tape off existing taped items and transfer it to any untaped items.

- Step 4.3[3] of procedure WCRR-WO-DOP-1376, states: "**VERIFY** that waste and samples from the previous parent drum are not present in the mixer bowls, blender vessel, measuring cups, transfer trays, any other containers, and daughter drums attached to the WCG and **DOCUMENT** on Attachment 1. (NCS-CSED-16-086)." This step is marked as a criticality safety step. The team alerted the MOT member to the presence of residual material in the sieve tray after the operator had missed residual material in sieve tray during the performance of the prerequisites for procedure WCRR-WO-DOP-1380. The MOT member then directed the PIC and operators to inspect the sieve tray carefully. Surrogate RNS was identified and a work pause was initiated.

  Once the Pause was initiated, the PIC contacted the WD-WT group leader and reported the presence of the residual material in the sieve tray. It was unclear to the CRA team exactly who the WP group leader consulted when developing a path forward. The WD-WT group leader relatively quickly contacted the PIC via radio. The WP group leader indicated that the WD PrE had stated that the CSED allowed for several ounces of residual material present in the WCG. The PIC requested an operator to estimate the volume of the residual material in the WCG, which was estimated at half a tablespoon. This was communicated to the WD-WT group leader. The consensus of the WD-WT group leader, RNS/UNS treatment team leader, MOT member, and PIC was this was an analyzed condition and the crew exited the pause. While not required by procedure P101-18, *Procedure for Pause/Stop Work*, the WCRRF operations center was not notified of the work pause during the demonstration of procedure WCRR-WO-DOP-1376, when residual material was identified in the WCG sieve tray. This lack of communication could prevent timely execution of procedure EWMO-RM-AOP-20124, *EWMO Nuclear Criticality Safety Requirement Noncompliance*.

- During the performance of procedure WCRR-WO-DOP-1376, step 4.3[4][A] (a marked criticality safety step) states: "**ENSURE** that the parent drum, all daughter drums from the parent, and all waste (including samples) are removed from the glovebox before a new parent drum or waste is introduced to the glovebox," the PIC completed the procedure step by ascending the platform and looking into the glovebox. However, the

team noted that glovebox ports for the daughter drums were in place, preventing direct observation of the inside of the daughter drums through the glovebox windows. Subsequent discussion with the WD division leader and MOT member indicated that once operations are performed in WCRRF, the cameras installed in the WCRRF WCG will be used to ensure there is no waste in the daughter drums. The observed performance reflects an artificiality of the ARTIC mockup.

- During the demonstration of procedure WCRR-WO-DOP-1376, step 6.6, Final WCG Cleanup, the team observed that step [5] states "**COLLECT** residual material (e.g., RNS waste) and **TREAT** per Section 5.2." During treatment of the residual material per section 5.2, the team observed only brown granular material being put into the blender. Prior to that, an operator was observed transferring residual material collected from the blender (dried slurry material that was pink in color) from the dustpan to a Spilfyter® wipe and placing it in a 1⅓ measuring cup. The team did not observe residual material collected from the blender being put into the mixer.

- Upon completion of treating the residual material per section 5.2 of procedure WCRR-WO-DOP-1376, the team observed that the crew exited section 5.2 and returned to performing section 6.6. The exit condition of section 5.2 directs execution of procedure WCRR-WO-DOP-1381 and does not provide an option to return to section 6.6. Returning to section 6.6 from section 5.2 is a violation of the procedure as written.

- Procedure WCRR-WO-DOP-1376, section 7.12, Other Situations/Conditions Not Specifically Addressed, was entered. Step 7.12[4] states:

  > **REVIEW** the recommended plan of action to ensure that actions are within the safety basis, RCRA permit, hazard analysis, and other governing regulations and **REQUEST** concurrence from the following to proceed: Operations Manager; Waste Disposition Division Leader; and Facility Operations Director.

  During performance of the operations demonstration for the CRA, Step 7.12[4] was not performed. Additionally, step 7.12[6] which states "**CONDUCT** a pre-job briefing for personnel involved per EWMO-AP-0112 prior to proceeding," was also not performed.

WCRR-WO-DOP-1381, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*

- During the performance of procedure WCRR-WO-DOP-1381, step 4.2.1, Special Tools and Equipment, a hooked box cutter (a sharp) was observed to be stored without a sheath in a toolbox, along with other nonsparking tools.

WCRR-WO-DOP-1378, *WCRRF RNS Waste Container Receipt and Handling*

- Comprehensive pre-job briefings were observed for procedure WCRR-WO-DOP-1378, *WCRRF RNS Waste Container Receipt and Handling*. The comprehensive pre-job briefing was very detailed, with good crew participation. It was evident that the field operators were very familiar with the operations and associated requirements. Worker

feedback was very good. However, the details of the work evolution/procedural work steps were not covered in these briefings.

- During the demonstration of procedure WCRR-WO-DOP-1378 section 4.0, Prerequisite Actions, the PIC completed prerequisite step 4.1 [7] to verify FGEs by stating he had verified this in the pre-job brief and through some other method, though he did not specify. The team did not observe the PIC physically looking at any documentation (neither paper or electronic) to complete this verification.

- After the post-job briefing for procedure WCRR-WO-DOP-1378, the team asked the personnel performing the demonstration what the distinction was between "verify" and "ensure." The MOT member stated that they could improve their demonstration of verification steps. FSD-315-16-001, Attachment A, *Action Verb List*, defines "verify" as "Confirm, substantiate, and ensure that a specific activity has occurred or that a stated condition exists." The team did not observe actions by the PIC commensurate with this definition. The use of the word "ensure" in the definition of "verify" in FSD-315-16-001 is a weakness that can lead to confusion and potential for execution issues in the field.

- Additionally, during the demonstration of procedure WCRR-WO-DOP-1378 section 4.0, Prerequisite Actions, several instances of lax three-way communication were observed. When queried by the PIC if the glovebox glove checks had been completed, the operators confirmed they had checked the gloves in various ports; however, they did not communicate the results of the checks for all glove ports.

WCRR-WO-DOP-1101, *Glovebox Glove Replacement*

- Procedure WCRR-WO-DOP-1101 step [21] states: "**IF** a parent RNS WASTE CONTAINER is not bagged-on to the WCG, **THEN PERFORM** the following: [A] **(&) DISCARD** the old glovebox glove in the waste container bagged-on to the debris daughter drum port." This step was performed and the replaced glove was placed in the waste container (i.e. drum) attached to the debris daughter drum port. The next step, [21][B] has the PIC update the waste inventory on Attachment 3. Attachment 3 is the *WCRRF Secondary Waste Container Inventory Sheet*. The secondary waste container is a container that is not bagged onto the WCG. When this was identified during performance of procedure WCRR-WO-DOP-1101 section 5.1, a work pause was initiated. The PIC, after consultation with the team leader and group leader, was directed to annotate the inability to use Attachment 3 and proceed with the rest of section 5.1.

WCRR-FO-DOP-1397, *WCRRF Operator Rounds*

- The performance of operator rounds was observed in accordance with procedure WCRR-FO-DOP-1397. The procedure provides instructions for inspecting key components and recording key parameters associated with the facility. It documents the TSRs compliance and other equipment inspections and provides instruction for prompt identification of abnormal or unusual conditions at WCRRF.

The rounds evolution was preceded by a comprehensive pre-job briefing. The comprehensive briefing addressed human factors, general hazards, ConOps, safety culture, and other precautions. The conduct of the rounds procedure followed the comprehensive briefing.

The operator performing the rounds addressed the prerequisites and verbalized his actions to the CRA team and other observers. The procedure has various sections including non-TSR outside rounds, non-TSR inside rounds, TSR outside rounds, and TSR inside rounds. These sections may be performed in any order. The operator opted to perform the inside rounds first, and then conducted the outside rounds. The operator was able to execute the rounds procedure in its entirety. One anomaly was noted during the outside portion of the procedure relating to the condition of the building. The situation was recorded on the log sheet and reported to the operations manager. A post-job brief was conducted with the operations supervisor and no issues were identified.

Overall, the execution of the pauses and the stop work demonstrated a disciplined adherence to the process, where external assistance was sought, and upon which recommendations/directions were acted. The CRA team identified concerns regarding the pause called during the demonstration of procedure WCRR-WO-DOP-1376, step 4.3[3], when the group leader and team leader consulted with the PrE about the criticality limits and did not engage the CSA or CSO. While the CRA team felt the conclusions were appropriate and compliant with the CSED, failure to contact criticality safety personnel was viewed as a weakness.

Although procedure issues were identified during the witnessed operations demonstrations, personnel performing the demonstrations followed their approved procedures and processes. The performance issues can be tied to procedures issues that are addressed in CRAD OPS2 criterion 2.

This criterion was **partially** met.

4. *A structured assessment program of implementation of ConOps is planned and accomplished, documented, with corrective actions established and tracked to completion. (DOE P 450.4, DOE O 226.1B, 10 CFR 830.120)*

There is a sufficient assessment program in place to ensure that ConOps is periodically reviewed given the limited duration of RNS processing. These reviews result in documented corrective actions that are tracked to completion via the PFITS system. PFITS actions are reviewed and categorized for significance levels as appropriate, and are evaluated regularly by the EWMO MRB.

In August 2016, an FE of Area G and WCRRF was performed that evaluated all eighteen criteria for ConOps. One finding corrected during the evaluation and one OFI were generated during the FE. A review of PFITS showed these to be closed. The MSA for WCRRF was also reviewed for issues which could impact ConOps. MG1-OFI-1 dealt with insufficient monitoring at the FOD

and ADEM levels. MG2-OFI-1 dealt with SSW R2A2s. OPS1-PRE-1 dealt with procedure (DOP-1378) implementation, and OPS1-PRE-2 also dealt with WCRRF operations procedures. These four MSA actions have been closed in PFITS. While there have been other procedural issues identified by the CRA, they are not repeats of previously identified issues, although some are similar. This calls into question the completeness of the review of the procedures and procedure revisions. It appears that only MSA-identified issues were addressed, but the procedures overall were not adequately reviewed or validated. The corrective action for OPS1-PRE-2 may have been written with too much specificity to correct the underlying issues with the procedures. Review of the MOV summaries from 2016 show that there were a number of months where MOVs documented were less than the target of two MOVs per month (several months had a large number of the managers performing no MOVs for that month). This calls into question if MG1-OFI-1 should have been closed without additional action being taken.

In addition to the scheduled, structured management assessments, there is an approved startup plan for WCRRF, which defines and specifies expectations for the MOT. The startup plan requires that the MOT will be formally identified by memorandum and approved by the EWMO FOD upon authorization to restart nuclear operations. In a memorandum dated 12/2/2016, the EWMO FOD has thus far appointed the following as the MOT in an effort to improve ConOps:

- EWMO FOD,
- Two EWMO Deputy FODs
- TA-54 Operations Manager
- WCRRF Operations Manager,
- EWMO ESH Manager,
- EWMO Maintenance & Work Control Manager,
- WD Division Leader
- WD Waste Process Engineering (WPE) Group Leader
- WD Waste Storage & Shipping Group Leader
- WD-WT Group Leader
- EWMO QA Manager

This criterion was met.

5. *ConOps commitments from the TSRs have been effectively implemented. (TSR, DOE O 422.1)*

The ConOps program mitigates the consequences associated with facility operations through the use of management supervision, work planning, change control, and proper equipment selection. WCRRF procedures require that all work is authorized prior to execution. Risks to operations are evaluated in the procedures, and development and implementation of identified controls are included such that operations personnel may perform the work safely and securely. Overall, programs are in place to ensure the ConOps program is implemented and maintained in accordance with the requirements of P315 for TSRs.

This criterion was met.

6. *Operations personnel follow procedures, work control documents and other implementing methods. When procedures cannot be followed, work is stopped until they are corrected. (DOE P 450.4, DOE O 422.1)*

Seven procedures were demonstrated and observed during the CRA. EWMO and WD personnel followed procedures, and the CRA team witnessed several instances when work was paused to clarify conditions, to ensure that operations were safe, or to obtain clarification on procedures issues. Criterion 2 of this CRAD provides a more thorough discussion of the observed procedure-related issues. While the WD organization owns the procedures and has primary responsibility for the writing and development of the procedures, it is evident that all levels of operations are encouraged to be intimately involved in the participation during development, the overall approval prior to use, and the responsibility for maintenance and improvement. However, weaknesses were noted in ensuring the involvement of the criticality safety personnel. This expectation for involvement from across organizations is documented in P313, and is the method by which operations ensures that their operators have what they need to perform the job safely. It is also evident from interviews with operations management they communicate clearly the expectation that users have shared ownership of procedures, and they can identify any recognized procedure weaknesses and get them corrected. It was also witnessed during demonstrations that operators, as well as PIC/fist line managers and operators, were all willing to stop or pause work as required, and that this expectation was clearly identified and discussed at the start of every evolution.

This criterion was met.

7. *Sufficient numbers of trained and qualified personnel are available to meet minimum staffing requirements and support WCRRF operations. (FSAR/TSR, P315)*

With the exception of TQ1-PRE-1 (the current documented basis for determination that FMH certification is not required for process operators in EWMO facilities is inadequate), through interviews, review of training documentation, and observation of process evolutions and drills, it was verified that all personnel assigned to perform operations in WCRRF were adequately trained and qualified per the latest approved training requirements, and are adequate to support WCRRF RNS waste operations. During a daily pre-job briefing it was observed that one of the RCTs was not current on a shift order required reading. The RCT was not allowed to participate in the demonstration until they had completed the required reading. Later in the day, this RCT completed the required reading, was signed onto the pre-job, and served on the relief shift for the demonstration.

Interviews with WCRRF management indicate that WCRRF staffing is adequate, with the exception of one position: operations center operator. There is currently only one qualified individual for this position, which may not support the planned operational tempo. However, discussion with the FOD indicates there is a staffing plan to have an additional qualified individual in position prior to operations.

This criterion was met.

8. The level of knowledge of operations personnel associated with WCRRF operations is adequate to permit safe operations. (DOE O 422.1, DOE O 426.2)

The CRA team evaluated the level of knowledge of operations personnel. Based upon review of training and qualification records, observation of fieldwork, and interviews, it was determined that the operating staff was able to demonstrate an adequate level of knowledge associated with processes and equipment.

There was a strong understanding of the procedures by the waste processing personnel and the two PICs, as observed by the team in demonstrations and interviews. There were some concerns with respect to whether or not the requirements and overall importance of safety basis and criticality safety were adequately understood and applied by the waste processing personnel, as indicated by the work pause due to residual material being discovered during the demonstration of procedure WCRR-WO-DOP-1376, as discussed in criterion 2 of this CRAD.

Interviews with the WCRRF SOM, operations center operator, and nuclear operators supporting the WCRRF RNS processing evolutions, indicates an excellent level of understanding and expectations for implementing the requirements of ConOps and other LANL requirements, such as procedures, safety basis, ESH, etc. However, as noted in CRAD CS1, the lack of specific training on the CSED led to inadequate understanding by operations personnel of the intent of procedural criticality safety steps.

Conversely, it was of particular note that two nuclear operators, when presented with an operational scenario were able to locate the correct limiting condition for operation in the TSR and explain how to execute it without being prompted.

This criterion was met.

CONCLUSION

The WCRRF TSRs identify SMP 5.6.3, Conduct of Operations, as a requirement of the WCRRF ConOps program. Based on documents reviewed, interviews conducted, and evolutions witnessed, the WCRRF ConOps program is in compliance with DOE order and LANL requirements, and is determined to be effective overall. ConOps principles are being applied in the facility through procedures, knowledgeable personnel, and maintained equipment and processes. Both the FOD and WD personnel exhibited ownership and strong adherence to "working to procedures" as evidenced by demonstrations, interviews and document reviews. Facility operations components including management supervision, work planning, change control, and proper equipment selection are also robust. The ConOps program requires that performance criteria be considered when accepting or authorizing work, identifying the risks to operations, and developing and implementing the controls needed to perform work safely and securely. Observed evolutions demonstrated adequate understanding of ConOps, with few discrepancies, none of which elevated to a concern with readiness to restart. The operators also

demonstrated an adequate understanding of criticality controls, even though procedures require improvement, as identified in finding OPS2-PRE-1.

This objective was met. No findings were identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	C. Eric Shogren **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Operations**	Objective: OPS2 Date: 2/9/2017	OBJECTIVE MET	
		YES ☐	NO ☒

OBJECTIVE:

OPS2: Adequate and accurate procedures and safety limits are approved and in place for operation the process and utility systems. Facility processes ensure that only the most current revision to each procedure is in use. (CR1, CR4, CR6, CR9)

CRITERIA

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. Procedure development and use processes for WCRRF operations and operations support procedures require that:
    - Procedures are screened through the USQ process as appropriate;
    - Procedures are verified to be the latest approved version prior to use;
    - Procedures are updated as necessary based on revised requirements, best management practices, and lessons learned;
    - A process is in place to ensure the latest approved procedure is readily available for use;
    - Revised procedures are reviewed to determine if training is required prior to use. (DOE O 422.1; DOE O 433.1B)

APPROACH

Records Reviewed

- Document History File, WCRR-WO-DOP-1376, R0, R1, R2, R3, and R4
- Document History File, WCRR-WO-DOP-1378, R0, R1 and R2
- Document History File, WCRR-WO-DOP-1380, R0, R1, R2, and R2 IPC-1
- Document History File, WCRR-WO-DOP-1381, R0, and R1
- EM-AP-10001, R1, *Document Control,* 2/1/2017
- EP-AP-10007, R2, *Technical Procedure Development,* 11/21/2016
- EP-AP-20282, R0, *ADEP New Activity and Change Control Requirements,* 11/6/2015
- EP-CHARTER-10012, R0, *Charter for Waste Processing Integrated Process Control Teams,* 10/1/2015
- EP-CHARTER-10077, R0, *Charter for Waste Processing Change Control Board,* 11/5/2015
- EP-CHARTER-1271, *Integrated Process Control Team Charter for UNS Sampling,*

- EP-CHARTER-20287, R0, *Charter for the Waste Disposition Division Operating Record Integrated Project Team,* 12/27/2015
- EP-DIR-AP-10008, R1, *ADEP Roles, Responsibilities, Authorities and Accountabilities,* 1/30/2017
- EP-DIV-AP-20039, R2, *EWMO Timely Orders*, 12/21/2015
- EP-DIV-AP-20047, R1, *LTP Glovebox/Glovebag and Glove Safety Program,* 1/12/2017
- EP-DIV-AP-20075, R2, *EWMO Nuclear Criticality Safety Administration,* 6/23/2015
- EP-DIV-AP-20089, R0, *LTP TRU Waste Container Management Operations,* 11/18/2016
- EP-DIV-AP-20099, R1, *Waste Processing Plan Requirements,* 10/2/2015
- EP-DIV-AP-20227, R0 IPC-1, *EWMO Radioactive Source Management,* 11/15/2016
- EP-DIV-RM-AOP-20124, R0, *EWMO Nuclear Criticality Safety Requirement Non-Compliance,* 9/1/2016
- EP-DIV-RM-AOP-20204, R0, *Waste Container Questionable Integrity,* 9/9/2016
- EP-DIV-RM-ERP-20200, R1, *EWMO Area Emergency Response,* 11/23/2016
- EP-DOP-20206, R0, *WD-SRS New Type 7A Waste Container Receipt, Control, and Distribution,* 12/22/2015
- EP-DOP-20252, R1, *WD-SRS Waste Inventory,* 7/21/2016
- EP-WCRR-FO-DOP-0403, R7 IPC-1, *WCRRF Lightning Protection System Visual/Continuity Inspection,* 8/21/2013
- EP-WCRR-FO-DOP-1202, R0, *WCRRF Uninterruptible Power Supply (UPS) Operation,* 2/21/2014
- EP-WCRR-VS-DOP-1359, R0, *TA-50-69 Ventilation System TE/TI-001 and TE/TI-002 Loop Verification and Interlock Test,* 12/16/2016
- EP-WCRR-WO-DOP-0303, R4, *Waste Characterization Glovebox In-Service Inspection,* 12/15/2016
- EWMO-AP-0112, R0, *EWMO Pre-Job Briefings*, 8/5/2016
- EWMO-AP-20059, R1 IPC-1, *EWMO Watchbill Administration,* 12/22/2016
- EWMO-AP-20183, R1, *EWMO Shift Turnover Checklists,* 1/27/2017
- EWMO-AP-20192, R0, *EWMO Equipment and System Status,* 12/18/2015
- EWMO-AP-20193, R0, *EWMO TSR Compliance Requirements Tracking,* 12/18/2015
- EWMO-AP-20253, R0, *EWMO General Site Hazards and Controls*, 4/29/2015
- EWMO-AP-20284, R0, *EWMO RCRA Permit Operating Record and Compliance Programs,* 3/8/2016
- EWMO-AP-20285, R0, *EWMO TSR-Related Operational Limits Actions Compliance Tracking,* 12/18/2015
- EWMO-AP-20286, R0, *Operations Acceptance Checklist for Modification and New Processes,* 12/22/2015
- EWMO-AP-20297, R0, *EWMO Emergency and Operational Drill Program,* 8/25/2016
- EWMO-BEP-20048, R0, *EWMO Division Building Emergency Plan (BEP),* 8/29/2016
- EWMO-CHARTER-20062, R0, *WD and EWMO Management Review Board Charter (MRB Charter),* 8/11/2016
- EWMO-DOP-20085, R1, *EWMO Industrial Truck and Equipment Refueling and Recharging,* 11/21/2016

- EWMO-DOP-20086, R0, *EWMO Division Specific Forklift And Drum Handler Equipment Operations,* 11/18/2016
- EWMO-DOP-20215, R1, *EWMO RCRA Inspections and Notifications,* 7/29/2016
- EWMO-PLAN-20250, R0, *EWMO Chemical Management Plan,* 8/6/2015
- EWMO-POLICY-20162, R0, *EWMO Narrative Log Key Positions Policy,* 2/26/2015
- EWMO-RM-AOP-20161, R0, *Inadequate Fire Department Manning,* 9/7/2016
- EWMO-RM-AOP-20199, R0, *Unplanned Loss of Electrical Power,* 9/1/2016
- EWMO-RM-AOP-20201, R0, *Discovery of an Airborne, Liquid, and/or Solid Material Release or Spill,* 9/1/2016
- EWMO-RM-AOP-20202, R0, *Loss of Electronic Badge Reader,* 9/1/2016
- EWMO-RM-AOP-20203, R0, *Severe Weather,* 9/26/2016
- FSD-315-16-001, R1, *Technical Procedure Writer's Manual,* 3/8/2016
- P315, R6, *Conduct of Operations Manual,* 7/8/2015
- SBP-112-3-R3.1, *Unreviewed Safety Question (USQ) Process,* 7/15/2016
- WC-303, *Waste Campaign 303 - Installation of PRDwSF on RNS Waste Containers at LANL,* 12/15/2016
- WC-304, R1, *Waste Campaign Plan 304 – Treatment of RNS Waste Containers at LANL,* 1/12/2017
- WCRRF-FO-DOP-1193, R0, *WCRRF Waste Characterization Glovebox Annual Drum Lift Surveillance,* 8/29/2016
- WCRRF-FO-DOP-1365, R0, *Waste Characterization Glovebox In-Service Inspection,* 12/15/2016
- WCRR-FO-AP-1093, R0, *WCRRF Access Control,* 8/2/2016
- WCRR-FO-AP-1316, R1, *WCRRF Vehicle Access Program,* 11/18/2016
- WCRR-FO-AP-1339, R0, *Radiation Protection Requirements,* 8/5/2016
- WCRR-FO-AP-1399, R0, *WCRRF Fire Protection Program,* 11/18/2016
- WCRR-FO-DOP-1192, R0, *WCRRF Building TA-50-69 Structural Design Integrity Inspection,* 12/10/2015
- WCRR-FO-DOP-1192, R0, *WCRRF Building TA-50-69 Structural Design Integrity Inspection, 12/10/2015*
- WCRR-FO-DOP-1193, R0, *WCRRF Waste Characterization Glovebox Annual Drum Lift Surveillance,* 8/29/2016
- WCRR-FO-DOP-1203, R0, *WCRRF Vehicle Barrier In-Service Inspection,* 12/9/2016
- WCRR-FO-DOP-1318, R0 IPC-1, *WCRRF and Building TA-50-69 TSR Mode Change,* 12/19/2016
- WCRR-FO-DOP-1338, R1, *WCRRF Fire Patrol / Stationary Fire Watch,* 11/18/2016
- WCRR-FO-DOP-1364, R0 IPC-1, *WCG Drum Lift Annual Inspection,* 12/14/2016
- WCRR-FO-DOP-1366, R0, *WCRRF Transportainer Annual Integrity Inspection,* 9/26/2016
- WCRR-FO-DOP-1398, R0, *Refueling Emergency Diesel Generator,* 11/18/2016
- WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes,* 2/2/2017

- WCRR-FP-DOP-1226, R1, *WCRRF Fire Suppression System Alignment Checklist,* 11/28/2016
- WCRR-FP-DOP-1322, R1, *WCRRF Monthly Fire Suppression Supply Valve Alignment Check,* 11/28/2016
- WCRR-FP-DOP-1328, R0, *WCRRF Monthly Fire Suppression System Startup,* 8/2/2016
- WCRR-FP-DOP-1329, R0, *Fire Suppression System Shutdown, 7/*28/2016
- WCRR-FP-DOP-1330, R1 IPC-1, *WCRRF Hydrant Flow Test,* 12/17/2016
- WCRR-FP-DOP-1331, R0, *WCRRF Main Drain and Full Flow (Inspector's Valve) Tests,* 7/29/2016
- WCRR-FP-DOP-1332, R2, *WCRRF Quarterly Combustible Loading Surveillance,* 11/28/2016
- WCRR-FP-DOP-1333, R0, *WCRRF Fire Suppression Supply Pressure Gauge Calibration,* 7/28/2016
- WCRR-PLAN-1387, R1, *WCRRF RNS Waste Operations Startup Plan,* 1/27/2017
- WCRR-PLAN-1388, R0, *Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF),* 10/12/2016
- WCRR-PLAN-1391, *WCRRF Implementation Plan for Attachment 1 of ABD-WFM-006, Rev 2.4,* 10/19/2016
- WCRR-RM-AOP-1165, R0, *WCRRF Loss of Confinement Ventilation System (CVS),* 10/4/2016
- WCRR-VS-DOP-1355, R1 IPC-3, *TA-50-69-Annual Confinement Ventilation System Instrument Calibration Surveillance,* 12/20/2016
- WCRR-RM-AOP-1166, R0, *WCG Fire Suppression Inadvertent Initiation,* 11/14/2016
- WCRR-RM-AOP-1173, R0, *Loss of Glovebox Integrity,* 10/4/2016
- WCRR-RM-AOP-1392, R1, *WCRRF RNS Waste Container Abnormal Conditions,* 11/28/2016
- WCRR-RM-ARP-1394, R0, *WCRRF Confinement Ventilation System Alarms,* 11/7/2016
- WCRR-VS-DOP-1351, R1 IPC-1, *WCRRF Confinement Ventilation System Startup,* 12/16/2016
- WCRR-VS-DOP-1352, R1, *WCRRF Confinement Ventilation System Shutdown,* 11/28/2016
- WCRR-VS-DOP-1353, R0 IPC-1, *WCRRF HEPA Filter Test,* 8/29/2016
- WCRR-VS-DOP-1354, R0 IPC-1, *WCRRF Confinement Ventilation System In-Service Inspection,* 1/23/2017
- WCRR-VS-DOP-1355, R1 IPC-3, *TA-50-69 Annual Confinement Ventilation System Instrument Calibration Surveillance,* 12/20/2016
- WCRR-VS-DOP-1356, R1 IPC-1, *WCRRF Uninterruptible Power Supply Load Test,* 1/24/2017
- WCRR-VS-DOP-1357, R1, *Building TA-50-69 and WCG Quarterly Static Pressure Channel Functional Surveillance,* 12/8/2016
- WCRR-VS-DOP-1358, R1, *WCRRF TA-50-69 Confinement Ventilation System Alignment Checklist,* 11/28/2016
- WCRR-VS-DOP-1360, R0, *WCRRF Confinement Ventilation System HEPA Filter Replacement,* 8/12/2016

- WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance,* 1/11/2017
- WCRR-WO-DOP-1363, R0, *WCRRF Scale Verification,* 8/30/2016
- WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment,* 1/27/2017
- WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling,* 1/11/2017
- WCRR-WO-DOP-1379, R0, *WCRRF Waste Container Shipment Preparation,* 11/18/2016
- WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF WCG Parent Drum Operations,* 1/27/2017
- WCRR-WO-DOP-1381, R1, *WCRRF WCG Daughter Drum Operations,* 1/11/2017
- WCRR-WO-DOP-1389, R1, *WCRRF WCG Bagport/Introductory Port Operations,* 1/27/2017
- WCRR-WO-DOP-1390, R2, *WCRRF RNS Container Monitoring and Refrigerator Rounds,* 1/25/2017
- WCRR-WO-DOP-1396, R1, *WCRRF WCATS WCG Waste Treatment,* 1/27/2017
- WCRR-WO-DOP-1397, R1, *WCRRF Operator Rounds,* 11/28/2016
- WD-AP-20098, R0, *Waste Container Information Packages,* 11/18/2016
- WD-DOP-20043, R0, *Waste Container Labeling,* 8/23/2016
- WD-DOP-20300, R0, *WD Empty Drum and POC Assembly / Preparation,* 11/23/2016

Interviews Conducted

- ADEM Associate Director
- ADEM Deputy Associate Director
- EWMO Deputy Director
- EWMO FOD
- Nuclear Operators (2)
- Operations Center Operators (2)
- PIC, RNS/UNS Treatment (2)
- Procedure Writers (2)
- SSWs (2)
- Team Leader, RNS/UNS Treatment
- Waste Disposition Division Leader
- Waste Operators/Glovebox Operators, RNS/UNS Treatment (3)
- WD-WT Group Leader
- WCRRF Operations Manager
- WCRRF SOM

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Tabletop: AREAG-WO-DOP-1383, R1, *TA-54 Area-G RNS Waste Container Shipment Preparation,* on 1/31/2017

- Pre-job briefing: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, and WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, on 1/31/2017
- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, section 4.0, *Prerequisite Actions*, initiated 1/31/2017. Stop Work initiated on 1/31/2017
- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, on 2/1/2017
- Demonstration: WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*, on 2/1/2017
- Post-Job briefing: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, and WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, on 1/31/2017 and 2/1/2017
- Pre-Job briefing: WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, and WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*, on 2/2/2017
- Demonstration: WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, and WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*, on 2/2/2017
- Post-Job: WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, and WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*, on 2/2/2017
- Pre-Job briefing: WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, on 2/2/2017
- Demonstration: WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, on 2/2/2017
- Post-Job briefing: WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, on 2/2/2017
- Demonstration: WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, section 5.1, *Replace Glovebox Gloves*, on 2/3/2017
- Post-Job Briefing: WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, section 5.1, *Replace Glovebox Gloves*, on 2/3/2017
- Operational Drill: EWMO-RP-17-008, R0, *Responding to a Glove Failure at the WCG in WCRRF*, on 2/3/2017
- Operational Drill Hotwash: EWMO-RP-17-008, R0, *Responding to a Glove Failure at the WCG in WCRRF*, on 2/3/2017
- Type 3 (Evaluated) Emergency Drill: 2017-EWMO-017, R0, *RNS Thermal Runaway/WCRR*, on 2/7/2017
- Operational Drill: EWMO-RP-17-008, R1, *Responding to a Glove Failure at the WCG in WCRRF*, on 2/8/2017
- Operational Drill Hotwash: EWMO-RP-17-008, R1, *Responding to a Glove Failure at the WCG in WCRRF*, on 2/8/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

The WCRRF TSRs identify SMP 5.6.3, Conduction of Operations, as a requirement of the WCRRF ConOps program. As noted in OPS2-PRE-1, the operations procedures necessary for WCRRF RNS operations need to be field validated with appropriate personnel to ensure they can be performed as intended and to achieve consistency between them. ISI procedures are in place to ensure operability of TSR-credited systems, and their performance for RNS processing has been verified in CRAD SB1.

DOE-STD-1029-92, *Writer's Guide for Technical Procedures*, addresses the content, format, and style of technical procedures that prescribe production, operation of equipment and facilities, and maintenance activities. LANL procedures such as P315, *Conduct of Operations Manual*, and FSD-315-16-001, *Technical Procedure Writer's Manual*, effectively implement the requirements of DOE O 422.1, *Conduct of Operations*, and DOE-STD-1029-92. Additionally, EM-AP-10001, R1, *Document Control*, successfully addresses configuration control of procedures. Based on interviews and observed procedure work control practices, this process seems to be well understood by those responsible for the development and control of the procedures. However, the number of pauses taken during procedure demonstrations and number of procedures reviewed that could not be performed as written calls into question the maturity of the procedure validation process.

Based on review of documents and interviews with personnel responsible for procedure development and change control, there is sufficient evidence that operations procedures associated with WCRRF have been screened through the USQ process, and there is a process in place to ensure that this is done.

Review of organization charts and training records and interviews with WCRRF personnel indicate that sufficient trained and qualified resources are available to support development, validation, configuration management, and use of procedures.

Procedures management has been previously verified to be acceptable through the FE and WCRRF MSA. Findings from these reviews that can impact WCRRF RNS processing have all been closed, as evidenced by document reviews and interviews, as well as verification by the WCRRF SMP owner. Review of 84 procedure-related PFITS items for the last months indicates that 23 are still open, with only one overdue. None of the open items are considered to impact safe restart of WCRRF.

This criterion was met.

2. *Procedure development and use processes for WCRRF operations and operations support procedures require that: (DOE O 422.1; DOE O 433.1B)*
   - *Procedures are screened through the USQ process as appropriate;*

- *Procedures are verified to be the latest approved version prior to use;*
- *Procedures are updated as necessary based on revised requirements, best management practices, and lessons learned;*
- *A process is in place to ensure the latest approved procedure is readily available for use;*
- *Revised procedures are reviewed to determine if training is required prior to use.*

Operations procedures associated with WCRRF RNS waste receipt and processing have been verified to have met the following objectives through review of evidence files:

- A review of document history files for the procedures demonstrated indicates that procedures are screened through the USQ process, as required by SBP-112-3-R3.1, *Unreviewed Safety Question (USQ) Process*
- As required by P315 and supported by observations and interviews, procedures are verified to be the latest approved version prior to use. This is accomplished through use of the electronic document management system by personnel to ensure the latest approved procedures are used
- Management and operators are very proactive at ensuring procedures are updated as necessary to ensure they are technically accurate and can be executed safely; however, as noted in OPS2-PRE-1, weaknesses in the procedure validation process have resulted in procedures that cannot be performed as written
- A review of document history files indicates that revised procedures are reviewed to determine if training is required prior to use.

The following procedure issues were observed during the course of the demonstrations.

WCRR-WO-DOP-1378, *WCRRF RNS Waste Container Receipt and Handling*

- WCRR-WO-DOP-1378, step 4.3[2] states: "**($) ENSURE** the daily walkdown of BUILDING TA-50-0069, the refrigerator, and the WCRRF Yard is performed to ensure that only TRANSIENT COMBUSTIBLES required by the process are present and that all pallets are metal and **INITIAL** Attachment 1. (SAC 5.10.6)" The procedure is unclear as to whether the operators performing this step ensure if only transient combustibles required for the process are present, or if they are ensuring this was completed during the performance of WCRR-FO-DOP-1397. During the performance of the step, the operators were observed to approach the refrigerator and open the door to check for transient combustibles without performing air monitoring as the door was opened. However, when transferring the simulated RNS waste drum to the refrigerator later in the procedure, step 5.[31] was performed which states: "Prior to entering the refrigerator, **SLIGHTLY OPEN** the door and **PERFORM** air monitoring just inside the door opening starting in the breathing zone and working up and down." The inconsistent application of air monitoring requirements within WCRR-WO-DOP-1378 calls into question the adequacy of the procedure validation.

- Section 4 contains a statement that prerequisite actions are performed prior to the shipment leaving TA-54 Area G. However, the procedure neither contains any verification step as to the status of the shipment prior to performing prerequisites, nor

contains notification to Area G that prerequisites are complete and the shipment may proceed.

- Step 5[3] requires the PIC to verify there are no discrepancies between the WCATS "Shipping or Transfer Pickup Report" and other transfer paperwork. However, the procedure is not clear for what discrepancies they are to check.

- Step 5[16] states that, if there is evidence of thermal runaway, to take emergency action. However, this step follows conduct of radiological surveys and removal of the cooling jacket. The step should come before these other actions, and should clearly state that, if signs of thermal runaway are identified at any time, they are to implement emergency actions.

- The note prior to step 5[16] states that steps 5[16] through 5[25] may be performed for multiple containers simultaneously. However, step 5[26] directs the repeat of steps 5[16] through 5[25] until all RNS containers have been accepted and removed from the transport vehicle. This seems to conflict with the note prior to 5[16].

- The note prior to step 5[30] states that steps 5[30] through 5[35] may be performed for multiple containers simultaneously. However, step 5[36] directs the repeat of steps 5[30] through 5[35] until all RNS containers have been placed in the refrigerator. This seems to conflict with the note prior to 5[30].

- During the demonstration of shipping an RNS drum from Area G to WCRRF, the "inter-area transfer," there was an issue with WCATS that caused a pause. The waste operator notified the PIC, who then notified the WCRRF operations center that they were pausing due to an issue with WCATS; then the PIC contacted the WCATS administrator to resolve the issue. The primary issue was the result of using the WCATS beta system and an "apparent" missing signature that was corrected by the WCATS administrator, which allowed the evolution to proceed. Once the WCATS beta missing signature issue was resolved, the PIC instructed the waste operator to complete the intra-area transfer to WCRRF, which was performed per the procedure. Note that the WCATS operation is credited in the procedure for meeting both an authorization basis requirement and a HWFP requirement. Additional concerns with WCATS are addressed in WM1.

WCRR-WO-DOP-1376, *WCRRF RNS Waste Treatment*

- During the demonstration of WCRR-WO-DOP-1376, the team observed that step 5.2[23] provides criteria to exit section 5.2 and then states: "**THEN EXIT** this subsection and **BAG-OFF** and **REPLACE** the daughter drum per WCRR-WO-DOP-1381 and **DOCUMENT** the new daughter drum number on Attachment 1." This directs executing WCRR-WO-DOP-1381; however, the next section performed was section 6.1, Blending of WypAll Paper Rags and Paper. Procedure could not be performed as written.

- WCRR-WO-DOP-1376, section 6, Performance – Supplemental Processing Activities, states: "The subsections in this section are stand-alone subsections and may be performed independently of, or in conjunction with, other Performance sections." While clear entry conditions for section 6.3, Sample Collection, appear in several locations in section 5, no clear entry conditions are provided for these sections:
  - 6.1, Blending Wypall Paper Rags and Paper
  - 6.2, Disposition of Free Liquid
  - 6.4, Treating Cloth Material
  - 6.5, Parent Drum Closure
  - 6.6, Final WCG Cleanup
  - 6.7, Placement of WCG INVENTORY in a SAFE CONFIGURATION

- WCRR-WO-DOP-1376, section 6 also states:

  > Not all prerequisite actions may be applicable based on actions that have been completed within the procedure steps. The PIC, WT team Leader, and SOM are to agree on any prerequisite actions that do not apply, and an entry will be made in the WT team Leader's and SOM's Logbooks stating which prerequisite(s) do not apply and why, and which steps prior to the point of resumption, if any, need to be re-performed.

  This step will result in inconsistent procedure execution, particularly when the procedure is not performed from beginning to end without interruption.

- Section 4.3 Field Preparation step 4.3[6] states to "ensure" that forklifts are removed from the building. The step should verify that there are no forklifts in the building. At this time, if a forklift were present, it would be a violation of the TSR. The use of "ensure" implies the forklift may be removed and operations continued.

- Section 4.3 Field Preparation step 4.3[11] directs the operator to document the daughter drum numbers. However, it is possible that the daughter drums have not been installed. This step requires clarification such that the drums get installed and the numbers are documented.

WCRR-WO-DOP-1101, *WCRRF WCG Maintenance*

- The evolution for replacement of a glove on the WCG resulted in confusion about what to do with the waste generated from the glove replacement. The procedure step 4.1[C] directs the PIC to ensure an empty daughter drum is bagged onto the debris daughter drum port, per WCRR-WO-DOP-1381, *WCRRF Waste Characterization Glovebox Daughter Drum Operations.* Later step 5.1[20][B] directs the waste operator to ensure a waste stream profile is prepared in WCATS for a secondary waste container and create a container in WCATS. This caused confusion for the waste operator, since a daughter drum was bagged on but the waste generated was secondary waste. The procedure contains insufficient direction for creation of the required waste drum in WCATS.

- WCRR-WO-DOP-1101, section 5.1, Glovebox Glove Replacement, step [20][B] states: "**IF** a parent RNS WASTE CONTAINER is not bagged-on to the WCG, **THEN PERFORM** the following: [A] **(&) DISCARD** the old glovebox glove in the waste container bagged-on to the debris daughter drum port." This step was performed and the replaced glove was placed in the waste container (i.e. drum) attached to the debris daughter drum port. The next step, [21][B], has the PIC update the waste inventory on Attachment 3. Attachment 3 is the *WCRRF Secondary Waste Container Inventory Sheet*. The secondary waste container is not bagged onto the WCG. When this was identified during performance of WCRR-WO-DOP-1101, section 5.1, a pause was called. The PIC, after consultation with the team leader and group leader, was directed to annotate the inability to use Attachment 3 and proceed with the rest of section 5.1. The procedure could not be performed as written.

- WCRR-DOP-1101, section 5.2, Glovebox Window Replacement, step [28] also directs updating the waste inventory for the waste container attached to the debris daughter drum port on Attachment 3. These steps could not be performed as written. Referencing and branching is not clearly demonstrated by the sequence of steps observed during this evolution.

WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*

- WCRR-FO-DOP-1403, step 5[5] states: "**IF UNSAT THEN** immediately **NOTIFY** the [operations center operator] to **REPORT** deficiency to the SOM **AND DOCUMENT** the deficiency/guidance on Attachment 1." This step documents failure to meet the inspection criteria in step 5[3]; however, as written, the procedure provides no subsequent steps to reposition the wire rope support stands and wire ropes to meet the inspection criteria. As written, the procedure only allows the support stands and wire ropes to be left in a noncompliant condition.

WCRR-WO-DOP-1396, *WCRRF WCATS Operations for RNS Waste Treatment*

- Step 4[6] requires the operator to perform a "test execute" function to confirm the requirements tracked in WCATS and associated with the RNS waste container are satisfied. However, the procedure does not specify what the requirements are. Additionally, the note prior to the step states "Other error messages relating to the completeness of the task are expected and can be disregarded at this time." During the demonstration of RNS processing, the test execute function was completed and five error messages were received. The operator was not sure which error messages constituted a condition which must be corrected prior to proceeding and which error messages could be disregarded.

WCRR-WO-DOP-1380, *WCRRF Waste Characterization Glovebox Parent Drum Operations*

- Section 4.3 Field Preparation step 4.3[6] states to "ensure" that forklifts are removed from the building. The step should verify that there are no forklifts in the building. At this time, if a forklift were present, it would be a violation of the TSR. The use of "ensure" implies the forklift may be removed and operations continued.

EP-DIV-RM-AOP-20124, R0, *EWMO Nuclear Criticality Safety Requirement Non-Compliance*

- EP-DIV-RM-AOP-20124 is missing entry requirements for potential criticality safety noncompliances associated with criticality requirements that material received at TA-50-0069 or mated to the WCG must be in a 55-gallon drum and that unassayed drum(s) containing HEPA filters must be 10 feet or greater from fissile material.

Additional procedure reviews identified the following:

- WCRR-WO-DOP-1378, WCRR-WO-DOP-1380 prerequisites, or successor prerequisite procedures must include a criticality safety step to verify material received at TA-50-0069 or mated to the WCG is in a 55-gallon drum (CSED-credited engineered feature).

- EP-DIV-AP-20047, R1, *LTP Glovebox/Glovebag and Glove Safety Program*, is an administrative procedure that provides specific steps for the inspection of glovebox gloves. While its designation as mixed reference/use-every-time procedure maybe appropriate for the activities covered, the significance and potential impacts resulting from glovebox glove inspections warrants classification as a technical procedure, and thus, a requirement for periodic review. A field walkdown of the procedure with operators and CSEs may have revealed the importance of its impact on operations.

- EP-DIV-AP-20227, R0 IPC-1, *EWMO Radioactive Source Management*, contains steps that implement criticality safety steps and SRs, yet it is categorized as an administrative procedure and not a technical procedure. While its designation as a reference procedure maybe appropriate for the activities covered, the significance and potential impacts resulting from criticality safety steps and SRs warrants classification as a technical procedure, and thus, a requirement for periodic review. A field walkdown of the procedure with operators and CSEs may have revealed the importance of its impact on operations.

- The cover page of EP-DOP-20206, R0, *WD-SRS New Type 7A Waste Container Receipt, Control, and Distribution*, identifies the procedure as "Both UET & Reference;" however, all subsequent pages are marked as reference. Improved procedure validation should correct these inconsistencies.

The document history file for WCRR-WO-DOP-1378, R0, R1, and R2 reflects that the document action request (DAR) for R0 specified walkdown as the validation method; however, the actual validation was performed by tabletop, as reflected in the validation checklist. The DAR for R1 waived the validation. The DAR for R2 specified validation by tabletop. The validation checklist

for R2 indicates that a tabletop was performed. Documentation of validation by walkdown was not evident in the document history file. Improved procedure validation should correct previously identified deficiencies.

The document history file for WCRR-WO-DOP-1376, R0, R1, R2, R3, and R4 reflects that the DAR for R0 initially specified walkdown as the validation method, but that was lined out and initialed, and tabletop was the method specified. The actual validation was performed by tabletop, as reflected in the validation checklist. The DAR for R1 waived the validation. The DAR for R2 specified a validation be performed, but the scope of the validation and the validation of method were blank. The validation checklist for R2 indicated that a walkdown was performed. The DAR for R3 indicated no validation was required. The DAR for R4 indicated no validation was required. Improved procedure validation should correct previously identified deficiencies.

The document history file for WCRR-WO-DOP-1380, R0, R1, R2, and R2 IPC-1 reflects that the DAR for R0 initially specified walkdown as the validation method, but that was lined out and initialed, and tabletop was the method specified. The actual validation was performed by tabletop as reflected in the validation checklist. The DAR for R1 waived the validation. The DAR for R2 initially specified walkdown as the validation method, but that was lined out and initialed, and tabletop was the method specified. The actual validation was performed by tabletop, as reflected in the validation checklist. The document history file does not indicate a validation was performed for R2 IPC-1. Documentation of validation by walkdown was not evident in the document history file. Improved procedure validation should correct previously identified deficiencies.

The document history file for WCRR-WO-DOP-1381, R0, and R1 reflects that the DAR for R0 specified walkdown as the validation method, but the actual validation was performed by tabletop, as reflected in the validation checklist. The DAR for R1 specified walkdown as the validation method, and the validation checklist indicates that walkdown was the method used.

Of the four document history files reviewed, only WCRR-WO-DOP-1376 and WCRR-WO-DOP-1381 had walkdowns performed as a validation method. This is due, in part, to weak wording in EP-AP-10007, *Technical Procedure Development*, section 5.8, Field Validation. As written, this section only provides recommendations and no requirements on how procedure validations are performed. This fails to establish an expectation for rigorous field validations. This, coupled with four instances noted above where procedures could not be performed as written (as illustrated by three pauses during demonstrations; see CRAD OP1 criterion 6 for additional discussion), reflects a weakness in the procedure validation process. The operator's use of the pause/stop work processes allowed them to receive additional guidance and execute the work safely.

Interviews with the procedure writers confirmed their use of P315, FSD-315-16-001, and EP-AP-10007 (which was put in place after the WIPP drum incident). While their intent is that,

whenever possible, field validations take place using walkdowns, over the last year, this practice has not been utilized as often as in the past due to:

- Work load/schedule pressure. In the last year, over a hundred procedures have been modified and a new set of RNS procedures have been developed. This is a much greater work load than has been experienced in the past.
- Responsibility for walkdowns. In the past, the procedure writers would take part in the validation process; this is now being performed by the SSWs, who are responsible for the validations, and only the results are fed back to the procedure writers.
- Validations for revisions typically use a less rigorous method. Procedure writers pointed to the example of DOP-1376, which for R0, was a full in-field simulation; however the revisions to the procedures have been roundtables.

The procedure writer also mentioned that all SMEs are not necessarily at the roundtable validations. For example, as WCRR-WO-DOP-1376 was revised and validated (via roundtable) the week of 2/6, neither CSAs nor the CSO took part in those discussions/validations. Where a specific criticality step was touched, email/phone discussion between the ADEM Deputy Associate Director and CSA were used to discuss the specific change. This approach may not provide a holistic view of the series of waste processing procedures governing waste operations at WCRRF. Further discussion revealed that, during some of the early reviews primarily focused on executability and optimization, not all personnel needed to be present. Additional roundtable reviews are planned that would require all pertinent SMEs to be present, as are field validations of the updated procedures. Given this clarification, it is expected that all necessary contributors will have the opportunity to review and provide their valuable input to the applicable areas in the procedures. The document review sheet system is in place for procedure reviews, leading to a stronger/more formal application of procedure reviews. A hundred percent concurrence on a procedure is necessary before the procedure can be implemented. The issue, previously identified in TA-55, where P315's allowance of some amount of time without response from a reviewer could be considered to signify "no comment," is not allowed within the EWMO procedure process. Through effective use of roundtable reviews, field validations, and the document review sheet final approval processes, the WCRRF RNS procedures will be strengthened and improved to ensure field executability, operator ownership, and consistency of operations.

A review of the procedures, document history files, and interviews indicates an established process for procedure development.

OPS2-PRE-1: The operations procedures necessary for WCRRF RNS waste processing operations lacked adequate field validation with appropriate personnel. Additional effort is necessary to ensure they can be performed as intended and achieve the desired consistency of performance.

This criterion was **not** met.

CONCLUSION

The WCRRF TSRs identify SMP 5.6.13, Procedures Management, as a requirement of the WCRRF ConOps program. Upon closure of OPS2-PRE-1, WCRRF operations will have adequate procedures to cover the activities under this restart effort, as evidenced through document reviews and observed evolutions. ISI procedures are in place to ensure operability of TSR-credited systems, and their performance for WCRRF restart has been verified under objective SB1. Based on documents reviewed and interviews conducted, the WCRRF ConOps Program is in compliance with the DOE order and LANL procedure control requirements, and is determined to be effective overall, as further evidenced through observed evolutions. ConOps principles are being applied in the facility through procedures and personnel are knowledgeable and competent. The weaknesses observed in the procedures can be minimized with additional, thorough field validation with the procedure writers, operators, SMEs, and facility personnel involved. In general, the critical portions of the procedures were able to be executed safely; however, improved validation will drive improved operator execution performance.

This objective was not met. One finding was identified.

FINDINGS

Pre-Start
OPS2-PRE-1: The operations procedures necessary for WCRRF RNS waste processing operations lacked adequate field validation with appropriate personnel. Additional effort is necessary to ensure they can be performed as intended and achieve the desired consistency of performance.

Post-Start
None

Assessed by:	C. Eric Shogren **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Occupational Safety & Health**	Objective: OSH1 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

OSH1: Personnel exhibit an awareness of public and worker safety and health and environmental protection requirements and, through their actions, demonstrate a high-priority commitment to comply with these requirements. Worker safety and health requirements of Title 10 Code of Federal Regulations (CFR) Part 851, *Worker Safety and Health Program*, have been implemented within the facility. (CR1, CR4, CR5, CR6)

CRITERIA

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. The OSH program has conducted current and comprehensive exposure assessments for WCRRF operations. An adequate monitoring program is in place including equipment. (Exposure to radioactive contamination will be evaluated in the radiological protection functional area.) (10 CFR 851)
3. The occupational safety program has identified hazards and incorporated appropriate controls for WCRRF operations work activities, such as glovebox safety, pressure safety, cryogen safety, ladder safety, electrical safety, lock-out/tag-out, hot work, ergonomics/materials handling, and vehicular safety. (10 CFR 851)
4. Adequate numbers of IH and occupational safety professionals are assigned and perform effectively (work place surveillances, work package reviews, walkdown, etc.).
5. Level of knowledge of managers, operations, and operations support personnel regarding working safely with hazardous materials is adequate, based on reviews of interviews and work observations. An effective hazard communication program is in place. Personnel exhibit an awareness of public and worker safety and health protection requirements and, through their actions, demonstrate a high-priority commitment to comply with these requirements. (DOE O 426.2)
6. The level of knowledge of occupational and IS personnel concerning their roles and responsibilities for WCRRF operations is adequate. (DOE O 440.1B, DOE O 426.2)

APPROACH

Records Reviewed

- 10 CFR 851, *Worker Safety and Health Program*
- Area G-WO-DOP-1383, R1, *TA-54 Area G RNS Waste Container Shipment Preparation*, 1/12/2017

- CIPs 11-22-2016 For Training Purposes Only for containers 68430, 69079, 69280, 69519, 11/22/2016
- DESHS-EWMS, *Bob Stokes Personnel List*, 12/6/2016
- EM2016-5363, *Final Report for the Restart of the Waste Characterization, Reduction, and Repackaging Facility (WCRRF) Management Self-Assessment*, 1/6/2017
- Email, Christman to Newberry, Stokes, Whitney, Guillen, Subject: *TA54 drum handling ergonomics force tables*, 9/8/2016
- Email, Martin to Wilmot, Romero, Stokes, Subject: RE: *MSA document request professional certs*, 12/12/2016
- EM-AP-10007, R2, *Technical Procedure Development*, 11/21/2016
- EM-AP-10008, R1, *ADEM Roles, Responsibilities, Authorities, and Accountabilities*, 1/30/2017
- EP-AP-20047, R1, *WD Glovebox and Glovebox Glove Safety Program*, 1/12/2017
- EP-CHARTER-10012, R0, *Charter for Waste Processing Integrated Process Control Teams*, 10/1/2015
- EP-DIR-AP-10008, R1, *ADEP Roles, Responsibilities, Authorities, and Accountabilities*, 1/30/2017
- EP-DIV-AP-03, R1, *WDP Integrated Work Document Review and Tracking Program*, 9/10/20
- EP-DIV-AP-20039, R2, *EWMO Timely Orders*, 12/21/2015
- EP-DIV-AP-20098, R0, *LTP TRU Waste Remediation Evaluation*, R0, 5/28/2013
- EP-DIV-AP-20099, R1, *Waste Processing Plan Requirements*, 10/2/2015
- EP-DIV-AP-20197, R0, *Acceptance Checklist for Procurement of Processing Support Equipment*, 11/1/2013
- EP-DIV-POLICY-20057, R0, *EWMO Health and Safety Policy – Manual Movement*, 6/6/2012
- EWMO-BEP-20048, R0, *EWMO Division Building Emergency Plan (BEP)*, 8/29/2016
- EWMO-RM-AOP-20203, R0, *Severe Weather*, 9/16/2016
- EWMO-RM-ERP-20200, R1, *EWMO Area Emergency Response*, 11/23/2016
- Hazard Analysis for WCRR-FO-DOP-1403, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Rope*, HA R0, 10/24/2016
- Hazard Analysis for WCRR-WO-DOP-1101, *WCRRF WCG Maintenance*, HA R0, 11/16/2016
- Hazard Analysis for WCRR-WO-DOP-1322, *WCRRF Monthly Fire Suppression Supply and Valve Alignment Check*, HA R0, 7/28/2016
- Hazard Analysis for WCRR-WO-DOP-1376, *WCRRF RNS Waste Treatment*, HA R1, 1/11/2017
- Hazard Analysis for WCRR-WO-DOP-1378, *WCRRF RNS Waste Container Receipt and Handling*, HA R1, 1/11/2017
- Hazard Analysis for WCRR-WO-DOP-1379, *WCRRF Waste Container Shipment Preparation*, HA R0, 11/18/2016
- Hazard Analysis for WCRR-WO-DOP-1380, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, HA R1, 1/11/2017

- Hazard Analysis for WCRR-WO-DOP-1381, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*, HA R1, 1/11/2017
- Hazard Analysis for WCRR-WO-DOP-1390, *WCRRF RNS Waste Container Monitoring and Refrigerator Rounds*, HA R0, 11/18/2016
- Lesson Plan, 32284, R0, *Fundamentals of Chemical Compatibility*, 2/22/2016
- Memorandum, DEHSH:16-009, From Whitney to Frederici and Stokes, Subject: *Evaluation of the potential for daughter waste drums processes from beryllium labeled RNS drums to be considered beryllium containing wastes*, 11/2/2016
- Memorandum, DESHS:16-0013, R1, Bullock to Stokes, Subject: *Waste Characterization, Reduction, and Repackaging Facility (WCRRF) Air Flow Study* 11/18/2016
- Memorandum, from Lawton to Stokes, Subject: *WCRR—New Glovebox Process Summary*, 10/17/2016
- Memorandum, OSH-16-081, Subject: *Letter of Interpretation: Whether Drum Lift Devices (JONA Handler) are Applicable to P101-25 Requirements*, 9/1/2016
- Monthly Inspection record for Overhead Bridge and Gantry Cranes, Equipment ID CTG-6/HE-6, 11/28/2016
- Operating manual for Altair 5 obtained on the internet
- OS-DO-RA-17-001P, *Implementation plan (IP) for the Restart of the Waste Characterization, Reduction, and Repackaging Facility (WCRRF) Contractor Readiness Assessment*,1/27/2017
- OSH-LIHSM-45-012, *Laboratory Industrial Hygiene Safety Manual (LIHSM)*, 10/31/2016
- P101-13, R3, *Electrical Safety Program*, 8/1/2016
- P101-21, R5, *Chronic Beryllium Disease Program*, 2/18/2015
- P101-25, R5, *Cranes, Hoists, Lifting Devices, and Rigging Equipment*, 7/20/2016
- P101-27, R4, *Confined Spaces*, 3/31/2015
- P101-28, R4, *Glovebox Safety Program*, 8/11/2016
- P101-32, R2, *Worker Exposure Assessments*, 8/24/2015
- P300, R8, *Integrated Work Management*, 6/16/2016
- P313, R9, *Roles, Responsibilities, Authorities, and Accountability*, 3/4/2015
- P322-4, R10, *Laboratory Performance Feedback and Improvement Process*, 4/21/2016
- Safety Management Program Affidavit, *Contractor Assurance System, Waste Characterization, Reduction, and Repackaging Facility (WCRRF) Restart*, 1/23/2017
- Spreadsheet, *Closure Status of LANS Corrective Actions WIPP AIB JONs*, 1/23/2017
- UTrain item ID: 32284, R0, *Lesson Plan, Waste Disposition (WD) Division Fundamentals of Chemical Compatibility*, 3/4/2016
- WCRR-FO-DOP-1403, R0 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*, 1/5/2017
- WCRR-PLAN-1388, R0 with page change, *Restart of the Waste Characterization, Reduction, and Repackaging Facility (WCRRF), Jet Docket #NA-00-LA-2016-11, JET 16-126.0, Contractor Readiness Assessment (CRA) Plan of Action (POA),* initial date 10/11/20216, issued 2/1/2017
- WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, 1/11/2017

- WCRR-WO-DOP-1363, R0, *WCRRF Scale Verification*, 8/30/2016
- WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, 1/27/2017
- WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, 1/11/2017
- WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, 1/27/2017
- WCRR-WO-DOP-1381, R1, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*, 1/11/2017
- WCRR-WO-DOP-1390, R2, *WCRRF RNS Waste Container Monitoring and Refrigerator Rounds*, 1/25/2017
- WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*, 1/27/2017
- WD-AP-20098, R0, *Waste Container Information Packages*, 11/18/2016
- Worker Qualification and Authorization System (WQAS) Report for 32284, *Fundamentals of Chemical Compatibility*, 12/7/2016

Interviews Conducted

- ADEM Deputy Associate Director
- Area G RNS Operations PIC (PIC during WCRRF RNS Waste Container Receipt and Handling evolution at WCRRF)
- EWMO ESH Manager
- EWMO ESH Team Leader
- EWMO Glovebox CSE
- EWMO Health Physicist
- EWMO IH Technician
- EWMO Industrial Hygienist
- EWMO Training Manager
- EWMO Waste Processing Engineer
- Waste Disposition Division Lead
- WCRRF CSEs
- WCRRF Glovebox Operators
- WCRRF Operations Manager
- WCRRF SSWs
- WD-WPE Group Leader
- WD-WT Group Leader

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Tabletop review of DOP-WO-DOP-1383, 1/31/2017
- Pre-job brief of WCRR-WO-DOP-1378, 1/31/2017
- Comprehensive pre-job brief of WCRR-DOPs-1376, 1380, 1381, and 1396, 1/31/2017

- Prerequisite demonstration for WCRR-DOP-1380, 1/31/17 and 2/1/2017
- Demonstration of WCRR-DOP-1380 and post-job brief, 1/31/17
- Pre-job brief, demonstration, and post-job brief for WCRR-DOPs-1376 and 1396, 2/1/2017
- Pre-job and complete operational drills – Processing, 2/3/2017 and 2/8/2017
- Emergency Drill preparation meeting, 2/3/2017
- Emergency Drill Preparation – Controller/evaluator briefing and SEO Observer briefings, 2/6/2017
- Emergency Drill Prep, Drill, Hotwash, and Controller Critique, 2/7/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

A review of the evidence packages for closure of the MSA findings and review of the prerequisites in the CRA IP indicate that all safety evaluations are complete and this criterion was met. There were three pre-start and one post-start findings related to OSH; all were closed in accordance with the wording of the findings, although pre-start OSH-PRE-1 related to adequacy of HAs for chemical hazards does not appear to have had an extent of condition review related to the IS and ergonomic hazards for the current RNS operations, as defined in procedures and executed in the field. Because the evolutions were performed in the ARTIC facility instead of the WCRRF, some of the IS and ergonomic issues identified during the evolutions may not exist in the WCRRF. However, the WCRRF IS/IH team should verify this through walkdowns and review of the applicable HAs. Criterion 3 of this CRAD describes the details of these deficiencies. WCRRF RNS procedure adequacy is described in CRAD OPS2 criterion 2.

Observation of RNS evolutions demonstrated that personnel exhibit adequate ConOps practices and embrace a safety culture, as evidenced by a number of work pauses and stop work events when procedure or process issues arose. The adequacy of procedures and ConOps practices are described in CRAD OPS2 criterion 2.

An interview with the OSH lead indicated that all of the pre- and post-start findings, any applicable WIPP AIB findings related to OSH, and an assessment of the health of the OSH SMP have been completed and there are no open items related to OSH that impact readiness to restart. Roles and responsibilities have been adequately defined in implementing procedures and program documents, and personnel interviewed understand these roles and responsibilities. There is documented evidence that they are being followed. IS and IH personnel have the appropriate training and, where necessary, certifications such as Certified Safety Professional and Certified Industrial Hygienist. All personnel interviewed are acceptably experienced and cognizant of RNS operations and the associated hazards and controls.

This criterion was met.

2. *The OSH program has conducted current and comprehensive exposure assessments for WCRRF operations. An adequate monitoring program is in place including equipment. (Exposure to radioactive contamination will be evaluated in the radiological protection functional area.) (10 CFR 851)*

A review of documentation, observation of work activities, and interviews with OSH and IH personnel indicates that adequate analyses of operations was performed to identify potential IH hazards, and exposure assessments were performed to determine the significance and proper controls to prevent, mitigate, and monitor exposures. The RNS waste generates flammable, toxic, and corrosive gases/vapors based on analysis of headspace gas samples; these include hydrogen, carbon monoxide, carbon dioxide, nitrous oxides, and nitric acid fumes. In addition, a runaway thermal event, as was experienced at WIPP and validated through LANL testing of simulated RNS waste, can generate significant quantities of hazardous gases, including significant quantities of nitrogen oxides (NOx) released during the tests, as evidenced by the color of the gases released from the drum. RNS waste processing procedures incorporate steps for operators to monitor the refrigerator prior to opening it to ensure that no hazardous or flammable gases have been released into the enclosed space. However, at least one instance was identified during the prerequisites for procedure WCRR-WO-DOP-1378, *WCRRF RNS Waste Container Receipt and Handling*, where the refrigerator door was opened without monitoring (during combustible loading verification). This evolution is further described in CRAD OPS2. Interviews with WCRRF management indicate that the requirement to monitor the refrigerator for hazardous gases is being considered for transfer to the operations organization as part of the facility rounds program. This would facilitate accomplishment of the prerequisites for several RNS process procedures and ensure consistent application across the procedures.

A review of the RNS processing procedures indicates that each RNS drum is only sampled for potentially hazardous gases in the area around the drum when it is being removed from the refrigerator, but never sampled after it is removed from the refrigerator and prior to it being mated with the WCG for any trace hazardous/corrosive gases, which was identified as an OFI in the MSA. The reviewer concurs with this not being a finding, but additional sampling during initial RNS operations during this period would be prudent. The Altair® 5 is a simple instrument to use and the operators are trained to use it. Review of Altair® 5 literature and discussion with WCRRF IH personnel indicates that the instrument in use at WCRRF is conservatively calibrated, and alarm set points are adequate to protect against both combustible and hazardous gases.

Based on personnel interviews, a walkdown of WCRRF, and review of documentation, the WCRRF appears to meet all of the Laboratory requirements for an inaccessible beryllium (Be) contamination area, as defined in P101-21. Reviewed reports indicate that the levels of Be in the WCG from prior Be-containing waste show the levels below those requiring Be controls, and analysis of the three remaining drums marked as Be-containing waste show that the waste does not contain Be at a level requiring Be controls. However, the WCG is currently posted as an inaccessible beryllium contamination area and all of the WCRRF operators are trained beryllium

workers, so additional Be controls as specified in P101-21, such as periodic surface sampling wipes, are not applicable.

This criterion was met.

3. *The occupational safety program has identified hazards and incorporated appropriate controls for WCRRF operations work activities, such as glovebox safety, pressure safety, cryogen safety, ladder safety, electrical safety, lock-out/tag-out, hot work, ergonomics/materials handling, and vehicular safety. (10 CFR 851)*

During demonstration of WCRR-WO-DOP-1380, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, in the ARTIC facility, it was observed that three operators were on one of the WCG work platforms during glove inspections in an attempt to hasten the inspection step. This is not consistent with the posted requirement for only two individuals on the platform at any one time. This condition was identified by the SSW and corrected on the spot. It was also self-identified by WCRRF management during the post-job briefing that there could be instances of this when two operators are inspecting gloves and assistance is required from an RCT.

The CRA team identified that there are unidentified slip and fall hazards that were created by fixing a potential tripping hazard from electrical cables running from the wall outlet to the glovebox. The cables were covered within industrial cable protectors (channel guides) that are about 1.5-in. high with beveled edges. This protects from tripping over the cables or damaging them from rolling over them, but presents a hazard from stepping on the beveled area and twisting an ankle. These are located perpendicular to WCG steps used to work on the glovebox, and stepping back off the steps places the foot parallel to the “ramp” section of the protector. This was corrected during the CRA, and later evolutions witnessed the hoses and covers had been rerouted to eliminate the hazard.

There are HAs developed for all of the detailed operating procedures used in WCRRF RNS waste operations, which were updated following the MSA. A review of the detailed operating procedures indicates that the associated HAs are not included in the reference document section, and there are some differences between the hazards and controls identified in the HA and those in the procedures. Several observed work activities do not appear to be specifically addressed in the HAs, and there were observed potential hazards in those activities; therefore, the procedures did not adequately address industrial hazard controls. For example, in procedure WCRR-WO-DOP-1380, R2 IPC-1, step 5.2[19], the operator is directed to “confirm airflow on the air mover and establish local ventilation for bag-on.” This step does not indicate the level of activity that was performed, as the operators had to move the HEPA vacuum manually out from under the glovebox, crawl under the glovebox, and attach the vacuum supply trunk to a hook under the glovebox. This presented several hazards not identified in the HA, such as ergonomic issues, pinch points, and contact with areas of the glovebox.

The CRA team witnessed other industrial hazards and potentially unsafe work practices associated with RNS operations, including manhandling of a drum on the truck during drum receipt (the operating procedures specify no manual drum handling is to occur); movement of

daughter drum out from under the WCG, where the operator pulled the drum on its caster directly toward him (line of fire potential); and potential unsafe conditions, such as a bolt protruding from the back of the steps on the west side of the WCG, which was an IS and radiological control hazard; potential tripping hazard with an uneven floor on the south side of the WCG (corrected overnight with tape to identify it); and questions regarding the use of stairs as working platforms and potential compliance of the steps as working platforms per Occupational Safety and Health Administration 29 CFR 1910, *Occupational Safety and Health Standards*, and 1926, *Safety and Health Regulations for Construction*. Although there may not be a specific requirement violated, the use of stairs is both an ergonomic issue and a fall issue, as the stairs are only 11-12 inches wide.

In procedure WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, step 5.1[10], the operator is directed to "…then cut away the inner bag beginning at its lowest point…" To accomplish this, the operator had to reach across the interior of the glovebox and pull on the horsetail to move the inner cardboard container out of the POC, resulting in a potential ergonomic hazard. This was not analyzed in the HA or in the procedure. The last ergonomic evaluation performed was in October 2016, and appeared, by the write-up, to be a discussion with the operators (report uses words like: "it is my understanding") instead of a direct observation of work activities as they are performed.

Other IS and health areas, such as glovebox safety, pressure safety, cryogen safety, ladder safety, electrical safety, lockout/tagout, hot work, and vehicular safety, were reviewed and either did not have hazards associated with ARTIC and WCRRF operation or were adequately addressed. For instance, there are no cryogenics or ladders used in those operations, based on walkdowns and observations of ARTIC and WCRRF; vehicular safety is addressed through the TSRs and adequately addressed as indicated by walkdowns, observations, and procedure reviews; and there are no electrical safety issues identified with normal RNS activities, since equipment located interior to the gloveboxes are plug-in and not hard-wired. Maintenance work activities were assessed to determine compliance with electrical safety, but no examples of maintenance-related electrical work were identified during the review. Any hot work associated with RNS operations will be performed under work package control, as was evident during the review for repair of the WCRRF airlock sump frame. Gloveboxes appear to meet the requirements of P101-28, *Glovebox Safety Program*, and all operators are qualified glovebox operators as well as nuclear operators.

MSA pre-start finding OSH-PRE-1 dealt with inadequate HAs associated with RNS waste related to chemical hazards, controls, and flowdown into procedures. Although there is sufficient evidence for closure of this pre-start finding, it is not apparent that an extent of condition review was performed to identify any IS or ergonomic issues that may be inherent in the actual work activities performed, not just the steps in the procedures. The CRA team determined that this is not a significant issue, as the identified deficiencies did not appear to be a breakdown in the program but a result of the changes that have been occurring as the ARTIC facility is used to practice RNS operations. These safety and ergonomic issues were not apparent in the actual WCRRF, due to the differences between the facilities.

This criterion was met.

4. *Adequate numbers of IH and occupational safety professionals are assigned and perform effectively (work place surveillances, work package reviews, walkdown, etc.).*

Line operating organization R2A2s are defined in EM-AP-10008, R1, *ADEP Roles, Responsibilities, Authorities, and Accountabilities*. These roles and responsibilities have been recently revised based on FE and MSA results, in order to provide additional clarification. Results of interviews demonstrate line management acceptance of responsibility for control of safety. Interviews with WCRRF and support organization personnel indicate that there are sufficient IH and occupational safety personnel to support RNS processing, and that all personnel assigned to support WCRRF have been trained and qualified to the LANL standards. OSH personnel appear to have been involved in development of the WCRRF procedures and review of the RNS operation in both ARTIC and WCRRF, although there is concern about the level of involvement during actual work activities, based on the IS and ergonomic deficiencies identified in criterion 3 of this CRAD. There have been changes to the procedures, based on practice of the evolutions; a focused evaluation of the actual work practices for IS and ergonomic issues in both ARTIC and WCRRF is warranted.

This criterion was met.

5. *Level of knowledge of managers, operations, and operations support personnel regarding working safely with hazardous materials is adequate, based on reviews of interviews and work observations. An effective hazard communication program is in place. Personnel exhibit an awareness of public and worker safety and health protection requirements and, through their actions, demonstrate a high-priority commitment to comply with these requirements. (DOE O 426.2)*

Interviews with operations and support personnel at all levels of the organization indicate that there is a high sense of awareness for all aspects of safety, from nuclear safety defined by the safety basis controls to occupational safety of the workers and co-located population. Operating procedures identify the IS and health hazards and associated controls to protect all populations, including the environment; personnel displayed an adequate understanding of these hazards and controls, as evidenced by witnessed operations demonstrations and emergency and operational drills.

The HAZCOM (hazard communication) program within WCRRF has been properly implemented, as evidenced by interviews with WCRRF and EWMO personnel, review of operating procedures, OSH documentation (IWDs, IH exposure studies, etc.) identified in the documents reviewed section of this CRAD, and closure documentation for MSA pre-start finding OSH-PRE-1. The reviewed WCRRF operating procedures now contain the appropriate chemical and biological hazards in the prerequisites sections, and witnessed pre-job briefings covered these hazards. The CRA team reviewed the labeling of RNS drums to verify that the hazards were identified. RNS drum labeling to meet Department of Transportation and HAZCOM requirements was identified as an issue in Area G, and the issue was closed by an email from J. Tozer to D. Frederici, dated 11/16/2016. Discussion with the OSH point of contact for the CRA indicates that the parent RNS drums are labeled with the appropriate Department of

Transportation hazard labeling, and daughter drums will be appropriately labeled when created. Labeling for HAZCOM is not a requirement for waste containers. All personnel assigned to or supporting the WCRRF are required to have HAZCOM training, and a review of training records performed under CRAD TQ1 verified this requirement.

Personnel's commitment to safe operations was demonstrated through operational evolutions performed during the CRA, where the operations crew executed a work pause or work stoppage when the procedures could not be executed as written, there was confusion with the procedures, or the WCRRF RNS facilities did not support procedure compliance; several of these work pauses were for potential safety issues.

This criterion was met.

6. *The level of knowledge of occupational and IS personnel concerning their roles and responsibilities for WCRRF operations is adequate. (DOE O 440.1B, DOE O 426.2)*

Based on interactions with OSH personnel, assigned personnel appear to be knowledgeable of the IS and IH hazards associated with RNS waste processing, and were actively involved with the specified controls. Questioning of the occupational health and IS personnel on the technical basis for the HAs and the associated controls indicated a high level of competence in their assigned areas, an in-depth understanding of the RNS process, a genuine concern for the safety and health of operations personnel, and evidence that they were involved in development of the procedures and walkdown of the facilities. Personnel interviewed understood their roles and responsibilities for providing oversight of work activities and for involvement in the planning and safe execution of work. Interviews with OSH management and technical personnel demonstrated an active involvement in work planning and execution. However, it was noted in criterion 3 of this CRAD that changes to the operating procedures and the ARTIC facility may not have been evaluated by the appropriate OSH SMEs, so a fresh walkdown of the facilities, review of the procedures, and comparison with the associated HAs is warranted.

This criterion was met.

CONCLUSION

Based on interviews with management, operations, and support personnel, review of applicable work documents and analyses, observation of work demonstrations in the ARTIC mockup facility, and walkdown of the WCRRF, there is adequate evaluation of RNS operations IS and IH hazards and selection/implementation of appropriate controls. Personnel interviewed are competent to perform their assigned duties, knowledgeable of the RNS operations and the hazards at all levels, actively engaged in assuring safe and compliant work, self-critical and willing to stop when actions cannot be performed as defined in work documents or unknown conditions are encountered, and are acting as a team. Pre-start and post-start issues identified dung the MSA have been adequately closed, and evidence of closure is acceptable. Open issues from the AIB report affecting OSH, have been closed by the organization and only a few are awaiting final closure by DOE (related to approval of the RNS processing procedures). Due to

identified safety and ergonomic issues during the CRA and lack of evidence for an extent of condition review in MSA pre-start finding OSH-PRE-1 for additional IS and ergonomic hazards, the facility would benefit from a fresh walkdown of ARTIC and WCRRF and observation of processing by OSH personnel to ensure additional safety or ergonomic issues are addressed. Based on the interviews, operations demonstrations, and documented evidence, current implementation of the OSH SMP will support safe restart of RNS operations at WCRRF.

This objective was met. No findings were identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Mike Montini **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Quality Assurance**	Objective: QA1 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

QA1: Line management has established and implemented a quality assurance (QA) SMP to ensure safe accomplishment of work. The level of knowledge of QA managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (CR1, CR4, CR5, CR6, CR14)

CRITERIA
NOTE: Other functional areas will also evaluate the effectiveness by which issues are identified, managed, and resolved within the specific functional area.

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. WCRRF operations effectively implement the following LANL QAP requirements to support operations:
    a. Personnel demonstrate appropriate knowledge of QAP elements applicable to their function and position, and commensurate with their responsibilities.
    b. Requirements for the verification of critical, quality-affecting activities have been established and are effectively executed.
    c. Personnel understand and demonstrate a commitment to identify and report quality problems and concerns.
    d. The process for delegation of responsibilities has been established and personnel understand their R2A2s and what can and cannot be delegated.
    e. Interfaces between organizations have been defined and formalized.
    f. Production supplies and equipment (e.g., empty waste drums, bag-in/bag-out bags) have been procured appropriately, and records demonstrate appropriate pedigree.
    g. Production supplies and equipment (e.g., empty waste drums, bag-in/bag-out bags) are identified and stored in accordance with requirements, and any shelf life requirements have been met.
    h. Facility spare and replacement parts are identified and stored in accordance with requirements, and any shelf life requirements have been met.
    i. M&TE have been identified, calibrated, and controlled in accordance with requirements.
    j. Nonconformances (NCRs) are identified and processed in accordance with requirements.
    k. A compliant, implemented, and effective records management process is in in place that demonstrates that required records are identified, classified, stored appropriately, and retrievable. (DOE O 226.1B, DOE P 450.4)

3. WCRRF operations are supported by an effective issues management process or program in that all WCRRF operations issues identified are tracked; corrective actions are developed and accomplished. (DOE O 414.1D, CFR 830.120)
4. Management has reviewed all open issues related to WCRRF operations and verified that no single open deficiency or group of deficiencies preclude safely starting nuclear operations. (10 CFR 830.120)
5. Software used within or in support of WCRRF operations has been properly defined and graded and the required level of software QA has been applied to each software application. (DOE O 414.1D, 10 CFR 830.120)
6. The level of knowledge of QA personnel concerning their roles and responsibilities for WCRRF operations is adequate. (DOE O 426.2).

APPROACH

Records Reviewed

- Area G-WO-DOP-1383, R1, *TA-54 Area G RNS Waste Container Shipment Preparation*, 1/12/2017
- DHF-WCRR-WO-DOP-1378, R0, R1 and R2, *Document History File WCRRF RNS Waste Container Receipt and Handling*, 1/11/2017
- Effectiveness Evaluation (EE) Related to DOE-IG-0922 Report, Parent PFITS 2014-592, 6/3/2016
- EM2016-5363, *Final Report for the Restart of the Waste Characterization, Reduction, and Repackaging Facility (WCRRF) Management Self-Assessment*, 1/6/2017
- EM-AP-10001, R1, *Document Control*, 2/1/2017
- EM-AP-10007, R2, *Technical Procedure Development*, 11/21/2016
- EM-AP-10008, R1, *ADEM Roles, Responsibilities, Authorities, and Accountabilities*, 1/30/2017
- EM-CHARTER-20062, R0, *WD and EWMO Management Review Board Charter*, 6/15/2016
- EP-AP-10003, R1, *Records Management*, 9/29/2016
- EP-DIR-AP-10005, R4, *Records Processing*, 1/18/2013
- EP-DIR-AP-10008, R1, *ADEP Roles, Responsibilities, Authorities, and Accountabilities*, 1/30/2017
- EP-DIR-QAP-0001, R8, *LANL Environmental Management Directorate Quality Assurance Program (QAP) Implementation Plan*, 7/14/2016
- EP-DIV-AP-20197, R0, *Acceptance Checklist for Procurement of Processing Support Equipment*, 11/1/2013
- EWMO-CHARTER-20062, R0, *WD and EWMO Management Review Board Charter (MRB Charter)*, 8/11/2016
- EWMO-PLAN-1405, R0, *User Performed Calibration Process Plan*, 1/11/2017
- IDED-08-TA50-0069-002, *Item Dedication for WCG Ground Clamp Assemblies*, 11/28/2007
- IDED-08-TA50-0069-004, *Item Dedication for WCG Non-Sparking Tools*, 11/28/2007

- IDED-10-TA50-0069-008, *Three-Phase Disconnect (CDD-H) upstream of VFD-002 for the FE-002 Ventilation Fan*, 5/16/2010
- IDED-11-TA50-0069-007, *Lift Table for Waste Container Glovebox (WCG) Daughter Drums*, 8/3/2011
- IDED-11-TA50-0069-009, *Laminated Safety Glass, 19 ¾ L 11 ¾ W ¼ in. thick*, 9/28/2011
- Implementation package and inspection report for Design Change Form DCF-11-TA50-0069-035, R0, *Install UPS Seismic Restraint*, 6/26/2017
- Issues Management Coordination, Roles and Responsibilities 6/6/2016
- LA-UR-10-04565, *Los Alamos National Laboratory Contractor Assurance System (CAS) Description Document*
- List of open NCRS for WCRRF, 2/1/2017
- MLDC-11-032, R1, *Conduct of Engineering Component or Part Management Level Determination for WCRRF, Various components*, 9/25/2014
- NCR-2016-483, *Wire rope clip spacing does not meet 4" minimum requirement*, 12/19/2016
- NCR-2017-017, *WCRRF Glovebox Window Components without Pedigree in Level B Storage*, 1/10/2017
- NCR-2017-018, *WCRRF Ventilation Fan Motors without Pedigree in Level B Storage*, 1/10/2017
- NCR-2017-026, *WCRRF Bags in Uncontrolled Level B Storage*, 1/17/2017
- NCR-2017-027, *WCRRF HVAC Filters in Uncontrolled Level B Storage*, 1/17/2017
- NCR-2017-028, *WCRRF NFT Filters in Uncontrolled Level B Storage*, 1/17/2017
- NCR-2017-035, *PRDwSF Components in Uncontrolled Level B Storage*, 1/17/2017
- NCR-2017-043, *WCRRF Fridge Temp Modification Installation*, 1/20/2017
- NCR-2017-050, *TA-54-0375 Pressure differential indicator controller outside calibration tolerance*, 1/13/2017
- OR(16)-006.000, *Test Plan for the Drum-Scale Thermal Transport Characterization Study*, 10/3/2016
- OR(17)-002.00, *Observation of Waste Characterization, Reduction, and Repackaging Facility (WCRRF) Daily Inspections*, 10/20/2016
- OS-DO-RA-17-001P, *Implementation plan (IP) for the Restart of the Waste Characterization, Reduction, and Repackaging Facility (WCRRF) Contractor Readiness Assessment*, 2/6/2017
- P1020-1, R6, *Laboratory Records* Management, 10/22/2015
- P1040, R9, *Software Quality Management*, 3/19/2015
- P313, R9, *Roles, Responsibilities, Authorities, and Accountability*, 3/4/2015
- P322-4, R10, *Laboratory Performance Feedback and Improvement Process*, 4/21/2016
- P330-2, R6, *Control and Calibration of Measuring and Test Equipment (M&TE)*, 10/27/2016
- P330-6, R11, *Nonconformance Reporting*, 11/22/2016
- P840-1, R8, *Quality Assurance for Procurements*, 8/30/2016
- PD328, R5, *LANL Assessment Program*, 11/22/2016
- PFITS 2016-2049-Action 2, *WD/EWMO Action Closure Form*, 2/1/2017

- QPA-VAR-2017-002.0, *Approval-Variance Request WCRRF PLC*, 1/25/2017
- Safety Management Program Affidavit, *Contractor Assurance System, Waste Characterization, Reduction, and Repackaging Facility (WCRRF) Restart*,1/23/2017
- Safety Management Program Affidavit, *Quality Assurance (QA) Program*, 1/24/2017
- SD320, R4, *LANL Contractor Assurance System Description Document*, 2/17/2016
- SD330, R9, *LANL Quality Assurance Program*, 9/26/2016
- Spreadsheet, *Closure Status of LANS Corrective Actions WIPP AIB JONs*, 1/23/2017
- SR(13)-096.000, *Surveillance Report for Waste Compliance and Tracking System (WCATS) Implementation at TA-54, Area G*, 9/20/2013
- SR(16)-40.001, *ADEM Software Quality Management Surveillance*, 4/12/2016
- SR(17)-013.000, R0, *Control and Calibration of Measuring and Test Equipment (M&TE) Surveillance Report*, 11/22/2016
- Subcontract No. 425562, Exhibit H, *Quality Assurance Requirements*, 1/18/2017
- Subcontract No. 425562, Form 1952, *Receipt Inspection Plan and Requirements*, DRAFT
- Subcontract No. 425562, *Procurement of 36,000 lbs. of zeolite from KMI Zeolite Inc*, 2/1/2107
- Surveillance No. SR(16)-40.001, *ADPSM Software Quality Management Surveillance*, 4/12/2016
- TA-50 WCRRF Level B Storage Inventory, 2/7/2017
- *WCRRF Master Equipment List*, 11/28/2016
- WCRR-FO-DOP-1403, R0 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*, 1/5/2017
- WCRR-PLAN-1388, R1 w/pen change, *Restart of the Waste Characterization, Reduction, and Repackaging Facility (WCRRF), Jet Docket #NA-00-LA-2016-11, JET 16-126.0, Contractor Readiness Assessment (CRA) Plan of Action (POA),* 2/1/2017
- WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, 1/11/2017
- WCRR-WO-DOP-1363, R0, *WCRRF Scale Verification*, 8/30/2016
- WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, 1/27/2017
- WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, 1/11/2017
- WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, 1/27/2017
- WCRR-WO-DOP-1381, R1, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*, 1/11/2017
- WCRR-WO-DOP-1390, R2, *WCRRF RNS Waste Container Monitoring and Refrigerator Rounds*, 1/25/2017
- WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*, 1/27/2017
- WD/EWMO Management Review Board Meeting (Agenda), 1/26/2017
- WD/EWMO Management Review Board Meeting (Agenda), 2/1/2017
- WD/EWMO MRB Attendance Sheet, 1/26/2017
- WD/EWMO MRB Attendance Sheet, 2/1/2017
- WO #00573789-01, *Re-mount floor plate on sump*, 2/1/2017

Interviews Conducted

- ADEM Associate Director
- ADEM Deputy Associate Director
- ADEM QA Program Manager
- Area G RNS Operations PIC (PIC during WCRRF RNS Waste Container Receipt and Handling evolution at WCRRF)
- Controlled Storage Area Custodian(s)
- EWMO Training Manager
- EWMO Waste Processing Engineer
- Issues Management Coordinators
- QA Representative for WCRRF
- SSWs
- WCRRF CSEs
- WCRRF Glovebox Operators
- WCRRF Operations Manager
- WD Division Lead
- WD-WPE Group Leader
- WD-WT Group Leader

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- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Comprehensive Pre-job brief of WCRR-DOPs-1376, 1380, 1381, and 1396, 1/31/2017
- Demonstration of WCRR-DOP-1380 and post-job brief, 1/31/2017
- Emergency Drill Prep, Drill, Hotwash, and Controller Critique, 2/7/2017
- Emergency Drill Preparation – Controller/evaluator briefing and SEO Observer briefings, 2/6/2017
- Emergency Drill preparation meeting, 2/3/2017
- Emergency Drill, 2/7/2017
- Pre-job and complete operational drills – Processing, 2/3/2017 and 2/8/2017
- Pre-job brief of WCRR-WO-DOP-1378, 1/31/2017
- Pre-job brief, demonstration and post-job brief for WCRR-DOPs-1376 and 1396, 2/1/2017
- Prerequisite demonstration for WCRR-DOP-1380, 1/31/17 and 2/1/2017
- Tabletop review of DOP-WO-DOP-1383, 1/31/2017
- Walkdown of the WCRRF Level B Storage area, 2/6/2017
- Management Review Board meeting on 2/1/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

The WCRRF BIO and TSRs identify the QA program as SMP 5.6.11, Quality Assurance program, which credits the QA program as controlling the integrity and reliability of safety-class/safety-significant SSCs and implementation of other SMPs. Requirements from the contract related to implementation of 10 CFR 830, *Nuclear Safety Management*, DOE O 414.1D, *Quality Assurance*, EM-QA-001, *EM Quality Assurance Program*, and NQA-1-2008/amended 2009, *Nuclear Quality Assurance*, parts I and II, are addressed in EP-DIR-QAP-0001, *LANL Environmental Management Directorate Quality Assurance Program (QAP) Implementation Plan*. The IP describes the various implementing plans and procedures under which WCRRF will be operated, such as SD330, *LANL Quality Assurance Program*, and other LANL-level procedures, such as SD320, *LANL Contractor Assurance System Description Document*, PD328, *LANL Assessment Program*, P1040, *Software Quality Management*, P840-1, *Quality Assurance for Procurement*, and various other procedures identified in the documents reviewed section of this form.

A review of the MSA final report for WCRRF and closure documentation for associated deficiencies demonstrates that the MSA review was sufficiently thorough in the areas of QA and contractor assurance, and that WCRRF has an effective process for identification, disposition, and closure of issues. The CRA team did not duplicate the MSA reviews, but instead reviewed a sample of personnel, activities, and documents covered under the MSA, as well some additional personnel, activities, and documents not covered under the MSA. The targeted prerequisites addressed are as follows:

Roles and responsibilities for WCRRF operations are defined in EP-DIR-AP-10008, *ADEP Roles, Responsibilities, Authorities, and Accountabilities.* Interviews with WCRRF personnel and EWMO QA personnel, and review of organization charts, indicates that an acceptable level of independence exists to assure quality functions are adequately performed. These interviews also indicated that there are sufficient personnel available to support the restart of WCRRF for RNS operations and personnel clearly understand their roles and responsibilities.

The CRA team verified, through document reviews, interviews, and observation of evolutions, that the training and qualification of WCRRF and support personnel is adequate to assure safe startup of RNS waste processing operations. Adequacy of personnel training and qualification is addressed under CRAD TQ1. Observation of WCRRF personnel performing evolutions listed in the evolutions/operations witnessed for this CRAD indicates operations personnel are knowledgeable of the procedures, equipment, and operations. Personnel interviews confirmed that there are adequate QA resources to support restart of RNS waste processing.

Observed evolutions were performed to procedures that were developed and reviewed by qualified environmental, safety, health, and radiological control support SMEs. EM-AP-10001, *Document Control*, and EM-AP-10007, *Technical Procedure Development*, describe the process

for document reviews. WCRRF procedures reviewed were found to contain the appropriate reviewers and approvers. These procedures also define when an immediate procedure change is warranted, and what is considered as a minor change. Several instances were observed during RNS process demonstrations that involved questionable interpretation of steps or alterations to steps that appeared to warrant more formal change control. These are discussed in CRAD OPS2, criterion 3.

Observation of RNS evolutions demonstrated that personnel exhibit adequate ConOps practices and embrace a safety culture, as evidenced by a number of work pauses and stop work events when procedure or process issues arose. The adequacy of procedures and ConOps practices are described in CRAD OPS1.

Interviews and review of open and closed PFITS items associated with the WCRRF operations, as of the date of this review, including closure of the MSA issues, indicated no recurring problems or inadequate implementation of lessons learned that would affect safe restart of RNS waste process operations. This is further discussed in criteria 3 and 4 of this CRAD.

Interview with the QA lead indicates that all of the pre- and post-start findings from the MSA related to QA, any applicable WIPP AIB findings related to QA and contractor assurance, and an assessment of the health of the QA SMP have been completed and there are no open items related to QA and contractor assurance that impact readiness to restart. There is only a single AIB CAP action that has not been completed, which is final training of LANL employees on counterfeit parts identification. Review by the EWMO MRB determined this open item does not impact the safety of RNS processing.

Roles and responsibilities have been adequately defined in implementing procedures and program documents, and personnel interviewed understand these roles and responsibilities. There is documented evidence through the witnessed evolutions and other documents listed in the documents reviewed section of this CRAD that they are being followed. QA personnel have the appropriate training and, where necessary, certifications. All personnel interviewed are acceptably experienced and cognizant of RNS operations and the associated quality and contractor assurance requirements.

This SMP was verified to be adequately implemented for RNS waste processing during the MSA, with one QA-related pre-start finding. The finding was related to lack of calibration/validation for process measurement items/equipment that will be used for volumetric measurements in RNS waste processing. Review of the closure documentation for this pre-start finding, review of the operating procedures, and observation of evolutions during the CRA demonstrated adequate resolution.

The prerequisites for CRs assigned to this functional area as identified in OS-DO-RA-17-001P, *Implementation plan (IP) for the Restart of the Waste Characterization, Reduction, and*

Repackaging Facility (WCRRF) Contractor Readiness Assessment, have been reviewed and determined to be satisfactorily completed.

This criterion was met.

2. *WCRRF operations effectively implement the following LANL QAP requirements to support operations:*
    a. *Personnel demonstrate appropriate knowledge of QAP elements applicable to their function and position, and commensurate with their responsibilities.*

Interviews with operations and support personnel at all levels of the organization indicate that they are sufficiently knowledgeable of the QA requirements and implementing mechanisms for the work they perform, in particular the SMP quality elements that support the safety basis. Review of quality surveillances and observations indicates that QA personnel are sufficiently knowledgeable of the quality requirements to produce critical and thorough reviews of quality-affecting activities.

This criterion was met.

b. *Requirements for the verification of critical, quality-affecting activities have been established and are effectively executed.*

Review of the WCRRF operating procedures and other support procedures, interviews with operations and quality personnel, and observation of RNS demonstrations indicated the procedures contained clear identification and verification of quality-affecting activities, including requirements for completion and verification of records. Observation of operations personnel completing records in support of RNS processing activities demonstrated a sufficient knowledge of the records requirements and competence in performance. Records generated during the RNS evolutions were reviewed and contained the required quality verification information expected for these evolutions. With few exceptions, other records generated for procurement, nonconformance reporting, and inspection were also reviewed and found to be adequate. The exceptions included documentation for closure of a portion of MSA pre-start finding MG1-PRE-1 for replacement of the magnehelic gauges on the WCRRF WCG and the documentation for WO #00573789-01, *Re-mount floor plate on sump*, 2/1/2017. The pre-start finding documentation is described in more detail in criterion 2.i of this CRAD. Further discussion of the issue with calibration of the magnehelic gauges is contained in CRAD MN2, criterion 6, and discussion of the issues with the WO adequacy are contained in CRAD MN1, criterion 2.

Interviews with QA personnel indicates that qualified QA personnel are available and are adequately performing oversight and support functions, such as receipt inspection of materials, supplies, and equipment, surveillances of work activities, review of procedures and other quality-implementing documents, calibration of M&TE, and nondestructive evaluation inspections.

Review of documentation in the evidence files indicated that personnel were knowledgeable of their responsibilities, qualified to perform the assigned tasks, and adequately perform these tasks.

This criterion was met.

c. Personnel understand and demonstrate a commitment to identify and report quality problems and concerns.

Reporting of quality issues is governed by Laboratory procedures P322-4, *Laboratory Performance Feedback and Improvement Process*, and P330-6, *Nonconformance Reporting*. Personnel interviews, document reviews including a sample of NCRs, and walkdown of the WCRRF Level B storage area indicate that personnel understand their role in identifying and reporting quality problems and the requirements for tagging, segregating, and dispositioning identified issues. Interviews and review of the NCR system indicated that WCRRF personnel initiate NCRs as appropriate and follow a culture of proactive reporting, tracking, and resolving issues within the WCRRF, WD, and EWMO.

This criterion was met.

d. The process for delegation of responsibilities has been established and personnel understand their R2A2s and what can and cannot be delegated.

EP-DIR-AP-10008 defines roles and responsibilities for EMWO positions. Interviews of WCRRF and support organization personnel demonstrated they were cognizant of their roles as described in the R2A2s document and as described in various program procedures, such as control of nonconformances and operating procedures. Review of completed work documents, such as operating procedures, NCRs, MLD forms, software quality documentation, etc., indicated personnel executed their respective responsibilities and levels of authority.

This criterion was met.

e. Interfaces between organizations have been defined and formalized.

Review of program plans, programmatic procedures, operating procedures, and interviews with the transportation department, EWMO personnel, and WCRRF personnel indicate that there are clear, defined interfaces between organizations, and that an integrated project team approach to restart has been applied. Interfaces between organizations are defined in program plans and operating procedures, as evidenced through review of EWMO and WCRRF documents. Tabletop review of the RNS drum shipment from Area G, transportation to WCRRF, and receipt at WCRRF appears to be well-planned, and comprehensive procedures are established. Witness of the evolutions identified in the evolutions/operations witnessed section of this CRAD demonstrated the adequacy of the process. It was noted during the tabletop that the

communications and R2A2s for the transportation process underwent a lean six sigma review to streamline those aspects.

This criterion was met.

f. Production supplies and equipment (e.g., empty waste drums, bag-in/bag-out bags) have been procured appropriately, and records demonstrate appropriate pedigree.

Procurement of items is controlled through P840-1 and EP-DIV-AP-20197, *Acceptance Checklist for Procurement of Processing Support Equipment*. The MSA identified one pre-start item related to supplies and materials that are beyond their expiration dates or for which pedigree paperwork was not available. This pre-start was closed through initiation of NCRs, tagging of the materials/equipment, and segregation in the ARTIC Level B storage area. Interviews with WCRRF personnel and walkdown of the WCRRF Level B storage area indicates that the NCR process was properly used to disposition these nonconforming items. Even though many of these NCRs are still open, adequate production supplies and materials are still available to support WCRRF restart, as evidenced by the walkdown of the storage area and discussion with WCRRF personnel. WCRRF personnel are confident that the materials in question will be finally dispositioned as use-as-is.

This criterion was met.

g. Production supplies and equipment (e.g., empty waste drums, bag-in/bag-out bags) are identified and stored in accordance with requirements, and any shelf life requirements have been met.

The Level B storage area inventory and production supply lists were reviewed to identify the production supplies and equipment requiring special storage requirements. A walkdown of the WCRRF Level B storage area verified that closure actions of MSA pre-start finding MG-PRE-3 were complete and correct. All items identified as being beyond shelf life or for which pedigree paperwork was not identified are tagged and segregated in an area under control of the storage area custodian. The materials in this area were verified to be not needed prior to WCRRF startup, through discussion with WCRRF management, as sufficient qualified supplies and materials are available, are properly stored in the Level B area, or WCRRF personnel believe that the final disposition of these items will be use-as-is. A review of the latest storage inventory lists did not identify any additional material concerns beyond those covered by the MSA pre-start finding.

This criterion was met.

h. Facility spare and replacement parts are identified and stored in accordance with requirements, and any shelf life requirements have been met.

A review of the Level B storage area inventory, MEL, and critical spare parts lists identifies the items requiring special storage requirements. As identified in MSA pre-start finding MG-PRE-3, there are two heating, ventilation, and air conditioning motors and a number of glovebox

windows currently under an NCR for lack of available pedigree. These items are segregated in the ARTIC Level B storage area awaiting NCR disposition. The parts in this area were verified to be not needed prior to WCRRF startup through discussion with WCRRF management, as sufficient qualified supplies and materials are available, and are properly stored in the Level B area. An interview with the storage area custodian indicates that the motors are not currently under periodic maintenance plans to ensure they are rotated periodically to prevent bearing damage. Critical spare parts acceptability is further discussed in CRAD MN1, criterion 2.

This criterion was met.

i. M&TE have been identified, calibrated, and controlled in accordance with requirements.

Control of M&TE is governed by Laboratory procedure P330-2, R6, *Control and Calibration of Measuring and Test Equipment (M&TE)*, and EWMO-PLAN-1405, *User Performed Calibration Process Plan*. A review of equipment requiring calibration during the witnessed evolutions and review of the associated calibration records indicates that equipment necessary for safety and quality performance of RNS waste treatment activities is properly calibrated, and its calibration is verified prior to use. There are two calibrated torque wrenches in the ARTIC facility, and the procedure only requires one to be verified as available. Since either wrench could be used to perform waste activities, the procedure should verify that all available equipment is within calibration as a good practice. This is not a quality issue, as the procedures require verification of calibration prior to use of the wrench, so there is no concern that operators would select and use an uncalibrated wrench. It should be noted that the actual equipment used in WCRRF was not reviewed for compliance, as all of the evolutions were performed in ARTIC. However, the performance of the operations personnel and adequacy of the procedures indicates there will be no issues with personnel using uncalibrated or out-of-calibration M&TE. The prerequisites to verify available calibrated instrumentation or other equipment does not verify operability as part of the prerequisites, so there is a potential that the instrument (e.g., infrared thermometer) or equipment (e.g., electric drill) will not work when called upon in the procedure. This is not a safety or quality issue, but would be a good practice to ensure efficient operations.

Review of the QA surveillance of M&TE, SR(17)-013.000, performed in November 2016, and interviews with QA personnel indicate that there were three findings identified related to control of M&TE in WCRRF. These findings included equipment with expired or illegible/missing calibration stickers, WCRRF M&TE not on the process engineering inventory list, and a calibration procedure for the confinement ventilation system instrumentation still in draft. Review of the status of the associated PFITS items indicates that all findings are not yet closed. The open PFITS item from this surveillance is related to labeling of some M&TE using universal product code labels. Based on the closure actions to address tracking of the WCRRF calibrated equipment, current calibration of the equipment and verification of calibration within operating procedures observed during witnessed evolutions, and justification by EWMO that the universal product code stickers are enhancement for tracking of M&TE, the CRA team concurs that this open PFITS item will not impact safe restart of WCRRF RNS operations.

The MSA also identified a pre-start finding related to calibration of installed magnehelic gauges on the WCG (MG2-PRE-1). Review of the closure documentation for MSA pre-start finding MG-PRE-1 identified that the facility chose to replace the gauges with calibrated gauges in lieu of in-place calibration. However, review of the closure documentation also identified problems with the acceptance of the gauge performance. Two of the gauges had as-found readings that did not meet the acceptance criteria, and one of those was marked acceptable. The IWD paperwork required the gauges to be replaced until all were acceptable, which was not demonstrated through the closure documentation. Therefore review of the closure documentation for MG2-PRE-1 indicates that this pre-start finding was improperly closed and that additional actions are needed to close MSA pre-start MG2-PRE-1.

This criterion was met.

j. Nonconformances (Nonconformance Reports) are identified and processed in accordance with requirements.

Nonconformances are controlled by Laboratory procedure P330-6, *Nonconformance Reporting*. Interviews with WCRRF and QA personnel and review of documentation indicates that personnel understand the purpose of the NCR process and when and NCR is required. A sample of NCRs associated with the WCRRF was reviewed to identify whether the NCR process was followed appropriately, whether the current NCR status is correct, and whether any open NCRs impact RNS operations:

- NCR-2017-043, *WCRRF Fridge Temp Modification Installation*, 1/20/2017
- NCR-2016-483, *Wire rope clip spacing does not meet 4" minimum requirement*, 12/19/2016
- NCR-2017-017, *WCRRF Glovebox Window Components without Pedigree in Level B Storage*, 1/10/2017
- NCR-2017-018, *WCRRF Ventilation Fan Motors without Pedigree in Level B Storage*, 1/10/2017
- NCR-2017-026, *WCRRF Bags in Uncontrolled Level B Storage*, 1/17/2017
- NCR-2017-027, *WCRRF HVAC Filters in Uncontrolled Level B Storage*, 1/17/2017
- NCR-2017-028, *WCRRF NFT Filters in Uncontrolled Level B Storage*, 1/17/2017
- NCR-2017-035, *PRDwSF Components in Uncontrolled Level B Storage*, 1/17/2017
- NCR-2017-050, *TA-54-0375 Pressure differential indicator controller outside calibration tolerance*, 1/13/2017

The selected NCRs are all adequately dispositioned based on review of the NCR paperwork and discussion with QA personnel. All of the sampled NCRs are still open, but none currently affect WCRRF restart, with one exception. NCR-2017-043 is related to the installation of bracing on the refrigerator door and was conditionally released through issuance of a standing order that added caution steps for closing the door. The steps called out in the standing order appear to be better suited for insertion in the procedure as caution statements, regardless of the correction of the initial nonconformance by adding the braces as final NCR closure. Although there is room

for improvement in the process, it is judged that the NCR process was adequately followed and objective evidence supports the resolution of the NCRs.

This criterion was met.

k. A compliant, implemented, and effective records management process is in in place that demonstrates that required records are identified, classified, stored appropriately, and retrievable. (DOE O 226.1B, DOE P 450.4)

Proper generation and processing of records is controlled under Laboratory procedure P1020-1, *Laboratory Records Management*, and EWMO procedure EP-AP-10003, *Records Management*. Reviewed WCRRF procedures included proper identification of records generated as part of procedure execution. Interview with the WCATS software owner and the WCATS software engineer indicate that WCATS produces electronic records that meet the records requirements as part of WCATS usage, extending from transfer of RNS drums from Area G through transfer of drums out of WCRRF after processing. These records are used in assuring the treated daughter drums will meet the WIPP waste acceptance criteria. WCATS transactions being executed for RNS demonstrations in ARTIC are currently being performed on a beta version of WCATS. Discussion of the acceptability of beta version usage and the plans for incorporation into the production version of WCATS is included in CRAD WM1, criterion 6.

WCRRF operations personnel were interviewed and demonstrated appropriate understanding of the records generation, control process, and control of records within their purview. Records generated during the RNS and WCATS evolutions were reviewed and found to be acceptable.

This criterion was met.

3. WCRRF operations are supported by an effective issues management process or program in that all WCRRF operations issues identified are tracked; corrective actions are developed and accomplished. (DOE O 414.1D, CFR 830.120)

SD330 Attachment B, *Nuclear and Radiological Activities QA Requirements*, invokes PD322, *Laboratory Performance Feedback and Improvement*, and its daughter procedures such as P322-4, *Laboratory Performance Feedback and Improvement Process*, as the implementing documents for the corrective action, feedback, and improvement aspects of quality. Procedure P328-3, *Management Assessment*, directs the scheduling and performance of formal, comprehensive self-assessments and management assessments; procedure P328-4, *Management Observation and Verification*, addresses lower level assessments of field activities by managers; and procedure P322-4 describes the process for reporting and tracking issues to closure. Independent audits and surveillances and implementation of the nonconformance reporting process are tools to identify issues for entry into the PFITS.

A review of the PFITS printout on 2/7/2017, indicates that both findings and opportunities for improvement from the WCRRF MSA, the WIPP AIB CAP, management assessments, and QA surveillances, as well as other assessment activities, are entered into PFITS, categorized, and

managed to closure in accordance with the Laboratory performance feedback and improvement process. Similar to the good practice initiated in TA-55, the SMP(s) associated with each WCRRF-related issue are included by reference in each applicable PFITS issue description. This allows for binning of issues sorted by SMP for tracking and trending purposes, as well as provide a valuable tool for sharing information with LANL SMP owners about what deficiencies or OFIs are being worked out in the field.

Two MRBs are held per month by WD/EWMO. One of these meetings is for screening new issues and determining the status of issues with target completion dates coming due. Interview with the lead issue coordinator and review of the MRB agendas for 1/26/2017 and 2/1/2017 indicate that rigorous and comprehensive reviews are performed of new and open PFITS items for WD/EWMO. The second monthly meeting, and any special MRB meetings held since the MSA completion, has been used to review closed PFITS items for adequacy and concurrence/rejection. Review of the open PFITS items brought to those meetings further indicates that the open items related to WCRRF are being adequately closed.

MOVs, as required by P328-4, are being performed by EMWO and WCRRF management, as determined through interviews and review of a sample of MOVs performed in the last year. Interview with line managers and review of the MOV program status for the 2016 MOVs indicates that managers from each functional area are engaged in performing MOVs, some more than others. Interviews with managers indicate that some of them participate in cross-functional reviews, which may skew the actual number of observations per manager, as they may not be counted as an MOV since they were on a team of managers. Performance of MOVs includes spending significant time in the field interfacing directly with operations personnel and observing operations evolutions. Items identified in MOVs that cannot be corrected on the spot are entered into PFITS for tracking and closure. MOV records were reviewed and demonstrated implementation of this program by the EWMO managers and FOD. The 2016 MOV status report provided in the evidence file, however, indicates that the level of performance of MOVs did not meet the expectations established in the performance indicator (as noted in CRAD OPS1, criteria 1 and 4).

Based on interviews and review of records associated with restart of WCRRF, a solid understanding of LANL assessment processes (i.e. MSAs, independent assessments, MOVs, QA surveillances, performance feedback from abnormal events, and nonconformance reporting) was demonstrated, although some improvement is needed in MOV performance. Overall, it was determined that facility and program personnel are exercising sound judgment and effectively using approved issues management processes to track and correct identified performance issues.

This criterion was met.

4. *Management has reviewed all open issues related to WCRRF operations and verified that no single open deficiency or group of deficiencies preclude safely starting nuclear operations. (10 CFR 830.120)*

Interviews with the WCRRF management team and EWMO support personnel, including the lead issues management coordinator, and a review of open and closed PFITS issues associated with the WCRRF operations, demonstrate multi-layer processes to ensure that no single open deficiency or group of deficiencies preclude safely restarting WCRRF operations.

Issues identified that are related to the RNS operations are reviewed during MRB activities, as described in the Laboratory performance feedback and improvement process and as verified through review of MRB agendas, listing of PFITS items associated with WCRRF, and observation of one MRB during the CRA. With the few exceptions identified in this CRAD, issues tracked to closure that were reviewed by the CRA team displayed a conscientious effort to close the issues effectively.

After identified issues are resolved by the various action-responsible personnel, the closure packages are reviewed by the appropriate responsible manager to ensure that the actions taken were sufficient, address the issue sufficiently to preclude recurrence, and that the objective evidence presented is complete and adequate. An additional independent review of the closure packages is performed prior to submittal to the MRB. Prior to commencing the CRA for WCRRF restart, all SMP owners were required to review the open and closed findings/issues associated with their SMP and assert, through a signed affidavit and during a series of special SMP MRBs held by ADNHHO, that the open findings and operations associated with WCRRF and prior MSA, WIPP AIB, and other independent assessments have either been sufficiently resolved, or that open issues do not pose a concern that would preclude safely restarting WCRRF RNS operations.

This criterion was met.

5. *Software used within or in support of WCRRF operations has been properly defined and graded and the required level of software QA has been applied to each software application. (DOE O 414.1D, 10 CFR 830.120)*

There are only three software applications that are under the control of WCRRF, as listed in the LANL software inventory list on the LANL intranet; only one of these is considered safety software: WCATS. The categorizations for these pieces of software were performed in accordance with P1040, *Software Management*. P1040, through a graded approach application based on the determined risk level of the software, provides acceptable processes and practices to ensure the software adequately and correctly performs all intended functions consistently. Interviews with the WCATS owner, WCATS software engineer, WCATS software QA specialist, and two of the WCATS training personnel, demonstrated adequate QA controls for the WCATS software application used for Area G and WCRRF operations.

There are two versions of WCATS being used in EWMO: a production version that has been validated and is in use throughout EWMO, and a beta version, which has been altered to address process changes to support RNS drum processing. Interviews with the owner and technical support personnel for WCATS indicate that the changes will be incorporated into the production version following closure of any FRA issues related to process procedures, as WCATS reflects the final approved processing and procedure flows. Discussion on the acceptability of WCATS and its impact on safe restart is included in CRAD WM1, pre-start finding WM1-PRE-1.

Based upon the CRA team's review of the governing procedures and processes and the observed results of the implementation of those procedures and processes, it was determined that the software verification and validation processes are adequately defined and performed for software development and modifications to support WCRRF RNS operations.

This criterion was met.

6. *The level of knowledge of QA personnel concerning their roles and responsibilities for WCRRF operations is adequate. (DOE O 426.2).*

Line operating organization R2A2s are defined in EM-AP-10008, R1. These roles and responsibilities have been recently revised based on FE and MSA results in order to provide additional clarification. Results of interviews demonstrate QA line management acceptance of responsibility for quality oversight and support. Interviews with QA personnel indicate that assigned personnel are knowledgeable of the QA requirements associated with RNS processing and were actively involved with the implementing actions imbedded in operating procedures and supporting activities, such as receipt inspection, surveillances, software QA, and records management. Questioning of the QA personnel on the basis for QA program implementation in WCRRF indicates a high level of competence in their assigned areas, an in-depth understanding of the RNS process, and evidence that they were involved in development of the procedures and walkdown of the facilities.

Current implementation of the QA SMP will support safe restart of RNS operations at WCRRF. Based upon the CRA team's inspection of objective evidence, interviews with responsible personnel, and observation of evolutions, QA procedures have been effectively implemented and the QA program is adequate. WCRRF operations are effectively integrated into the LANL feedback and improvement program, and readiness assessments and QA surveillances are being used as implementation of the management assessment program for WCRRF restart. Software verification and validation processes are adequately understood and implemented for the WCATS program. Procurement processes appear to be adequate based on presented evidence, and the safety-related components have been verified as acceptable through the use of ISI procedures prior to installation for use and/or through routine assessments.

This criterion was met.

CONCLUSION

With the exception of a manageable list of open pre-start issues, all MSA findings and AIB CAP actions that can affect WCRRF RNS restart have been verified as closed based on review of objective evidence, interviews with WCRRF and support personnel, walkdown of facilities, and observation of RNS operational demonstrations. Review of evidence files by the CRA team verified that QA procedures have been effectively implemented, and the EWMO QA program is adequate to support WCRRF RNS operations. WCRRF operations are effectively integrated into the LANL feedback and improvement program, including MSAs that meet Contractor Assurance Program requirements. Software verification and validation processes are adequately understood and implemented, although the beta version functionality of the WCATS has not yet been incorporated into the production version required for actual RNS waste processing. M&TE required for WCRRF restart has been calibrated, and previously identified issues related to M&TE control in WCRRF have been addressed. Based on the interviews, operations demonstrations, and documented evidence, current implementation of the QA SMP will support safe restart of RNS operations at WCRRF.

This objective was met. No findings were identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Mike Montini **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Radiation Protection**	Objective: RP1 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

RP1: Line management has established and implemented a radiological protection (RP) SMP to ensure safe accomplishment of work. The level of knowledge of RP managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (CR1, CR4, CR5, CR6)

CRITERIA

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. RP institutional requirements are flowed into facility and activity operations procedures. Applicable procedures have received review by RP staff. (10 CFR 835)
3. The LANL RPP has been effectively implemented in support of WCRRF operations, including contamination control, ALARA (as low as reasonably achievable) practices, workplace monitoring, worker monitoring, work control, and glovebox safety. (10 CFR 835)
4. RP core programs and services (e.g., internal and external dosimetry, instrumentation, analysis, and radiological engineering) are effectively implemented in support of WCRRF operations and maintenance. (10 CFR 835)
5. Sufficient qualified personnel are available to implement the RPP effectively for applicable emergency response, compliance activities, operations, and maintenance. (10 CFR 835)
6. Adequate facility systems, equipment, and supplies are available and functional to ensure safe facility and activity operations. Radiological instruments in support of operations are appropriate, available, and operable. (10 CFR 835)
7. Management, operations, and RP personnel demonstrate adequate knowledge and proficiency to execute RP requirements based on review of training records, interviews, and observation of performance demonstrations. (DOE O 426.2, 10 CFR 835)
8. RP and operations personnel demonstrate proficiency and adequate response to abnormal/emergency conditions based on observation of performance demonstrations and emergency drills. (10 CFR 835)
9. Issues from previous assessments of the RPP as related to WCRRF operations have been effectively tracked and resolved. (DOE O 226.1B, DOE O 414.1D)

APPROACH

Records Reviewed

- 10 CFR 835, *Occupational Radiation Protection*
- 2017 ALARA Meeting Minutes, EWMO/WD with Attachments WCRRF ALARA Goals PowerPoint Presentation, CY17 ALARA Goal Worksheet-WD, RNS Remediation NAAR, ALARA Meeting Sign Up Sheet
- ADESH-160920-114853, MOV, *NRC – RCRA – Housekeeping*, 9/15/2016
- ADESH-161115-172915, MOV, *Verification of Supplemental Dosimetry Issue Sheet – Implementation*, 11/15/2016
- EP-AP-20047, R1, *WD Glovebox and Glovebox Glove Safety Program*, 1/12/2017
- EWMO-RP-008, R0, *Operational Drill*, 2/7/2016
- P121, R5, *Radiation Protection*, 10/27/2016
- PFITS Actions for RP, 2/7/2017
- Radiation Protection Routine Monitoring Instruction surveys
- Radiation Work Permits RWP-2015-0098, RWP-2016-0237, RWP-2016-0268
- Routine Monitoring WCRRF
- WCRRF ALARA Goals presentation for CY2016
- WCRR-FO-AP-1339, R0, *Radiation Protection Requirements*, 8/5/2016
- WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, performed 11/28/16
- WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*, 1/5/2017
- WCRR-PLAN-1388, R0, *Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF)*, 10/11/2016
- WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, 1/11/2017
- WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, 1/27/2017
- WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, 1/11/2017
- WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, 1/27/2017
- WCRR-WO-DOP-1381, R1, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*, 1/11/2017
- WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*, 1/27/2017

Interviews Conducted

- CSEs
- Deployed Health Physicist
- Engineering Manager
- Health Physics Field Coordinator
- Operations Center Operators
- PrE

- RCTs
- Radiation Protection Team Lead
- WCRRF Operators

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Tabletop: AREAG-WO-DOP-1383, R1, *TA-54 Area-G RNS Waste Container Shipment Preparation*, on 1/31/2017
- Pre-Job briefing: WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, on 1/31/2017
- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, section 4.0, Prerequisite Actions, initiated 1/31/2017. Stop Work initiated on 1/31/2017.
- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, on 2/1/2017
- Demonstration: WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*, on 2/1/2017
- Demonstration: WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, on 2/1/2017
- Demonstration: WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*, on 2/2/2017
- Demonstration: WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, on 2/2/2017
- Demonstration: WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance*, section 5.1, Replace Glovebox Gloves, on 2/3/2017
- Operational Drill: Punctured Glovebox Glove on 2/3/2017
- Emergency Drill, WCRRF, 2/7/2016
- Operational Drill: Punctured Glovebox Glove on 2/8/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

Targeted prerequisites identified in WCRR-PLAN-1388 are fully met for the CRs assigned to this functional area. Evidence was gathered supporting the conclusion that RP procedures and RWPs are effectively implemented in support of WCRRF operations. P121, *Radiation Protection*, provides implementing requirements for the LANL RPP, which is mandated by 10 CFR Part 835, *Occupational Radiation Protection*. WCRR-FO-AP-1339, *Radiation Protection Requirements*, defines the responsibilities, requirements, and processes to control radiological hazards and personnel exposure to radiological hazards at WCRRF. This document also serves as the facility RP requirements required by P121. Lower-tier, facility-specific procedures provide detailed direction on implementation. A sufficient number of personnel and equipment are available to sustain implementation and the level of knowledge of the managers and staff

responsible for administering and implementing the RPP is adequate. The following statement was verified and signed by responsible management:

> Signatures below indicate the review confirmed the SMP-related requirements are implemented at WCRRF and support safe and compliant operations for the-facility and RNS Waste Processing. Where immediate actions are warranted, those actions have been identified and implemented to enable safe and compliant operations for RNS waste processing at WCRRF.

Current implementation of the RPP SMP will support safe restart of RNS operations at WCRRF. An RPP is established to ensure safe accomplishment of work at WCRRF, while protecting the employees, public, and the environment during radiological operations at the facility.

This criterion was met.

2. *RP institutional requirements are flowed into facility and activity operations procedures. Applicable procedures have received review by RP staff. (10 CFR 835)*

P121 provides implementing requirements for the LANL RPP, which is mandated by 10 CFR 835, *Occupational Radiation Protection*. WCRR-FO-AP-1339, *Radiation Protection Requirements*, defines the responsibilities, requirements, and processes to control radiological hazards and personnel exposure to radiological hazards at WCRRF. This document also serves as the facility RP requirements required by P121. Lower-tier, facility-specific procedures then provide detailed direction on implementation. RP personnel were able to explain the flowdown in detail during interviews. RP staff provides input to and reviews work documents for RP concerns relative to WCRRF operations.

This criterion was met.

3. *The LANL RPP has been effectively implemented in support of WCRRF operations, including contamination control, ALARA practices, workplace monitoring, worker monitoring, work control, and glovebox safety. (10 CFR 835)*

Review of documents and discussions with RPP personnel indicate that the ALARA, RWP, radiological survey, workplace monitoring, work control, glovebox safety, and contamination control are implemented and compliant at WCRRF in support of restart. The major elements for conducting surveys, radiological area posting, monitoring personnel and equipment, and other routine RP functions are evident at WCRRF, and are described in the RP requirements document.

RCTs and operators practiced good contamination control. RCTs were vigilant to ensure workers hands were frisked frequently. Frisks were done at proper speed and distance, and would have detected any loose contamination that may have been inadvertently transferred; however, towards the end of the final evolution at the end of the first week of this assessment, RCTs frisking speed began increasing and areas were not completely scanned. This was self-identified by the MOT during the post-job brief. Operators were also vigilant in frisking their hands and forearms each time they removed their hands from the glovebox gloves. During glovebox

operations, a nitrile glove was slightly torn that was noticed by the RCT. The RCT directed the operator to remove the hand carefully from the glovebox. The hand was appropriately surveyed and the nitrile glove was replaced. This was a good catch by the RCT.

RWP briefings performed during the pre-job briefings were detailed and thorough. Personnel were accepting of RCT direction and did not hesitate to ask questions.

A senior RCT was observed multiple times in teaching moments with junior RCTs and operators. This demonstrated program ownership by the RCT.

With the exception of the instances noted below, and the operational drill conducted on 2/3/2017 (discussed in criterion 8 of this functional area), good radiological controls practices were demonstrated by both RCT and operators:

- During the glovebox glove change-out pre-job briefing, RWP-2016-0237, *Treat RNS waste drums*, section 3 was briefed as "no electronic personal dosimeter required." The RWP was never updated nor changed in the field to reflect the change in electronic personal dosimeter requirement.
- During drum receipt evolution, the RCT was observed crossing the contamination area boundary on the counting table at least three times without frisking. The RCT also moved an instrument from the table into a materials cabinet under the table without surveying the instrument first.
- PPE hoods were not taped over respirators, resulting in visible skin around the respirator/hood interface.
- During the performance of step 5.31 of WCRR-WO-DOP-1378, *WCRRF RNS Waste Container Receipt and Handling*, the RCT began a radiation survey at the bottom of the open refrigerator door concurrently with the operator performing the gas free check. This could expose the RCT to off-gasses from the drum. This was recognized during the post-job review, and the project has made plans to address this in the procedure.
- Laundered anti-contamination clothing controlled as potentially radioactive material were used for mock-up activities in the ARTIC facility, which is an uncontrolled area. P121, Attachment A, Part 2, section 1022.3 requires: "Anti-C clothing must not be worn in uncontrolled areas except (1) during emergencies, (2) in designated commingling areas after being surveyed, (3) while proceeding between dress-out areas and work areas before initial entry, or (4) when escorted by an RCT for special work." This was corrected during the course of the review.
- Glovebox sharps are not all labeled with red tape, nor are they stored with the points covered or pointing downward as required by EP-AP-20047, R1, *WD Glovebox and Glovebox Glove Safety Program*, section 4.4, Glovebox and Glove Sharps Management, which contains the following conflicting guidance: "NOTE Red handles on a sharp object or tool does not indicate an approved sharp. Sharps shall have a red marking such as handles wrapped in red tape, handles dipped in red paint, or manufactured red handles."
- Maslin mops used to survey the floor are loaded using the finger to push the maslin into the retaining clips; this results in the finger contacting the foam below the clip. This has been demonstrated in the industry to be a source of internal contamination from contaminated sharp foreign material potentially embedded in the foam.

- Formatting of the RWP could result in controls being missed. A review of RWP 2016-0237, R2, revealed that information running on to the next page is printed at the very top of the page above the first solid line of the page. This could result in information being missed during review of the RWP. This occurred during the pre-job brief for the treatment of RNS waste, when the RCT missed the first line of the RWP.
- During demonstration of WCRR-WO-DOP-1381, R1, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*, steps 5.2.9 to 5.2.22, the operators were in close proximity to the drum for greater than twenty minutes, contrary to ALARA practices. As discussed at the post-job briefing, this may have been caused by effects of simulated radiation fields, numerous people in the area, and compressed ARTIC configuration as compared to WCRRF.
- Expired calibration sticker found on reviewed radiological survey form. Survey form WCRR-17-0149 indicates sample date of 2/6/2017 containing a Ludlum-139 HSE No 10842, with a calibration due date of 1/29/2017.

This criterion was met.

4. *RP core programs and services (e.g., internal and external dosimetry, instrumentation, analysis, and radiological engineering) are effectively implemented in support of WCRRF operations and maintenance. (10 CFR 835)*

Based on results of interviews, documentation review, and field observations, the team concludes that RP core programs and services are being adequately provided to support WCRRF operations and maintenance. There are a sufficient number of calibrated radiation detection instruments to support WCRRF operations/maintenance. External and internal dosimetry programs are implemented and executed as required. Radiological engineering and health physics have been involved in evaluating and optimizing facility systems and controls. The health physics analysis laboratory is available to support special sample analysis, emergency response, and other workplace sample analysis.

This criterion was met.

5. *Sufficient qualified personnel are available to implement the RPP effectively for applicable emergency response, compliance activities, operations, and maintenance. (10 CFR 835)*

Sufficient qualified personnel are available to implement the RPP in support of restart at WCRRF. A “DESHF-EWMS Organization Cost Center” printout (12/6/2016) was provided to the team that shows two team leaders and a health physicist reporting to the group leader. Four health physics field coordinators report to the team leads (the fourth was recently filled and not shown on the printout). Currently, there are eight RCTs assigned full-time to support WCRRF. An additional three RCTs are currently going through training at the White Rock training facility and will soon be available to support WCRRF operations. The plan is to have two shifts of five RCTs and an RCT responsible for routine monitoring instruction completion. The RP organization expressed confidence in its ability to support successful restart of WCRRF operations. However, discussions with the deployed health physicist indicate that she does not

have a formal backup in place to support WCRRF. This could create a situation where health physics support may be unavailable for periods of time if she was out of the area.

This criterion was met.

6. Adequate facility systems, equipment, and supplies are available and functional to ensure safe facility and activity operations. Radiological instruments in support of operations are appropriate, available, and operable. (10 CFR 835)

Discussions with RP staff and RCTs assigned to support WCRRF operations indicate that sufficient handheld radiation/contamination detectors are available to the RCTs to perform routine monitoring instructions and routine job coverage. It was reported that there are nine CAMs in the WCRRF glovebox room. Two personnel contamination monitors were located at the radiological control point exit from the WCRRF glovebox room. Alpha friskers were located on the outside of the gloveboxes to allow operators to frisk their hands for contamination upon removal from the gloveboxes. All instruments observed had current calibration stickers and current source and response check information (green card). RCTs successfully demonstrated response and battery checks, and were able to describe operation of their instruments thoroughly. Response (alarm) checks were performed on detectors periodically by RCTs and operators throughout the course of the evolutions. RP facilities and storage locations within WCRRF are adequate to support facility operation.

This criterion was met.

7. Management, operations, and RP personnel demonstrate adequate knowledge and proficiency to execute RP requirements based on review of training records, interviews, and observation of performance demonstrations. (DOE O 426.2, 10 CFR 835)

RP personnel have an acceptable level of knowledge to implement the RPP effectively at WCRRF. This was demonstrated during interviews and by observations of RP personnel during work. Interviews and discussions targeted RP personnel roles and responsibilities for WCRRF restart and operations. Interview questions involved fundamental discipline knowledge, regulatory and LANL requirements, and their roles in support of WCRRF operations. Individuals responded satisfactorily when asked specific knowledge and operations-related questions. Their level of knowledge is adequate to support WCRRF operations.

This criterion was met.

8. RP and operations personnel demonstrate proficiency and adequate response to abnormal/emergency conditions based on observation of performance demonstrations and emergency drills. (10 CFR 835)

The CRA team witnessed two operational drills (2/3 and 2/8/2017) and one emergency drill (2/7/2017), all involving radiological response. RP performance during the drills showed continuous improvement, starting with a number of concerns with the RP response of the first

drill to a significantly improved strong RP response in the final operational drill. Based on this observed improvement; the quality of the hotwashes, with RP self-identifying issues; interviews with drill players; and the solid response during the final operational drill, the CRA team concluded that this objective is met. Additional detail can be found in CRAD EM1.

This criterion was met.

9. *Issues from previous assessments of the RPP as related to WCRRF operations have been effectively tracked and resolved. (DOE O 226.1B, DOE O 414.1D)*

A report was generated from PFITS showing RPP-related items from the past twelve months. These items are being effectively tracked and closed. The four OFIs generated from the recent MSA have been addressed and are listed in PFITS as closed. Two MOVs were performed by the RP team lead since 9/15/2016, with both closed in the system.

This criterion was met.

CONCLUSION

Current implementation of the RP SMP will support safe restart of WCRRF operations. An RPP is established to ensure safe accomplishment of work at WCRRF, while protecting the employees, public, and the environment during radiological operations at the facility. RP procedures and RWPs are effectively implemented in support of WCRRF. An adequate number of RPP personnel are available to support WCRRF restart activities. Interviews were conducted with several RP personnel and they were all found to be very knowledgeable about their areas of responsibility.

This objective was met. No findings were identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Scott Lonchar **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Safety Basis**	Objective: SB1 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

SB1: Facility safety documentation is in place that describes the safety envelope of the facility. The level of knowledge of safety basis managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (CR1, CR4, CR6, CR13)

CRITERIA

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. The level of knowledge of managers, operations, and operations support personnel regarding the WCRRF operations safety basis is adequate. (DOE O 426.2)
3. The MEL captures safety-class and safety-significant SSCs and criticality safety engineered requirements. (DOE O 433.1B)
4. A BIO and TSRs have been developed by LANL and approved by the NA-LA or the DOE-EM to reflect WCRRF operations (10 CFR 830.200)
5. The BIO and TSRs are consistent with the physical facility configuration including all modifications. The equipment and systems are present as described and credited, and the requirements can be accomplished. (10 CFR 830.202)
6. Requirements, assumptions, commitments, and controls in the WCRRF BIO and TSR have been incorporated into WCRRF operations processes and procedures. (10 CFR 830.201)
7. The LANL change control process requires compliance with the NA-LA approved USQ procedure for changes to the WCRRF operations systems and procedures. The USQ program is effectively implemented for WCRRF operations and USQDs associated with WCRRF operations have been adequately performed. (10 CFR 830.203)
8. The level of knowledge of safety basis and USQ program personnel concerning their roles and responsibilities for WCRRF operations is adequate. (DOE 426.2)
9. Issues from previous assessments of the safety basis and USQ programs related to WCRRF operations have been effectively tracked and resolved. (DOE O 226.1B, DOE O 414.1D)

APPROACH

Records Reviewed

- ABD-WFM-005, R2.1, B*asis for Interim Operation for Waste Characterization, Reduction, and Repackaging Facility (WCRRF),* 12/7/2011
- ABD-WFM-005, R2.1.A, Attachment 1, R1, *WCRRF Support Activities for Treatment of RNS Waste*, 12/14/2016

- ABD-WFM-006, R2.5.1, *Technical Safety Requirements (TSRs) for Waste Characterization, Reduction, and Repackaging Facility (WCRRF),* 12/20/2016
- AP-341-504, R2, *Temporary Modification Control*, 7/31/2013
- AP-341-516, R3, *Operability Determination,* 5/24/2014
- AP-341-517, R1, *Design Change Form,* 5/18/2012
- AP-341-519, R4, *Design Revision Control*, 12/2/2015
- AREAG-WO-DOP-1383, R1, *TA-54 Area G RNS Waste Container Shipment Preparation*, 1/12/2017
- CSE Qualification Package for WCRRF Building TA-50-0069 Structural Integrity CSE, dated 8/31/2016
- CSE Qualification Package for WCRRF Waste Characterization Glovebox Drum Lift Fixture; Building TA-50-0069 FSS CSE, dated 10/6/2016
- EM-AP-10001, R1, *Document Control*, 2/1/2017
- EM-AP-10008, R0, *ADEM Roles, Responsibilities, Authorities, and Accountabilities*, 11/23/2016
- EP-AP-10007, R2, *Technical Procedure Development*, 11/21/2016
- EWMO-AP-20059, R1, *EWMO Watchbill Administration,* 11/18/2016
- EWMO-AP-20193, R0, *EWMO TSR Compliance Tracking,* 12/28/2016
- EWMO-AP-20285, R0, *EWMO TSR-Related Operational Limits Actions Compliance Tracking*
- EWMO-AP-20285, R0, *EWMO TSR-Related Operational Limits Actions Compliance Tracking*, 12/18/2015
- EWMO-DOP-20085, R1, *EWMO Industrial Truck and Equipment Refueling and Recharging*, 11/21/2016
- EWMO-DOP-20086, R0, *EWMO Division Specific Forklift and Drum Handler Equipment Operations,* 11/18/2016
- *IVR OSD 13543017 for WCRRF TSR Revision 2.5.1 Min staffing typo and FE-001 exception*, 1/3/2017
- Memorandum, AD-NHHO-16-190, from Cabbil to Mũnoz, Subject: *Submittal of ABD-WFM-006 Rev. 2.5.1, Waste Characterization, Reduction, and Repackaging Facility (WCRRF) for Approval,* 12/15/2016
- Memorandum, OPS:56ML-66178, from Leback to Cabbil, Subject: *Site Wide Unreviewed Safety Question Process – Approval of SB-112-3-R3, Unreviewed Safety Question Process, R3, with Direction,* 4/22/2016
- Memorandum, OPS:57JO-710844, from Leback to Cabbil, Subject: *Approval of ABD-WFM-006, Rev 2.5.1*, 12/20/2016
- NCR-2017-043, *WCRRF Fridge Temp Modification Installation,* 2/2/2017
- NI-1393, *New Information – Vital Safety System Assessment of Vehicle Barriers*, 10/26/2016
- NI-1594, *Inconsistency Between WCRRF Vehicle Barrier Design and Supporting Calculation,* Not issued
- OS-DO-IVR-16-002R, *Final Report, Implementation Verification Review Report (IVR) Waste Characterization Reduction, and Repacking Facility (WCRRF) Implementation for ABD-WFM-006, Rev 2.4,* 11/7/2016

- P313, R9, *Roles, Responsibilities, Authorities, and Accountability*, 3/4/2015
- P341, R5, *Facility Engineering Processes Manual*,11/7/2014
- PD340, R5, *Conduct of Engineering for Facility Work*, 1/27/2014
- PFITS 2016-2052-2
- PFITS 2016-2545, *Final Report, Implementation Verification Review (IVR) Waste Characterization Reduction, and Repackaging Facility (WCRRF) Implementation for ABD-WFM-005, Rev 2.1.A, Attachment 1 and ABD-WFM-006, Rev 2.4*
- PFITS 2016-2546-1
- PFITS 2016-2547-1
- PFITS 2016-2548-1
- PFITS 2016-2549-1
- PFITS 2017-83-1, *Complete Surveillance and ISIs to transition to Warm Standby*
- PFITS 2017-84-1, *Develop an NCR for the Gypsum board to document that the gypsum meets the requirements of Chapter 4 of the BIO and can be used as is*
- PFITS 2017-85-2, *Replace leg on the WCG*
- PFITS 2017-85-3, *Complete post-maintenance ISI on replaced leg*
- PFITS 2017-85-4, *Complete Closure of Temp Mod -01182*
- SAR-50-0069-00787, *LANL Vital Safety Assessment Report for Confinement Ventilation System at TA-50, Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, 12/23/2 SHR-50-0069-105, *System Health Report WCRRF Vehicle Barriers*, 12/5/2016
- SAR-99-MULT-01281, R0, *Vital Safety Assessment Report for Vehicle Barriers at Area G and WCRRF)*, 9/26/2016
- SBDL-WCRRF-475, R0, *Safety Basis Document List for Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, 12/20/2016
- SBDL-WCRRF-475, R1, *Safety Basis Document List for Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, 1/3/2017
- SBP-112-3, R3.1, *Unreviewed Safety Question (USQ) Process*, 7/15/2016
- SBP-112-4, R5, *USQ Qualified Evaluator (QEV) Qualification Standard*, 11/7/2016
- SBP-112-5-R1.1, *New Information (Initial Confirmatory) Process*, 9/30/2015
- SBP-114-5-R0.1, *Safety Basis Document Generation, Change, or Update*, 9/30/2014
- SER-RNS, R0, *Safety Evaluation Report*, 10/2016
- SHR-50-0069-01179, *System Health Report WCRRF Fire Suppression System (FSS)*, 2/1/2016
- SHR-50-0069-01270, *System Health Report WCRRF Building Structural Integrity*, 8/1/2016
- SHR-50-0069-107, *System Health Report WCRRF Fire Suppression System (FSS)*, 1/25/2017
- SHR-50-0069-109, *System Health Report WCRRF Confinement Ventilation System (CVS)*, 2/3/2017
- SHR-50-0069-110, *System Health Report WCRRF Uninterruptible Power Supply (UPS)*, 1/31/17
- TMC-50-0069-0112, R1, *Installation of Temporary Walk In Refrigerator*, 1/26/2017
- TMC-50-0069-111, R1, *Modifications for Processing of RNS Drums in WCG*, 1/27/2017

- VAR-10075, R0, *PRDwSF Variance for P341 Administrative Procedures*, 11/15/2016
- VAR-2015-062, R0, *Reduction in Requirements for WCRRF Drum Lift, RANT Type Bs, RANT TRU Waste Containers, WCRRF Waste Confinement Glovebox, and WCRRF TRU WASTE Containers Inside and Out*, 8/6/2015
- VAR-2015-062, R1, *Reduction in Requirements for WCRRF Drum Lift, RANT Type Bs, RANT TRU Waste Containers and WCRRF TRU WASTE Containers Inside and Out*, 8/5/2016
- VSS-50-0069-00000, R4, *List of Facility VSSs and CSEs for WCRRF*
- *WCRRF Master Equipment List*, 11/28/2016
- WCRRF-15-211-D, R0, *WCRRF Building TA-50-69 Structural Design Integrity Inspection*, 12/7/2015
- WCRRF-16-292-D, R1, *WCRRF Waste Characterization Glovebox Daughter Drum Operations* (WCRR-WO-DOP-1381, R1), 1/9/2017
- WCRRF-16-331-D, R1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes* (WCRR-FO-DOP-1403, R0 IPC-1), 1/5/2017
- WCRRF-16-411-D, R0, *Modifications for Processing RNS Drums in WCG, TA-50-0069 WCG Water Addition System* (TMC-50-0069-111, WO #565647-03, R0), 12/20/2017
- WCRRF-17-008-D, R0, *WCRRF RNS Waste Container Receipt and Handling* (WCRR-WO-DOP-1378, R2), 1/5/2017
- WCRRF-17-011-D, R0, WCR*RF Waste Characterization Glovebox Parent Drum Operations* (WCRR-WO-DOP-1380, R2), 1/9/2017
- WCRRF-17-053-D, *WCRRF RNS Waste Treatment* (WCRR-WO-DOP-1376, R4), 1/27/2017
- WCRRF-FO-DOP-1193, R0, *WCRRF Waste Characterization Glovebox Annual Drum Lift Surveillance*, 8/29/2016
- WCRRF-FO-DOP-1365, R0, *Waste Characterization Glovebox In-Service Inspection*, 12/15/2016
- WCRRF-FO-DOP-1365, R0, *Waste Characterization Glovebox In-Service Inspection*, completed 1/24/2017
- WCRRF-FO-DOP-1397, R1, *WCRRF Operator Rounds*, 11/28/2016
- WCRRF-FP-DOP-1332, R2, *WCRRF Quarterly Combustible Loading Surveillance*,11/28/2016
- WCRR-FO-AP-1399, R0, *WCRRF Fire Protection Program*, 11/18/2016
- WCRR-FO-DOP-1192, R0, *WCRRF Building TA-50-69 Structural Design Integrity Inspection*, 12/10/2015
- WCRR-FO-DOP-1192, R0, *WCRRF Building TA-50-69 Structural Design Integrity Inspection*, completed 10/26/2016
- WCRR-FO-DOP-1192, R0, *WCRRF Building TA-50-69 Structural Design Integrity Inspection*, completed 2/2/2017
- WCRR-FO-DOP-1318, R0 IPC-1, *WCRRF and Building TA-50-0069 TSR Mode Change*, 12/19/2016
- WCRR-FO-DOP-1338, R1, *WCRRF Fire Patrol/Stationary Fire Watch*, 11/18/2016
- WCRR-FO-DOP-1403, R0 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*, 1/5/2017

- WCRR-SO-1407, R0, *Performance of WCRRF Procedures with Engineering Oversight*, 1/18/2017
- WCRR-VS-DOP-1355, R1 IPC-3, *TA-50-69-Annual Confinement Ventilation System Instrument Calibration Surveillance*, 12/20/2016
- WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, 1/27/2017
- WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, 1/11/2017
- WCRR-WO-DOP-1379, R0, *WCRRF Waste Container Shipment Preparation*, 11/18/2016
- WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, 1/27/2017
- WCRR-WO-DOP-1381, R1, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*, 1/11/2017
- *WCRR-WO-DOP-1390, R1, WCRRF RNS Waste Container Monitoring and Refrigerator Rounds, 11/28/2016*
- WCRR-WO-DOP-1397, R1, *WCRRF Operator Rounds*, 11/28/2016

Interviews Conducted

- EWMO Engineering Manager
- EWMO Operations Support Manager
- EWMO Safety Basis Implementation and Facility Compliance
- Safety Basis Analyst (2)
- Safety Basis Manager
- USQ QEVs (2)
- WCRRF CSEs (5)
- WCRRF Nuclear Operations Team Lead/PIC
- WCRRF Nuclear Operators (2)
- WCRRF Operations Center Operator
- WCRRF PrE
- WCRRF SOM
- WCRRF Waste Operations Team Lead/PIC
- WCRRF Waste Operators (3)
- WD Division Leader

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Pre-Job briefing: WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, on 1/31/2017
- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, section 4.0, Prerequisite Actions, initiated 1/31/17. Stop Work initiated on 1/31/2017

- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, on 2/1/2017
- Demonstration: WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*, on 2/1/2017
- Demonstration: WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, on 2/1/2017
- Demonstration: WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*, on 2/2/2017
- Demonstration: WCRR-FO-DOP-1397, R1, *WCRRF Operator Rounds*, on 2/2/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

Management signatures attesting to the health of the SMPs including the USQ program are included on the *Readiness Review Prerequisite Acceptance Form*.

The BIO (ABD-WFM-005, R2.1.A, *Basis for Interim Operation for Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*), and TSRs have been verified to be approved and implemented. The self-identified pre-start finding from the MSA (discussed in MSA MG1-PRE-4 and documented in PFITS 2016-2545) related to approval and implementation of the BIO, Attachment 1, R1, *WCRRF Support Activities for Treatment of RNS Waste*, resubmittal was closed prior to the start of this CRA. The closure package for this action (PFITS-2017-92 Action 1) was reviewed. It included the IVR packages for WCRRF TSR Rev 2.4, 2.5, and 2.5.1. The CRA team did not identify any issues with the closure.

This criterion was met.

2. *The level of knowledge of managers, operations, and operations support personnel regarding the WCRRF operations safety basis is adequate. (DOE O 426.2)*

Through observation of performance demonstrations and interviews, the CRA team concluded that the level of knowledge of managers, operations, and operations support personnel regarding the WCRRF operations safety basis was adequate. Personnel interviewed to evaluate their level of knowledge of the WCRRF safety basis are listed in the interviews conducted section above. Personnel interviewed indicated they had received safety basis training and exhibited a good level of knowledge of the safety basis and its implementation for their respective positions. During interviews, performance of the rounds, and RNS process performance demonstrations, the operators exhibited a good knowledge level of the safety basis controls behind the procedural steps. Training reports were reviewed to verify operations personnel interviewed had attended TSR training. Additionally the subcurricula for WCRRF nuclear operator and WCRRF glovebox operator were reviewed to verify TSR training was included.

This criterion was met.

3. The MEL captures safety-class and safety-significant SSCs and criticality safety engineered requirements. (DOE O 433.1B)

The WCRRF MEL effectively captures safety-class and safety-significant SSCs and criticality safety engineered requirements. The MEL provided to the CRA team was reviewed. As noted in CRAD ENG1, previous assessments found issues with maintenance of the MEL, and seven of the WCRRF VSSs have an open PFITS item to review and update the MEL. However, the WCRRF MEL does capture safety-class and safety-significant equipment for WCRRF VSSs, with the exception of the PRDwSF, which was exempted from inclusion in the MEL by VAR-10075, *PRDwSF Variance for P341 Administrative Procedures*.

This criterion was met.

4. A BIO and TSRs have been developed by LANL and approved by the NA-LA or DOE-EM to reflect WCRRF operations (10 CFR 830.200)

BIO and TSRs have been developed by LANL to reflect WCRRF operations, and have been approved by NA-LA and DOE-EM. The most recent approval is documented in OPS:57JO-710844, dated 12/20/2016. The SBDL-WCRRF-475, R1, correctly includes BIO and TSR documents developed by LANL for WCRRF waste operations and approved by NA-LA and DOE-EM, which are:

- ABD-WFM-005, R2.1, *Basis for Interim Operation for Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, 12/7/2011
- ABD-WFM-005, R2.1.A, Attachment 1, R1, *WCRRF Support Activities for Treatment of RNS Waste*, 12/14/2016
- ABD-WFM-006, R2.5.1, *Technical Safety Requirements (TSRs) for Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, 12/20/2016
- SA-SBD-452, R1, *Analysis of Remediated Nitrate Salt (RNS) Accidents with Mitigated Consequence Estimate over the EG Based on DOE Standard 3009-2014 Criteria for Area G BIO and WCRRF BIO RNS Attachments*, 10/19/2016

This criterion was met.

5. The BIO and TSRs are consistent with the physical facility configuration including all modifications. The equipment and systems are present as described and credited, and the requirements can be accomplished. (10 CFR 830.202)

Review of the WCRRF BIO and TSRs, interviews, and walkdowns with WCRRF engineering and operations personnel demonstrated the facility descriptions in the BIO are consistent with the physical facility configuration with exceptions as listed below. Interviews and walkdowns demonstrated the CSEs possess adequate knowledge of their system configuration and status.

At the time of the CRA, TMC-50-0069-111, R1, for installation of the water system in the WCG was reviewed; it had been accepted. The MSA identified pre-start finding ENG-PRE-2 regarding verification of building ceiling repair attributes versus the WCRRF BIO chapter 4 description

has been closed (PFITS 2017-84, Action 1). An NCR was issued with use-as-is disposition approved. Additionally, ENG-PRE-3 was identified in the MSA, which is related to temporary modifications TMC-50-0069-112 (*Installation of Temporary Walk In Refrigerator*) and TMC-50-0069-01182 (*TA-50-69 Engineering to Remove Leg of Glovebox*). The WCG leg was reinstalled and TMC-50-0069-01182 was closed (PFITS 2017-85, Actions 2, 3, and 4). TMC-50-0069-0112 was revised (PFITS 2017-85, Action 1); however, due to a nonconforming condition identified, the temp modification and, therefore, the refrigerator is not yet accepted by operations. The refrigerator is not a credited safety system.

The new information process was entered on 1/24/2017 for an issue regarding the vehicle barriers (NI-1594). The issue was identified in a VSSA (SAR-99-MULTI-01281) that was issued in September of 2016. The new information evaluation had not been issued prior to completion of the CRA.

Review of TSR requirements compared to the implementing operating procedures demonstrated that the TSR requirements can be accomplished. A review of the closure package for ENG-PRE-1 from the MSA (PFITS 2017-83 Action 1) confirms that SRs and ISIs have been performed to support going to warm standby and operation modes. It was identified that the surveillance on temperature in the WCG refrigerator had not been performed, but as no RNS waste was in the refrigerator, that surveillance was not required to go to warm standby mode.

This criterion was met.

6. Requirements, assumptions, commitments, and controls in the WCRRF BIO and TSR have been incorporated into WCRRF operations processes and procedures. (10 CFR 830.201)

Controls in the WCRRF BIO and TSR were verified to have been incorporated into WCRRF implementing procedures provided to the CRA team.

The IVR OS-DO-IVR-16-002R, *Final Report, Implementation Verification Review (IVR) Waste Characterization Reduction, and Repackaging Facility (WCRRF) Implementation for ABDWFM-005, Rev 2.1.A, Attachment 1 and ABD-WFM-006, Rev 2.4*, 11/7/2017, was also reviewed during the CRA. The IVR identified six findings, five of which were verified as closed by the MSA team, and the CRA team concurred. The remaining finding was WCRRF FOD-Self-Identified-FND-002, which identified that the scope of the IVR included the verification that the Safety Evaluation Report-defined conditions of approval and directed actions have been implemented but cannot be finalized until the conditions of approval and directed action responses have been approved by NA-LA and DOE-EM. PFITS 2016-2545 was written for this finding. As discussed in criterion 1, the closure package for this action (PFITS-2017-92 Action 1) was reviewed, which included *IVR OSD 13543017 for WCRRF TSR Revision 2.5.1 Min staffing typo and FE-001 exception*, 1/3/2017. No findings were identified in the IVR. The CRA team did not identify any significant issues and concurred with the action closure.

It was noted that the ISI for WCRRF building structural integrity (WCRR-FO-DOP-1192, R0) does not explicitly include floor inspection as part of Attachment 1. Based on interview, the CSE

indicated that the floor does fulfill a safety function for building integrity, and he does inspect it when he performs the ISI. This procedure was used as the post-maintenance acceptance test for repair to floor plate on sump per work package WO #00573789-01, *Re-mount floor plate on sump*.

It was also noted that the ISI for *Waste Characterization Glovebox In-Service Inspection* (WCRRF-FO-DOP-1365) appears to make the inspection of the introduction box seals optional, per CSE direction, and the note added during the ISI performance indicated it was not required per CSE. Discussion with engineering indicated that the requirement to open one introduction box door at a time, to facilitate more complete inspection of the introduction box seals, was added in the last major revision by the CSE, as he wanted the ability to look for degradation of the seals better. However, based on input from RP personnel regarding radiological concerns associated with opening the doors, and the fact that the daily surveillance check of the WCG ensures that the required pressure differentials are met to verify the system's ability to maintain the safety function of confinement, inspection of the available surfaces was deemed acceptable and the requirement to open the doors to perform the inspection was made optional. The inspection of the available surfaces was performed during the performance of the ISI. A clarification to the ISI procedure may be warranted to ensure that it is clear that opening the doors to perform the inspection is optional, not the inspection itself.

Operators displayed a good knowledge of their procedures and TSR requirements during demonstrations and other interactions.

This criterion was met.

7. *The LANL change control process requires compliance with the NA-LA approved USQ procedure for changes to the WCRRF operations systems and procedures. The USQ program is effectively implemented for WCRRF operations and USQDs associated with WCRRF operations have been adequately performed. (10 CFR 830.203)*

The USQ process is implemented by SBP-112-3, R3.1, *Unreviewed Safety Question (USQ) Process*. Revision 3 was approved by NA-LA (OPS:57JO-710844) with directed changes, resulting in Revision 3.1. LANL P341, *Facility Engineering Processes Manual*, requires compliance with LANL PD110, *Safety Basis*, which invokes and applies the USQ process to changes to facility systems and procedures. AP-341-504, R2, *Temporary Modification Control*, AP-341-517, R1, *Design Change Form*, and AP-341-519, R4, *Design Revision Control*, appropriately invoke PD110 and the USQ process. EP-AP-10007, R2, *Technical Procedure Development*, reviewer matrices require that all types of technical procedure documents must receive a safety basis review, and EM-AP-10001, R1, *Document Control*, requires documents to be sent for USQ review.

The USQDs listed in the records reviewed section of this CRAD were reviewed. These included USQDs written for WCRRF procedures implementing controls developed in the WCRRF BIO and TSR documents, temporary modifications, and permanent facility changes. The sample of USQDs reviewed indicates the QEVs have a good understanding of the safety basis, the USQ

process, and facility procedures and systems being evaluated. It was noted that the safety basis group lead had instituted a safety analyst review signature on USQDs associated with this campaign as added assurance for completeness and accuracy. Additionally, the engineering manager instituted a CSE review to ensure integration with engineering and accurate proposed activity descriptions. Overall, the USQDs were well written with appropriate description of proposed activity, references, and thorough answers to the seven USQD questions. One USQ screening, WCRRF-17-068-S, was identified in work package WO #00573789-01 for the re-mount of floor plate(s) on the sump that was missing the preparer signature. The USQ preparer indicated he had resent the signed copy shortly after sending the initial version; the record copy includes the required signature.

One issue with the USQ program implementation was identified. The new information/initial confirmatory process was entered on 1/24/2017 for an issue regarding the vehicle barriers. The issue was identified in a VSSA (SAR-99-MULTI-01281) that was issued in September of 2016. DOE G 424.1-1B, *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements,* is quoted in SBP-112-5-R1.1, *New Information (Initial Confirmatory) Process,* which notes that a short period of time (hours or days but not weeks) is appropriate to investigate conditions with respect to the safety basis adequacy prior to declaring a PISA. This issue did not get formally entered into the new information/initial confirmatory process for approximately four months, although investigation by engineering was ongoing.

Although an issue with delay in entering the new information process was identified, based on reviews and interviews, the USQ program is effectively implemented.

This criterion was met.

8. The level of knowledge of safety basis and USQ program personnel concerning their roles and responsibilities for WCRRF operations is adequate. (DOE 426.2)

Based on interviews conducted with safety analysts and USQ qualified personnel, the level of knowledge of safety basis and USQ personnel regarding their roles and responsibilities is adequate. The USQ QEV qualification standard, which had been recently revised, was reviewed. Interview responses from the safety basis group lead indicated that the revision was part of the continuous improvement effort, and QEV preparer responsibilities had been added. Several safety analysts, the safety basis group lead, and a QEV were interviewed. The CSEs that were USQ qualified were also questioned on their responsibilities and knowledge regarding roles and responsibilities. Personnel were experienced and were familiar with their roles and responsibilities. As discussed in criterion 7, overall, the USQDs were well written.

This criterion was met.

9. Issues from previous assessments of the safety basis and USQ programs related to WCRRF operations have been effectively tracked and resolved. (DOE O 226.1B, DOE O 414.1D)

The safety basis/USQ related items from the FE and the MSA were reviewed. Additionally, previous CRAs and FRAs were reviewed, and open PFITS items for issues related to safety basis/USQ were reviewed for impact on restart of the WCRRF processes. The closure of the MSA pre-start item related to safety basis implementation was reviewed and discussed in criterion 1 of this CRAD. PFITS items that were applicable were reviewed and are listed in the records reviewed section above. As noted in WM1 criterion 6, there is an open post-start PFITS item for Area G to evaluate making WCATS a specific administrative control. Further evaluation of the applicable open issues through document reviews and interviews with engineering personnel indicate that none of the open items impact safe restart of the WCRRF processes.

This criterion was met.

CONCLUSION

The BIO and TSRs have been developed, approved, and implemented. The TSR SMPs, including USQ program, were verified to be implemented. As demonstrated through observations and interviews, the level of knowledge of managers, operations, and support personnel regarding their responsibilities and the safety basis is adequate to support RNS processing. The safety-class/safety-significant SSCs and criticality safety engineered requirements are contained in the MEL, although seven of the VSSs have open PFITS items to review and update the MEL. The BIO and TSRs are consistent with the WCRRF configuration, with minor inconsistencies identified, and the requirements and controls have been implemented into procedures to support RNS processing. The facility has a rigorous implementation verification process. The WCRRF ISIs were verified to be completed. The USQ program is effectively implemented for facility and procedure changes and supports safe RNS processing. Safety basis and USQ personnel are knowledgeable of their roles and responsibilities for RNS processing. Overall, issues from previous assessments of the safety basis and USQ programs related to WCRRF RNS processing have been effectively tracked and resolved.

This objective was met. No findings were identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Diane Cato **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Training & Qualification**	Objective: TQ1 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

TQ1: Line management has established a training and qualification SMP to ensure safe accomplishment of work. The selection, training, and qualification programs for operations and operations support personnel have been established, documented, and effectively implemented. Training and qualification requirements for each position encompass the range of assigned duties and activities. The level of knowledge of training managers and staff is adequate based on review of records, interviews, and observation of training activities. (CR1, CR3, CR4, CR5, CR6, CR9, CR10, CR12)

CRITERIA
Note: Level of knowledge for operators and supervisors will be assessed in the Operations functional area. Level of knowledge for support personnel will be assessed in the appropriate functional areas.

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. LANL has implemented the training and qualification SMP for the positions required to perform and support WCRRF operations. A TPP has been submitted and approved by NA-LA or DOE-EM that includes WCRRF operations and meets the commitments within the approved WCRRF BIO and TSR. (10 CFR 830, FSAR/TSR, DOE O 426.2)
3. Procedural changes have been evaluated by the training department for effects on training program content, as appropriate, and to ensure that any changes to the BIO and TSRs are flowed down accordingly to affected workers. (DOE O 426.2)
4. Personnel performing or supporting the WCRRF operations demonstrate an adequate knowledge of:
    - WCRRF operations equipment,
    - Relevant procedures,
    - Procedural compliance,
    - Response to upset conditions, and
    - Authorization basis requirements applicable to WCRRF operations.

    Personnel knowledge shall be ascertained through review of personnel selection, qualification, and training records, observation of performance, and interviews.
5. WCRRF operations training and qualification records including lesson plans and qualification records are complete, auditable and meet the requirements of the TPP and the LANL training and qualification program. (DOE O 426.2, P781-1)
6. Training documentation provides evidence that the systematic approach to training process was used in the development of training course materials and evaluations. (DOE O 426.2, P781-1)

7. Managers and personnel who perform or support WCRRF operations are currently qualified at a level that supports safe operations or are supervised by personnel who are qualified. (DOE O 422.1, DOE O 426.2)
8. Issues from previous assessments of the training and qualification program as related to WCRRF operations have been effectively tracked and resolved. (DOE O 226.1B, DOE O 414.1D)

APPROACH

Records Reviewed

- *Area G BIO/TSR*, Course 31100, no date provided
- Email, from Christensen to Barbee, Subject: *Grams of Pu 239*, 11/15/2016
- EM-AP-10001, R1, *Document Control*, 2/1/2017
- EWMO-QS-001, R3, *Environmental Waste Facility Operations (EWMO) Operations Manager Qualification Standard*, 9/23/2016
- EWMO-QS-002, RO, *Environmental Waste Facility Operations (EWMO) Shift Operations Manager Qualification Standard*, 6/20/2016
- EWMO-QS-003, R1, *EWMO Nuclear Operator/Operations Center Operator Qualification Standard*, 1/19/2017
- EWMO-QS-004, R1, *EWMO Operations Center Operations Center Shift Operation Supervisor Qualification Standard*, 1/19/2017
- EWMO-QS-004, R1, *EWMO Operations Center Operations Center Shift Operation Supervisor Qualification Standard*, 1/19/2017
- EWMO-TPP-001, *R1, Environmental Waste Management Operations (EWMO) Training Program Plan*, 1/11/2017
- *Fire Suppression System Alignment Checklist*, item #35573, 1/17/2017
- Memorandum, AD-NHHO-TR-16-020, from Barbee to Sonnenberg, Hohs, Wysong, Subject: *Non-FMH Decision at Area G, RANT and WCRRF*, 12/1/2016
- NCS-CSED-16-086, *Criticality Safety Evaluation for the Treatment of Previously Remediated Nitrate Salt-Bearing Waste at the Waste Characterization, Reduction, and Repackaging Facility at TA-50*, 11/9/2016
- NHHO-FORM-022, R2, *NHHO-TR Systematic Approach to Training (SAT) Determination Form*
    - Completed form, WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*
    - Completed form, WCRR-WO-DOP-1389, R1, *WCRRF WCG Bagport/Introductory Port Operations*
- NHHO-PLAN-011, R0, *DOE Order 426.2 Compliance Plan*, 4/5/2016
- OS-DO-RA-17-001P, R1, *Implementation Plan for the restart of the Waste Characterization, Reduction and Repackaging Facility* (WCRRF), 2/6/2017
- SD130, R3, *Nuclear Criticality Safety Program*, 9/24/2015
- UTrain, completion report, *Fire Watch*, 1/31/2017
- UTrain, *Waste Treatment Operations OJT*, item #34734
- UTrain, *Waste Container Handling and Shipment Preparation*, item #34691, 11/21/2016

- UTrain *Waste Disposition Criticality Safety Fundamentals*, item #21287
- *WCRRF BIO/TSR*, Course 41712, 9/2016
- *WCRRF Engineered Safety Features Walk-through: Building TA-50-59 and WCG Fire Suppression System (FSS)*, Course 56458, R2, 10/15/2015
- *WCRRF Engineered Safety Features Walk-through: Building TA-50-69 Structural Integrity*, Course 56458, R2, 10/15/2015
- *WCRRF Engineered Safety Features Walk-through: Confinement Ventilation System (CVS)*, Course 56459, R2, 10/15/2015
- *WCRRF Engineered Safety Features Walk-through: Uninterruptible Power Supply (UPS)*, Course 56455, R2, 10/15/2015
- *WCRRF Engineered Safety Features Walk-through: Vehicle Barriers*, Course 56454, R2, 10/15/2015
- *WCRRF Engineered Safety Features Walk-through: Waste Characterization Glovebox (WCG) Drum Lift*, Course 56453, R2, 10/15/2015
- *WCRRF Engineered Safety Features Walk-through: Waste Characterization Glovebox (WCG)*, Course 56460, R2, 10/15/2015
- WCRR-PLAN-1388, R0, *Restart of the Waste Characterization, Reduction and Repackaging Facility* (WCRRF), 10/11/2016
- WD-QS-001, R1, *WD Waste Operator Qualification Standard*, 1/19/2017
- WD-QS-002, R0, *Waste Disposition Division (WDD) Team Leader Qualification Standard*, 9/27/2016
- WD-QS-003, R0, *WD Waste Process Engineer Qualification Standard*, 10/19/2016
- WD-QS-003, R0, *WD Waste Process Engineer Qualification Standard*, 10/19/2016
- WD-QS-004, R0, *WD Glovebox Operator Qualification Standard*, 12/16/2016
- WD-QS-004, R0, *WD GB Operator Qualification Standard*, 12/16/2016
- WM-QS-003, R0, *LANL Waste Management Coordinator Qualification Standard*, 6/17/2015

Interviews Conducted

- ADEM Associate Director
- ADEM Deputy Associate Director
- Glovebox Operators (4)
- NHHO-TR First Line Manager
- NHHO-TR Group Leader
- Nuclear Operators (4)
- Procedure Writers (2)
- SOM
- Training Coordinator
- Training Specialist
- Waste Operators (4)

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

Two prerequisites related to training and qualifications are found in WCRR-PLAN-1388:
1) "The Worker Qualification and Authorization System has been verified to ensure that there are an adequate number of qualified personnel to perform, support, and manage WCRRF operations. (CR3)"

The following WQAS activities/positions were reviewed.

Position	# Assigned	# Complete	Qualified/Authorized	Incomplete
EWMO SOM WCRRF	5	3	3	2
EWMO Operations Manager WCRRF	3	3	3	0
WD Waste Process Engineer	3	1	1	2
WCRRF Nuc. Operator	6	4	4	2
WCRRF Operations Center Operator	3	1	1	2
WD Division Team Leader	4	3	3	1
WD Waste Operator • Ship/Prep Operator	4	3	3	1
WD Waste Operator • RNS Monitoring	6	5	4	1
WCRRF Glovebox Operators	8	8	8	0
Area G/WCRRF RNS Ship/Prep/Operator	4	3	3	1

As shown in table above, some positions have only one fully qualified and authorized worker available to perform tasks. Having only one qualified worker could have the potential to impact operations. WCRRF management is aware that, once the facility is in operation, they will require additional support, and is currently working on increasing the number of employees in the staffing plan.

2) "Qualification and training records have been evaluated and demonstrate a satisfactory level of knowledge for managers, operators, and support personnel assigned to WCRRF operations (CR3)."

A review of relevant qualification standards demonstrated that each contained the required elements and met the requirements of DOE O 426.2, *Personnel Selection, Training,*

Qualification, and Certification Requirements for DOE Nuclear Facilities. Required elements include:

- Medical examinations,
- Health, safety and environmental protection training prerequisites,
- Institutional training,
- Facility and job specific training,
- Evaluation/examinations,
- Continuing training,
- Period of qualification/loss of qualification, and
- Absence from duties.

Qualification standards and UTrain records for operations personnel were reviewed and found to be adequate. After the completion of the MSA, qualification standards and UTrain structure for all qualified positions were reviewed. A comparison and check of each hardcopy qualification standard against the equivalent UTrain curricula ensured that errors and omissions were identified and corrected. Item numbers were removed from qualification standards and replaced with curricula numbers to eliminate conflict between the hardcopy qualification standard and UTrain curricula. UTrain data for each curricula/position now provides accurate information on operations equipment, procedures, procedural compliance, and applicable authorization basis requirements. MSA identification of unsatisfactory lesson plans and records have been satisfactorily corrected. Based upon document reviews, interviews, and evolutions, working knowledge of managers, operators, and support personnel is adequate.

Operators are required to complete criticality safety fundamentals as part of their initial qualification. However, during interviews with operators they identified criticality safety as a weakness within their respective qualification standard and communicated a need for additional/increased support and guidance. Walkthroughs, discussions, and briefings with operators should be completed with the CSO as part of initial qualification and continuing training. In addition, CSED-specific training has not been provided to operators unique to the RNS waste activities. Additional detail is contained in CRAD CS1 criteria 8 and 9.

This criterion was met.

2. *LANL has implemented the training and qualification SMP for the positions required to perform and support WCRRF operations. A TPP has been submitted and approved by NA-LA or DOE-EM that includes WCRRF operations and meets the commitments within the approved WCRRF BIO and TSR. (10 CFR 830, FSAR/TSR, DOE O 426.2)*

A sustainable training and qualification program has been developed and effectively implemented by NHHO-TR for safe and adequate WCRRF RNS process operations, with the exception of the two following items.

As described in NHHO-PLAN-011, R0, *DOE Order 426.2 Compliance Plan*, a TPP was developed and released for the WCRRF. EWMO-TPP-001, R1, *Environmental Waste Management Operations (EWMO) Training Program Plan*, was initially released in July 2016

and takes the place of a training implementation matrix. A revision to the WCRRF TPP was issued on 1/11/2017 in response to issues arising from the WCRRF MSA.

Training records, WQAS records, qualification standards, and on-the-job training (OJT) material have been reviewed and meet the commitments identified in the WCRRF BIO and TSR. The qualification standards reviewed meet the Conduct of Training manual requirements that operator training must be sufficiently comprehensive to cover areas fundamental to the candidate's assigned tasks, to ensure that workers are capable of safely performing their job duties. Initial operator training includes the following:

- Core subjects (such as ESH, instrumentation and control, basic physics, chemistry, industry operating experience, and major facility systems) relevant to the position and facility,
- OJT and classroom-type training must include but is not limited to, the following:
    - Normal and emergency procedures,
    - Administrative procedures,
    - Radiation control practices,
    - Location and functions of pertinent safety systems and equipment,
    - Procedures for making changes or alterations in operations and operating procedures, and
    - TSRs.

As written, memorandum AD-NHHO-TR-16-020 (Barbee to Sonnenberg), *Non-FMH Decision at Area G, RANT and WCRRF*, 12/1/2016, has an inadequate basis for making the determination that FMH certification is not necessary for the Area G, Radioassay and Nondestructive Testing (RANT), and WCRRF. The justification not to require FMH (leading to the certification of operators per DOE O 426.2) as described, does not include the appropriate technical content and basis for this decision. The current basis is that no single container in the Area G inventory contains greater than a significant quantity of fissile material. While this may be true, for facilities where containers are opened and the potential for comingling exists, a different basis must be made.

WCRRF RNS processing is such a facility. Review of the procedure review checklists performed by the CSA and CSO in regards to WCRR-WO-DOP-1381, *WCRRF Waste Characterization Glovebox Daughter Drum Operations*, (and likely WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*) have acknowledged that greater than a significant quantity of fissile material is being processed. On the criticality review sheet for DOP-1381 on 9/29/2016, the CSA checked "yes" in the box that states, "If the process involves fissile material in excess of the significant quantity thresholds provided in SD130, are the appropriate criticality safety evaluations reference in the procedure?" For this same procedure, the CSO checklist for the procedure has checked "no" in relation to the question, "Does the procedure support fissionable material levels that in aggregate are below the fissile material mass limits listed in SD130?" This leads to the conclusion that criticality is not precluded by nature of process or material form, but instead by a set of established controls, which the operators are expected to perform.

In addition, NCS-MEMO-15-002, *Criticality Accident Alarm System Evaluation for WEMO Facilities*, states, "Note that while the total fissionable inventory involved with these operations substantially exceeds the significant quantity thresholds in Reference 1, the maximum amounts of fissionable material typically present in handled containers are relatively small and are well below a critical mass." For the RNS waste campaign, reference to the CSED for the processing of RNS waste could be used to explain the unlikely nature of comingling to the point that a significant quantity would be found within the WCG within WCRRF during RNS activities, and form the basis for the non-FMH determination leading to qualification only. It is noted that DOE O 426.2 requires FMH to be trained to the principals of criticality safety, which has been made part of the glovebox operator qualification standard; thus, there does not appear to be a gap in the current training, regardless of qualification or certification. Reference to the NCS-MEMO-15-002, which states that the risk of the operation is trivial, could also be used as part of a determination of the need for FMH, as long as it is clear that NCS-MEMO-15-002 adequately covers the full scope of activities being performed within these facilities (inadequate scope within NCS-MEMO-15-002 was identified as OFI CS-F.1e in the FE, August 2016).

Additional justification for significant quantity for UNS drums and other future campaigns must be made. The justification for the current short duration campaign for RNS should be reissued with an adequate technical justification that is consistent with other NCS documentation developed for the process. Without a similar review of the operations at Area G and RANT, and potentially other campaigns at WCRRF, the current memo does not provide an adequate basis for these activities as well.

TQ1-PRE-1: The current documented basis for determination that FMH certification is not required for process operators in EWMO facilities is inadequate.

WCRRF maintenance training is developed but has not been effectively implemented. DOE O 426.2 states that maintenance personnel must be qualified to perform the tasks associated with their specialty, or work under the direct supervision of personnel qualified to perform the activity or task. Included in this category are systems having a direct impact on the safe operation of the facility.

Training material reviewed for seven WCRRF VSSs meet the required elements referenced in DOE O 426.2. However, deficient implementation of training was evident for three of the VSS. It could not be verified that training had been completed on the following systems: CVS, UPS, and WCG. In addition, UTrain curricula has not been established or implemented for any of the WCRRF-owned maintenance worker training. Without established UTrain curricula, effective implementation of training cannot be maintained or sustained on a 24-month basis, as required by DOE O 426.2.

TQ1-PRE-2: WCRRF maintenance training has been developed but has not been effectively implemented. Maintenance personnel lack required training on VSSs.

This criterion was **not** met.

3. Procedural changes have been evaluated by the training department for effects on training program content, as appropriate, and to ensure that any changes to the BIO and TSRs are flowed down accordingly to affected workers. (DOE O 426.2)

A process to evaluate revisions to procedures formally is referenced within EM-AP-10001, R1, *Document Control*. NHHO-TR has implemented NHHO-FORM-002, *NHHO-TR Systematic Approach to Training, (SAT) Determination Form*, as a tool to be utilized across all LANL nuclear facilities. NHHO-FORM-002 is referenced throughout EM-AP-10001 as the form to ensure and document that training staff, partnered with the procedure writer and SME, conduct an analysis to determine the appropriate level of training to implement or develop when revisions to procedures are made or when new procedures are generated. In the case of procedure revision, the extent of revision to the procedure drives the rigor of retraining necessary for the identified audience. Although a member of the training staff does not perform an initial technical review of the procedure, a SAT form is required on every procedure. Before concurring on the SAT form, a member of the training staff conducts a review of the form along with the impacted procedure. Significant changes (new activity, new knowledge, skills or abilities; implementation of new policy, process, intent, scope, purpose, or responsibilities; or change to safety or technical content) require a revision to the existing training material or the development of new formal training when none exists. Less significant revisions (editorial and grammatical content changes) may require some form of delta training, briefing, or required reading, which is also formally documented on the SAT form. Attachment 1 of EM-AP-10001, R1 references the DAR and also requires the completion of a training determination.

Interviews with training staff and NHHO-TR group leader, as well as reviews of SAT documentation, clearly demonstrate an established process for ensuring that procedural changes are evaluated by training staff for impacts on training program content, the BIO and TSRs. WCRRF training material (OJTs, classroom or, briefing material) is not formally controlled or maintained in the electronic data management system, as are other WCRRF procedures. However, WCRRF qualification standards are formally controlled and maintained within the NHHO-TR data repository. This inconsistent approach to document control could cause potential issues in the future. A consistent and formal approach to document control for all WCRRF training material would be beneficial.

The MSA identified that nuclear operators and operations center operators were not receiving awareness-level training related to the TSRs or BIO. These positions were not fully qualified to TSR-implementing procedures related to the tasks required of them in the qualification standard, because the SAT determinations completed on those procedures did not result in the development of new OJT. As a result, EWMO-QS-003, R1, *EWMO Nuclear Operator / Operations Center Operator Qualification Standard*, was revised. An additional category of "WCRRF NO" tasks was added to the task-to-training matrix for those tasks not expected to be performed during RNS treatment. The development of standing order WCRR-SO-1407, *Performance of WCRRF Procedures with Engineering Oversight*, dated 1/18/2017, was subsequently developed and approved, which effectively provides guidance regarding performance of the infrequently performed WCRRF procedures (tasks). Engineering oversight

by a qualified system engineer is required if these infrequently WCRRF procedures are performed. The procedures covered by SO-1407 are listed below:

- WCRR-FO-DOP-1193, *WCRRF WCG Annual Drum Lift Surveillance*
- WCRR-FO-DOP-1364, *WCG Drum Lift Annual Inspection*
- WCRR-FO-DOP-1366, *WCRRF Transportainer Annual Integrity Inspection*
- WCRR-FP-DOP-1328, *WCRRF Fire Suppression System Start Up*
- WCRR-FP-DOP-1329, *Fire Suppression System Shut Down*
- WCRR-FP-DOP-1330, *WCRRF Hydrant Flow Test*
- WCRR-FP-DOP-1331, *WCRRF Main Drain and Full Flow Test*
- WCRR-VS-DOP-1353, *WCRRF HEPA Filter Test*
- WCRR-VS-DOP-1354, *WCRRF Confinement Ventilation System ISI*
- WCRR-VS-DOP-1355, *TA-50-69 Annual CVS Instrument Calibration Surveillance*
- WCRR-VS-DOP-1357, *TA-50-69 Quarterly Building and WCG Static Functional Surveillance*
- WCRR-VS-DOP-1359, *TA-50-69 Ventilation System TE-TI-001 and TE-TI-002 Loop Verification and Interloclc Test*
- WCRR-VS-DOP-1360, *WCRRF Confinement Ventilation System HEPA Filter Replacement*

The standing order requires that infrequently performed tasks, where no formal training currently exists in the qualification standard, would be performed under the direct supervision of a qualified CSE during the RNS treatment campaign. The CRA team agrees that this is an appropriate and risk-informed approach to handling infrequently performed tasks in this case. If development of formal training for these tasks should occur in the future, the associated procedure would then be removed from the standing order via documented revision.

The standing order was distributed to the following personnel/organizations: WD-WT group leader, EWMO operations manager, EWMO FOD, EWMO Deputy FOD, operations support manager, WCRRF SOM(s), WCRRF operations center operator(s), *Timely Order* book and environmental program document control, EWMO safety basis manager, EWMO engineering manager, EWMO ESH manager, and EWMO maintenance manager. The guidance was also found within the content of the qualification standard, in order for trainees to be made aware of it.

Continuing training programs for qualified positions referenced in Attachment 1 of the EWMO TPP were found to be structured commensurate with specific position needs, and administered on a cycle not to exceed two years. Specific continuing training curricula were established in UTrain for each position.

This criterion was met.

4. *Personnel performing or supporting the WCRRF operations demonstrate an adequate knowledge of:*
    - *WCRRF operations equipment,*

- *Relevant procedures,*
- *Procedural compliance,*
- *Response to upset conditions, and*
- *Authorization basis requirements applicable to WCRRF operations.*

Personnel knowledge shall be ascertained through review of personnel selection, qualification, and training records, observation of performance, and interviews.

Qualification standards and UTrain records for operations personnel were reviewed and found to be satisfactory. A comparison and check of each hardcopy qualification standard against the equivalent UTrain curricula was conducted to ensure that errors and omissions were identified and corrected. UTrain data is accurate and provides information on operations equipment, procedures, procedural compliance, and applicable authorization basis requirements for each qualified position.

Responses to questions asked during interviews with waste operators, nuclear operators, operations center operators, and glovebox operators demonstrated an adequate knowledge of operations equipment, procedures, procedural compliance, and applicable authorization basis requirements.

Procedures that are required to support the scope of the CRA for the restart of the WCRRF, as listed in Table 1 above, as well as those procedures that interface with the affected operations and evolutions, are referenced appropriately in each OJT and form the basis of the knowledge questions and performance demonstrations in each OJT.

Each OJT contains the method of accomplishment which includes:

- Perform;
- Simulate; and
- Discuss, the method allowed for contingent responses to off-normal situations.

While simulation or performance of off-normal situations is preferred, a thorough discussion of the situation is acceptable, and meets the requirements of Conduct of Training manual. The use of “Standard” within the OJT designates the document or a referenced procedure that delineates the performance requirements for the listed task. The qualified OJT instructor shall use the listed procedures to guide the training session and form the basis of determining acceptable response during the formal evaluation.

A review of relevant qualification standards demonstrated that each contained the necessary elements and met the requirements of DOE O 426.2. Required elements include:

- Medical examinations,
- Health, safety and environmental protection training prerequisites,
- Institutional training,
- Facility and job specific training,
- Evaluation/examinations,
- Exceptions/extensions
- Continuing training,

- Period of qualification/loss of qualification, and
- Absence from duties.

As stated in the Conduct of Training manual, a responsible line manager is compelled to ensure that workers are trained and qualified on the activity to be performed, as well as on facility-specific access requirements. Documentation of each worker's training and qualification is required to be maintained in UTrain. Responsible line managers or designees are required to verify qualification of a worker before assigning work. The RLM responsible for the work activity must authorize workers using WQAS or equivalent, including workers from other organizations, to perform work activities. This entails determining whether each individual is enrolled in the required training, is up-to-date on the required training, and qualified for the activity to be performed. It was verified that supervisors receive daily UTrain subscription reports which reflect the current state of qualification for each of the positions referenced in the EWMO TPP.

This criterion was met.

5. *WCRRF operations training and qualification records including lesson plans and qualification records are complete, auditable and meet the requirements of the TPP and the LANL training and qualification program. (DOE O 426.2, P781-1)*

UTrain is the system of record for all Laboratory training, qualification, certification, and worker authorization. UTrain is powered by the Plateau Learning Management System. WCRRF qualification standards, OJT material, and UTrain records were reviewed and found to meet all the requirements of the TPP and DOE O 426.2 satisfactorily.

This criterion was met.

6. *Training documentation provides evidence that the systematic approach to training process was used in the development of training course materials and evaluations. (DOE O 426.2, P781-1)*

EWMP-TPP-001 formally documents the Laboratory's implementation of DOE O 426.2 for activities conducted by ADEM with support from EWMO. Specifically, this TPP addresses activities conducted at the Nuclear Environmental Sites, WCRRF, the RANT facility; and TA-54 Area G requirements associated with DOE O 426.2 are considered met when programs and processes are approved, and there is documented objective evidence they are implemented. Training programs are considered implemented upon the first delivery of an approved course to the intended target audience. Workers are considered qualified upon completion of all requirements defined in the applicable qualification standard for the position to which they are assigned. Information and observations from interviews demonstrated that WCRRF personnel share a common passion for and take ownership of programmatic and facility operations. Responses to interview questions demonstrated confidence, knowledge, and professionalism.

Document reviews and interviews performed provided evidence that a systematic approach to training was used for the development of training course materials. Evidence contained within each qualification standard and associated OJT included all required elements of instructional system design, including:

- Analysis,
- Design,
- Development,
- Implementation,
- Evaluation,
- Medical examinations,
- Health, safety and environmental protection training prerequisites,
- Institutional training,
- Facility and job specific training,
- Evaluation/examinations,
- Exceptions/extensions
- Continuing training,
- Period of qualification/loss of qualification, and
- Absence from duties.

Elements such as method of accomplishment, acceptable response to knowledge questions, performance criteria, lessons learned, and a documented process for remediation form the basis of effective OJT that meets the requirements of the Conduct of Training manual. In addition, continuing training programs and associated UTrain curricula were structured commensurate with specific position needs, and meet the requirements of DOE O 426.2.

This criterion was met.

7. *Managers and personnel who perform or support WCRRF operations are currently qualified at a level that supports safe operations or are supervised by personnel who are qualified. (DOE O 422.1, DOE O 426.2)*

A review of WCRRF personnel in WQAS is found in the table below. This table demonstrates the number of workers that are assigned to a qualification standard, the number of workers that are complete on the qualification, as well as those who have been formally authorized to perform the work. The CRA team concluded that some positions contain only one qualified individual. WCRRF management is aware of the need to develop a plan for increasing the numbers of qualified workers. In addition, the qualification program meets the requirements of DOE O 426.2.

Position	# Assigned	# Complete	Qualified/Authorized	Incomplete
EWMO SOM WCRRF	5	3	3	2
EWMO Operations Manager WCRRF	3	3	3	0
WD Waste Process Engineer	3	1	1	2

WCRRF Nuc. Operator	6	4	4	2
WCRRF Operations Center Operator	3	1	1	2
WDD Team Leader	4	3	3	1
WD Waste Operator • Ship/Prep Operator	4	3	3	1
WD Waste Operator • RNS Monitoring	6	5	4	1
WCRRF Glovebox Operators	8	8	8	0
Area G/WCRRF RNS Ship/Prep/Operator	4	3	3	1

For trainees that have not completed qualification, DOE O 426.2 requires:

> The contractor must ensure that personnel who are in the process of completing training on tasks and activities for which they are not fully qualified must work under the direct supervision of someone who is qualified, and must not independently make decisions or take action when that work could affect facility safety. Additionally, contractor management must not place personnel who are in training in such positions. However, they may independently perform specific tasks or job assignments for which they are qualified.

WCRRF qualification standards contain content that meets the requirements of DOE O 426.2. While it is implicitly found within the content of the qualification standards, it cannot be verified, nor is it required to be verified, that workers may not make independent decisions while in training.

Workers who are in training may not make decisions independently or take actions that could affect facility safety. However, candidates in training may independently perform specific tasks or job assignments for which they are qualified. In all cases, candidates performing activities for which they are not yet qualified must be under direct observation and guidance of qualified operator or supervisor who has constant control of the activities being performed.

This criterion was met.

8. *Issues from previous assessments of the training and qualification program as related to WCRRF operations have been effectively tracked and resolved. (DOE O 226.1B, DOE O 414.1D)*

Objective evidence used to close out MSA findings TQ-PRE-1 and TQ-PRE-2 related to nuclear operator/operations center operator, waste operator, and glovebox operator training and qualification requirements was adequate and clearly demonstrated that the corrective actions completed were satisfactory. A summary of the training requirements for the various positions at WCRRF is included below.

Nuclear Operator/Operations Center Operator

Additional training analysis was completed on nuclear operator/operations center operator. Additional tasks were identified and added to the task-to-training matrix. Training required was revised to reflect tasks both on the paper copy of the qualification standard as well in UTrain curricula. An alternative approach for additional tasks for which training did not currently exist was called out in WCRR-SO-1407. This standing order established a process for ensuring that infrequently performed tasks for WCRRF nuclear operators would not be performed unless formal training was developed or engineering oversight used during performance of the task. Prevention from performance of the task is clearly expressed within the qualification standard and assigned as required reading to a wide distribution. During an interview with nuclear operators, they responded correctly when asked about the process/approach for training on unfrequently performed tasks and understood the purpose of the standing order. Required changes were made to UTrain curricula structure, including adding the comprehensive exam as a required item. Facility access requirements and two additional OJTs were added to curricula 35034, *Opening and Closing WCRRF Vehicle Barrier Gate*, and 35573, *WCRRF Fire Suppression System Alignment Checklist*.

Waste Operators

Additional training analysis was completed on the glovebox portion of the waste operator task-to-training matrix. It was determined that the glovebox tasks be decoupled from the waste operator qualification standard. The qualification standard was revised and reissued without the glovebox operator duty areas.

Glovebox Operator

After conducting additional training analysis on the waste operator position, it was decided to develop a standalone qualification standard for glovebox operators. This also included the development of a comprehensive exam for glovebox operators. Curricula for glovebox operators was reviewed and confirmed in UTrain.

A review of the facility position matrix, Attachment 1 of the TPP, accurately reflects the addition of glovebox operator and all other positions for which formal qualification is required per DOE O 426.2. Qualification standards were reviewed and meet the requirements of DOE O 426.2.

This criterion was met.

CONCLUSION

Current implementation of the training and qualification SMP, upon closure of TQ1-PRE-1 and TQ1-PRE-2, will support safe restart of RNS operations at WCRRF. The CRA team interviews and document reviews conducted for all positions, according to the EWMO TPP, confirm that an effective training and qualification program is developed and appropriately implemented at WCRRF, with limited exceptions. Interviews conducted demonstrate that WCRRF personnel

display personal ownership of the established SMPs, including training and qualification. Through interviews and review of training material, procedures, and other relevant documentation, the CRA team determined that the necessary training requirements to support safe work performance are adequately flowed down to the workforce. WCRRF personnel are confident and knowledgeable, and demonstrated this during evolutions and interviews. Supervisors, managers, and workers displayed a strong ownership of training and qualification at WCRRF. WCRRF personnel demonstrated that they understood their function, roles, and responsibilities in accordance with DOE O 426.2 and LANL P781-1, *Conduct of Training*

This objective was met. Two findings were identified.

FINDINGS

Pre-Start
TQ1-PRE-1: The current documented basis for determination that FMH certification is not required for process operators in EWMO facilities is inadequate.

TQ1-PRE-2: WCRRF maintenance training has been developed but has not been effectively implemented. Maintenance personnel lack required training on VSSs.

Post-Start
None

Assessed by:	Ruby Molinar **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

ASSESSMENT FORM (FORM 1)

Functional Area: **Waste Management, Hazard Management, & Environmental Compliance**	Objective: WM1 Date: 2/9/2017	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

WM1: Line management has established an effective management system that ensure environmental protection and compliance requirements are incorporated into all WCRRF operations, activities, and procedures (CR1, CR2, CR3, CR4, CR5, CR9, CR10)

CRITERIA

1. Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)
2. Applicable portions of the LANL HWFP have been effectively amended, approved, and implemented in support of WCRRF operations. (LANL HWFP EPA ID #NM0890010515, Parts 2 and 7; Attachments A, B, C, G.4, G.5, J, and N)
3. Facility and operations procedures have been developed to ensure compliance with environmental permits and LANL waste management requirements. (DOE O 450.1, P409)
4. Assessments of program elements are performed, the results of the assessments are evaluated, and issues are resolved. The assessments confirm the adequacy of the hazardous material and waste management program in support of WCRRF operations.
5. An adequate number of personnel, including RCRA SMEs, deployed environmental professionals, and operations support personnel are assigned and available to support WCRRF operations.
6. The level of knowledge of environmental personnel concerning relevant RCRA requirements associated with their roles and tasks to support compliant WCRRF operations is adequate. Personnel exhibit an awareness of public and environmental protection requirements and, through their actions, demonstrate a high-priority commitment to comply with these requirements. (DOE O 426.2)
7. Issues from previous assessments of the hazardous material and waste management program as related to WCRRF operations are effectively tracked and resolved or on a path to be effectively resolved. (DOE O 226.1B, DOE O 414.1D, AIB CAP [DIR-15-142], Settlement Agreement and Stipulated Final Order HWB-14-20, effective January 22, 2016)
8. Successful completion of enhanced training by workers, demonstrates a commitment to environmental compliance. Revisions to the TPP reflect proactive changes developed in response to the 2014 LANL drum-breach event. (DOE O 426.2, Ch.1, section 4.a and DOE-STD-1070-94)

APPROACH

Records Reviewed

- ABD-WFM-006, R2, *Technical Safety Requirements (TSRs) for Waste Characterization, Reduction, and Repackaging Facility (WCRRF),* 9/23/2016
- *Closure Status Of LANS Corrective Actions WIPP AIB JONs*, 1/23/2017
- DOE 436.1, *Departmental Sustainability*, 5/2/2011
- DOE O 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*, 10/5/2010
- EM2016-5363, *Final Report for the Restart of the Waste Characterization Reduction and Repackaging Facility (WCRRF) Management Self-Assessment (MSA),* 1/6/2017
- EM-AP-10001, R1, *Document Control,* 2/1/2017
- EM-AP-10008, *ADEM Roles, Responsibilities, Authorities, and Accountabilities,* 1/30/2017
- EP-AP-10007, *Technical Procedure Development,*10/21/2016
- EP-CHARTER-10012, R0, *Charter for Waste Processing Integrated Process Control Teams,* 10/1/2015
- EP-CHARTER-10077, R0, *Charter for Waste Processing Change Control Board,* 11/5/2015
- EP-CHARTER-1271, *Integrated Process Control Team Charter for UNS Sampling,* 9/30/2015
- EP-CHARTER-20287, R0, *Charter for the Waste Disposition Division Operating Record Integrated Project Team,* 12/27/2015
- EP-DIV-AP-20089, R0, *LTP TRU Waste Container Management Operations,* 11/18/2016
- EP-DIV-AP-20099, R1, *Waste Processing Plan Requirements,* 10/2/2015
- EP-DIV-RM-AOP-20204, R0, *Waste Container Questionable Integrity,* 9/9/2016
- EP-DOP-20206, R0, *WD-SRS New Type 7A Waste Container Receipt, Control, and Distribution,* 12/22/2015
- EWMO-AP-0112, R0, *EWMO Pre-Job Briefings,* 8/5/2016
- EWMO-AP-20193, R0, *EWMO TSR Compliance Requirements Tracking,* 12/18/2015
- EWMO-AP-20253, R0, *EWMO General Site Hazards and Controls*, 4/29/2015
- EWMO-AP-20284, R0, *EWMO RCRA Permit Operating Record and Compliance Programs,* 3/8/2016
- EWMO-AP-20285, R0, *EWMO TSR-Related Operational Limits Actions Compliance Tracking*, 12/18/2015
- EWMO-CHARTER-20062, R0, *WD and EWMO Management Review Board Charter (MRB Charter),* 8/11/2016
- EWMO-DOP-20215, R1, *EWMO RCRA Inspections and Notifications,* 7/29/2016
- EWMO-PLAN-20250, R0, *EWMO Chemical Management Plan,* 8/6/2015
- HWB-LANL-16-031, *Fee Assessment and Approval Class 1 Modification to the Los Alamos National Laboratory (LANL) Hazardous Waste Permit EPC ID#NM0890010515,* 7/25/2016

- LANL HWFP EPA ID NM0890010515 Attachments A, B, C, G.4, G.5, J, N, Parts 2 and 7
- LA-UR-16-24452, *Class 1 Permit Modification Request for the Addition of Treatment in Containers by Stabilization, Los Alamos National Laboratory*, June 30, 2016
- Memorandum, QPA-DO:16-067, from Spain to Distribution, *Transmittal of the Facility Evaluation (FE) Report of the Environmental and Waste Management Operations (EWMO) and the Associate Directorate for Environmental Management (ADEM) at Area G and the Waste Characterization, Reduction, and Repackaging Facility (WCRRF),* 10/21/2016
- Memorandum, QPA-IQ:14-010, from Diepolder to Valkenburg, Subject: *Transmittal of Surveillance Report for Waste Compliance and Tracking System (WCATS) Implementation at TA-54, Area G, SR(13)-096.000,* 11/12/2013
- P313, *Roles, Responsibilities, Authorities, and Accountability,* 3/4/2015
- P409, R5, *LANL Waste Management,* 7/30/2015
- P930-1, R6, *LANL Waste Acceptance Criteria*,
- *PFITS from FE for ENG, MAINT, SB,* 2/6/2017
- *Readiness Review Prerequisites Acceptance Form*, 1/24/2017
- SRNL-RP-2014-01198, R0, *Waste Isolation Pilot Plant Technical Assessment Team Report,* 10/17/2015
- WC-303, *Waste Campaign 303 - Installation of PRDwSF on RNS Waste Containers at LANL,* 12/8/2016
- WC-304, R1, *Waste Campaign Plan 304 – Treatment of RNS Waste Containers at LANL*, 1/12/2017
- WCRR-PLAN-1387, R1, *WCRRF RNS Waste Operations Startup Plan*, 1/27/2017
- WCRR-PLAN-1388, R0, *Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF), Contractor Readiness Assessment (CRA), Plan of Action (POA),*10/11/2016
- WCRR-RM-AOP-1173, R0, *Loss of Glovebox Integrity,* 10/4/2016
- WCRR-RM-AOP-1392, R1, *WCRRF RNS Waste Container Abnormal Conditions,* 11/28/2016
- WCRR-WO-DOP-1101, R1, *WCRRF WCG Maintenance,* 1/11/2017
- WCRR-WO-DOP-1363, R0, *WCRRF Scale Verification,* 8/30/2016
- WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment,* 1/27/2017
- WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling,* 1/11/2017
- WCRR-WO-DOP-1379, R0, *WCRRF Waste Container Shipment Preparation,* 11/18/2016
- WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF WCG Parent Drum Operations,* 1/27/2017
- WCRR-WO-DOP-1381, R1, *WCRRF WCG Daughter Drum Operations,* 1/11/2017
- WCRR-WO-DOP-1389, R1, *WCRRF WCG Bagport/Introductory Port Operations,* 1/27/2017
- WCRR-WO-DOP-1390, R2, *WCRRF RNS Container Monitoring and Refrigerator Rounds,* 1/25/2017
- WCRR-WO-DOP-1396, R1, *WCRRF WCATS WCG Waste Treatment,* 1/27/2017

- WCRR-WO-DOP-1397, R1, *WCRRF Operator Rounds,* 11/28/2016
- WD-AP-20098, R0, *Waste Container Information Packages*, 11/18/2016
- WD-DOP-20043, R0, *Waste Container Labeling,* 8/23/2016
- WD-PLAN-20280, R0, *LA-CIN01 Management Plan,* 9/23/2015
- WM-QS-003, R0, *LANL Waste Management Coordinator Qualification Standard,* 6/17/2015

Interviews Conducted

- Deployed Environmental Professional (DEP)
- Operations Center Operators (2)
- RCRA Specialist
- Waste Management Coordinator (WMC)
- Waste PrE
- WD-WPE Group Lead
- Waste Storage and Shipping Group Lead
- WCATS SMEs (4)
- WCRRF Nuclear Operators (2)
- WCRRF Operations Manager
- WD-WT Group Leader

Evolutions/Operations Witnessed

- Facility Tour of Area G, ARTIC, and WCRRF, 1/30/2017
- Tabletop: AREAG-WO-DOP-1383, R1, *TA-54 Area-G RNS Waste Container Shipment Preparation*, on 1/31/2017
- Pre-Job briefing: WCRR-WO-DOP-1378, R2, *WCRRF RNS Waste Container Receipt and Handling*, on 1/31/2017
- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, section 4.0, Prerequisite Actions, initiated 1/31/2017. Stop Work initiated on 1/31/2017
- Demonstration: WCRR-WO-DOP-1380, R2 IPC-1, *WCRRF Waste Characterization Glovebox Parent Drum Operations*, on 2/1/2017
- Demonstration: WCRR-WO-DOP-1396, R1, *WCRRF WCATS Operations for RNS Waste Treatment*, on 2/1/2017
- Demonstration: WCRR-WO-DOP-1376, R4, *WCRRF RNS Waste Treatment*, on 2/1/2017
- Demonstration: WCRR-WO-DOP-1378, R2, *RNS Receipt of Shipment at WCRRF*, on 2/2/2017
- Demonstration: WCRR-FO-DOP-1403, R1 IPC-1, *Opening and Closing WCRRF Vehicle Barrier Gate and Wire Ropes*, on 2/2/2017
- Demonstration: WCATS Inter-Facility Transfer, 2/6/2017

DISCUSSION OF RESULTS

1. *Any prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area. (LANL FSD-115-001)*

The CRA team conducted document reviews including reviews of previous assessments, observation of representative WCRRF work evolutions including drills, and interviews of facility and SMP managers, supervisors, operators, and engineers. The *Readiness Review Prerequisites Acceptance Form* dated 1/24/2017 documents the SMP managers' declaration of implementation of the SMPs. The CRA team concluded that managers, operators, and support personnel have sufficient operational knowledge, technical knowledge, and experience to perform their assigned duties in support of WCRRF RNS operations. Evaluation of applicable programmatic descriptions, procedures, and organization charts demonstrated that R2A2s are sufficiently documented to support WCRRF RNS operations. Interviews with operations and support personnel revealed a thorough knowledge and understanding of safety and regulatory requirements. In addition, the interviews also showed a strong level of communication and coordination between groups at WCRRF. Reviews of training and qualification records and observation of facility personnel during evolutions, meetings, and in interviews supported the conclusion that they are knowledgeable of authorization basis requirements and have the necessary technical operational skills to support safe startup of WCRRF RNS operations. The targeted prerequisites identified in WCRR-PLAN-1388 are met for the CRs assigned to this functional area.

This criterion was met.

2. *Applicable portions of the LANL HWFP have been effectively amended, approved, and implemented in support of WCRRF operations. (LANL HWFP EPA ID #NM0890010515, Parts 2 and 7; Attachments A, B, C, G.4, G.5, J, and N)*

Documentation of the HWFP modification by LANL is found in LA-UR-16-24452, *Class 1 Permit Modification Request for the Addition of Treatment in Containers by Stabilization, Los Alamos National Laboratory,* dated June 30, 2016. The modification requested supports treatment and processing the RNS waste in the WCRRF. The New Mexico Environment Department (NMED) approval of the permit modification is documented in HWB-LANL-16-031, *Fee Assessment and Approval Class 1 Modification to the Los Alamos National Laboratory (LANL) Hazardous Waste Permit EPC ID#NM0890010515.* ABD-WFM-006 R2, *Technical Safety Requirements (TSRs) for Waste Characterization, Reduction, and Repackaging Facility (WCRRF),* which incorporated the appropriate controls to support the permit modifications allowing treatment of the RNS waste. These requirements have been flowed down to WCRRF operations planning documents and facility-specific implementing procedures.

This criterion was met.

3. Facility and operations procedures have been developed to ensure compliance with environmental permits and LANL waste management requirements. (DOE O 450.1, P409)

WCRRF operators, supervisors, and support staff are working to procedures that were developed, reviewed, and verified by engaged SMEs via EP-AP-10007, *Technical Procedure Development*. The document history files for facility-level and detailed operating work procedures support and document SME participation and comment disposition. Operations and support personnel detailed their involvement with development and review of procedures to ensure technical accuracy. Procedures for WCRRF operations activities implement the requirements of LANL HWFP EPA ID #NM0890010515, TSRs, and waste management requirements. The procedures were comprehensive and technically correct. However, some issues noted with the procedures are captured in CRAD OPS2 criterion 2.

This criterion was met.

4. Assessments of program elements are performed, the results of the assessments are evaluated, and issues are resolved. The assessments confirm the adequacy of the hazardous material and waste management program in support of WCRRF operations.

WCRRF operations and associated waste management activities are assessed on a periodic basis. The Compliance Technical Assistance Program (CTAP) provides waste management oversight and compliance assurance for waste regulated by LANL's HWFP, as well as state and federal regulations for hazardous/mixed, universal waste, used oil, NM special waste, and Toxic Substances Control Act waste. The CTAP coordinates with waste generator facilities and conducts quarterly assessments of all hazardous and mixed waste, universal waste, used oil, NM special waste, and Toxic Substances Control Act waste storage and treatment sites on a rotating basis (i.e. different facilities each quarter). The CTAP program identifies potential noncompliance with the above waste management requirements and works with generating facilities to address potential issues. LANL's Environmental Protection & Compliance compliance programs group coordinates with the WCRRF WMC and performs a walkdown of the area. Noncompliant conditions identified by the inspector are noted. The conditions are captured in PFITS and corrective actions taken are reported to the CTAP reporting database. The last CTAP assessment of WCRRF was conducted on July 14, 2016. There were no noncompliant conditions identified.

An FE of WCRRF was completed October 6, 2016. A review of FE (16)-004.000, *Environmental and Waste Management Operations (EWMO) and the Associate Directorate for Environmental Management (ADEM) at Area G and the Waste Characterization, Reduction, and Repackaging Facility (WCRRF)*, and PFITS determined that 57 PFITS items were generated as a result of the FE. Of those 57 PFITS items, 21 were pre-start findings. All of those findings have been closed. Additionally, 23 of the 57 non-pre-start items remain open in PFITS, as of 2/6/2017. A review of the PFITS information indicated that adequate information had been provided to verify the closed items had been properly closed.

An MSA was completed January 6, 2017. Reviewing EM2016-5363, *Final Report for the Restart of the Waste Characterization, Reduction and Repackaging Facility (WCRRF) Management Self-Assessment (MSA)* indicated there were eighteen pre-start findings identified (in addition to the four self-identified pre-start findings) in the assessment. A review the evidence file revealed adequate and appropriate documentation to verify that all pre-start findings from the MSA have been closed.

A review of the "WD/EWMO Management Assessment Schedule Update" dated 1/9/2017 showed that three assessments originally scheduled for FY16 have been rescheduled for FY17:

PFITS #	Title/Scope	Original Start/ Finish Date	Extended To
2015-372	*Assessment of Waste Process Engineering/Effectiveness of the process to meet the Accident Investigation Board (AIB) JON14*	8/1/16 10/5/16	5/26/17
2016-286	*Radioactive/Hazardous Material Release Response Assessment*	10/1/16 12/1/16	No date given
2016-287	*Waste Operating Record (WCATS) compliance with RCRA Permit and RCRA, NMED, and DOE waste storage requirements*	11/1/16 1/15/16	8/1/17 9/15/17

Due to startup preparations and a number of other assessments being conducted, these management assessments were not performed. It is expected that all pre-start findings from previous assessments will be addressed prior to startup; therefore, delay of these assessments until after WCRRF RNS processing commences does not represent undue risk to the facility and will serve to field-validate closure of previous findings.

Finally, over a hundred MOVs covering a range of areas were conducted between 7/1/16 and 12/31/16. A review of the observation results indicated that the MOV program is generally healthy (with the exception noted in CRAD OPS1 criteria 1 and 4), with identification of issues being communicated to facility staff immediately, and corrective actions taken at that time the conditions are identified when possible.

This criterion was met.

5. *An adequate number of personnel, including RCRA SMEs, deployed environmental professionals, and operations support personnel are assigned and available to support WCRRF operations.*

WCRRF staff has assigned roles and responsibilities defined in procedures P313, *Roles, Responsibilities, Authorities, and Accountability*, and EM-AP-10008, *ADEM Roles, Responsibilities, Authorities, and Accountabilities.* WD provides full time process engineering support, WD-WT operations support, and waste storage and shipping support to facilitate WCRRF operations. The EWMO organization provides system engineering, ESH, safety basis, emergency response, QA, and operations support. Additionally, ADNHHO/EWMO provides

RCRA permitting and waste characterization and certification support as needed. Interviews with the facility operations manager and the WD division leader indicate that there are sufficient resources for WCRRF operations. If management determines multiple shifts are necessary, additional staffing will be required.

This criterion was met.

6. *The level of knowledge of environmental personnel concerning relevant RCRA requirements associated with their roles and tasks to support compliant WCRRF operations is adequate. Personnel exhibit an awareness of public and environmental protection requirements and, through their actions, demonstrate a high-priority commitment to comply with these requirements. (DOE O 426.2)*

The CRA team evaluated the level of knowledge of the FOD and WD operations staff as well as support personnel. They were questioned about institutional processes and RNS treatment process requirements. Facility operations staff was questioned about safety basis content and alignment with the physical facility and procedures. Additionally, facility operators were asked about RCRA requirements and inspections for WCRRF. There was consistently strong understanding of the application and protection of the safety basis as well as RCRA permit requirements. The WD operations staff was very knowledgeable regarding process requirements and the flowdown to operations procedures. The operators demonstrated their ability to comply with requirements through field demonstrations. They recognized off-normal conditions and paused operations until the conditions were resolved. Based upon the CRA team's document review, interviews, and observation of fieldwork, the CRA team determined WCRRF personnel clearly demonstrated a commitment to worker safety, environmental compliance, and protection of the safety basis. Operations personnel are supported by other professionals assigned to provide assistance and guidance in the areas of waste management, RCRA compliance, and other environmental issues. These environmental professionals support routine operations as well as RNS remediation operations. Interviews with the WMC, RCRA specialist, and DEP indicated a strong understanding of requirements and needs of the WCRRF operation; they expressed a willingness to provide real-time support to ensure success for the RNS treatment campaign. WCRRF operations are also supported by a full-time PrE. Interviews with the PrE and the WD-WPE group lead revealed strong support for planning and evaluation for the RNS treatment process. The WD-WPE group develops a waste processing plan for each campaign. The WD-WPE group leader appoints the integrated process control team, whose primary responsibilities are:

- Defining, establishing, and documenting the technical and regulatory functions and requirements for remediating or treating the waste;
- Assisting in development of, reviewing, and approving the process baseline; and
- Assisting in development of reviewing, and approving the processing procedures.

Membership of the integrated process control team includes PrE (team lead), WD storage, remediation, and shipping group, chemistry, environmental compliance programs, safety basis, system engineering, IH and safety, QA, RP, difficult waste team, and central characterization

program representatives. The integrated process control team developed WC-304, *Waste Campaign Plan 304 – Treatment of RNS Waste Containers at LANL.*

Finally, a team of information technology professionals support the development and configuration control of WCATS, which is used to track waste movement and storage and to ensure facility inventory limits are not exceeded. In total, the WCRRF team demonstrated an appropriate understanding of the requirements, a commitment to comply with the requirements, and ample technical knowledge to ensure safe and compliant RNS operations.

One issue was noted during interviews with the information technology group that supports WCATS development. Currently, a beta version of the WCATS software for RNS processing workflow is being used for training and testing. Changes have been made to the beta version of the software which have not been implemented in the production version of the software. The production version should be brought up to date and implemented for further testing and training to ensure it is working properly in preparation for RNS processing.

WM1-PRE-1: The version of WCATS currently being used is a beta version of the software. The production version must be tested and in use prior to beginning RNS operations.

A second issue surfaced as a result of document reviews and observation of field demonstrations. The WCATS software is used for verification of facility inventory thus verifying TSR requirements. WCATS is considered safety software. A previous FE PFITS item for Area G states that consideration should be given to including WCATS in the TSR as a specific administrative control. At a minimum, a backup method for tracking inventory should be in place in the event WCATS is unavailable.

This criterion was not met.

7. *Issues from previous assessments of the hazardous material and waste management program as related to WCRRF operations are effectively tracked and resolved or on a path to be effectively resolved. (DOE O 226.1B, DOE O 414.1D, AIB CAP [DIR-15-142], Settlement Agreement and Stipulated Final Order HWB-14-20, effective January 22, 2016)*

A review of the "STATUS OF LANS CORRECTIVE ACTIONS WIPP AIB JONs," dated 10/31/2016, revealed a total 58 actions, of which 55 have been completed as determined by the action owner, and validated for closure by the owning organization MRB and the institutional MRB. A total of 44 of the actions have been validated for closure by the DOE-EM Los Alamos field office (EM-LA). Of the remaining fourteen that have not been validated by EM-LA for closure:

- Three have not yet been completed (these are actually DOE actions for approval or concurrence with specific LANL corrective actions);
- The action closure forms and objective evidence for three have completed classification review and were submitted to EM-LA in January 24, 2017.
- Responses to DOE comments with revised OE packages for five closure packages are currently in process. One package was submitted to EM-LA on 1/24/2017, three packages

were submitted to EM-LA on 1/31/2017, and the fifth package is expected to be submitted to EM-LA by 2/15/2017.
- There are three closure packages in DOE review, for which DOE had no comments or the additional information that had been requested has been provided.

The CAP associated with the MSA report issued January 6, 2017, identified 43 pre-start actions. As of 2/8/2017, 42 of the pre-start actions have been closed. The remaining open item is replacement of the sprinkler head in the WCG glovebox prior to beginning operations. This activity is being planned at this time and is scheduled to be completed by 2/10/2017 (see CRAD FP1 for further discussion).

Based on a review of the MSA evidence files and PFITS information, documentation is satisfactory and closure of the items is complete. Therefore, the CRA team concluded that issues are effectively tracked, addressed, and closed with appropriate documentation.

This criterion was met.

8. Successful completion of enhanced training by workers, demonstrates a commitment to environmental compliance. Revisions to the TPP reflect proactive changes developed in response to the 2014 LANL drum-breach event. (DOE O 426.2, Ch.1, section 4.a and DOE-STD-1070-94)

The following PFITS items were generated as a result of the WIPP AIB JONs.

9/10-2 – Evaluate and modify qualification standards, as appropriate, for Waste Management Coordinators (WMCs) and Deployed Environmental Professionals (DEPs). Revise training for WMCs, DEPs, and designated ADEP personnel (e.g. waste operators and process engineers) on RCRA requirements to include a) secondary waste segregation requirements or the need to conduct compatibility evaluations; b) understanding of what constitutes waste processing and treatment; and c) what steps are required to ensure compliance with the HWFP.

9/10-3 – Revise training for WMCs, DEPs, and designated ADEP personnel (e.g. waste operators and process engineers) on RCRA requirements to include a) secondary waste segregation requirements or the need to conduct compatibility evaluations; b) understanding of what constitutes waste processing and treatment; and c) what steps are required to ensure compliance with the HWFP.

9/10-4 – Augment Treatment, Storage, and Disposal Facility (TSDF) inspector training with development of qualifications for RCRA TSDF inspections to include field application of inspection criteria. The objective evidence will be: (1) RCRA TSDF Inspection Record Form OJT Course; and (2) rosters demonstrating completion of required training as determined by the Responsible Line Manager.

The following is the current status found in PFITS:

9/10-2 – The WM-DO has updated and issued the “LANL Waste Management Coordinator Qualification Standard”, WM-QS-003, R0, effective June 17, 2015. The assigned WMCs are implementing the updated training requirements, compliance is on track. The DSESH-DO has updated and issued the "LANL ADESH Deployed Environmental Professional Qualification Standard", ENV-ES-QS-001 R0 effective August 20, 2015. Training requirements are scheduled to be uploaded in UTrain by August 25, 2015. Standard implementation time-frame of 30-days for compliance is targeted. Objective evidence provided herein is the training analysis of qualification standards as appropriate. The provided documents have been highlighted in yellow to represent the changes (see the revision log, and pages 2, 5, and 6 of the WM-QS-003, R0 document and pages 11, 12, and 14 of the EN-ES-QS-001, R0 document). LANL WM-QS-003, R0 is on a 2-year review cycle. LANL ENV-ENV-ES-QS-001, R0, is on a 3-year review cycle. Perform ongoing program monitoring to evaluate effectiveness. Additionally, provided is OIO-15-004, dated 8/27/15. This memorandum references Section 8.1.1 of the ADESH Training Project Plan. The TPP specifies the process for training requirement(s) implementation and worker notification. Training requirements will be implemented via this process and communicated/documented via UTrain.

9/10-3 – 8/25/15--Request for extension from 8/27/15 to 10/22/15 is based primarily on aligning language with ongoing NMED waste compatibility and treatment discussions. The approach taken to address the following action statements: (a) Ensure secondary waste segregation requirements are identified and enable the waste managers to identify when it’s necessary to conduct compatibility evaluations; (b) Ensure waste managers are aware of what constitutes waste processing and treatment; and (c) Ensure waste managers are aware of what steps are required to ensure compliance with the HWFP. The deliverables generated to satisfy the required include the addition of a new training course the “RCRA Refresher for Waste Managers”, Course #28426 added as an assignment for Waste Management Coordinator (WMCs), Deployed Environmental Professionals (DEPs), and designated ADEP personnel (e.g. waste operators and process engineers). Objective evidence includes the following: (1) copies of the training course materials with modifications identified and a highlighted word copy of the web-based [electronic] training for direct responses to required actions [a-c, above]. Highlighted text is provided on pages 1, 3, 5, 10-15, 16-19, 21, and 22-23; and (2) A copy of the exam/quiz question bank with the questions which specifically address the AIB JONs 9/10-3 action statements. Training implementation is detailed in the Memo to File (OIO-15-004, dated 08/27/15) and as noted is documented in UTrain alerts (daily alerts) sent to the members of the target audience. Rosters demonstrating completion of required training, as determined by the Responsible Line Manager, will be submitted by 10/22/15. Current completion status is 83% target audience completion (45 of 54 personnel assigned). This improvement will be sustained as follows: the awareness level training provided in the “RCRA Refresher for Waste Managers” Course #28426 will be included in the Waste Generator Live (Course #23263) and Waste Generator Overview Refresher (Course #21464) updates.

9/10-4 – Developed On-The-Job (OJT) Training module for RCRA inspectors of waste treatment, storage, and disposal facilities (TSDF). 47 staff were assigned the training. Training

began October 8, 2015. Completed training of 80% of assigned staff by mid-December. Training report was tracked. Provided as OE are the following: RCRA TSDF Inspection Record Form OJT Course (OJT Course Number 27745/ADESH-OJT-001, dated October 2015); rosters demonstrating completion of required training (EXCEL spreadsheet) with email confirming 89% of TSDF Inspectors having taken the training. Also provided as support documentation are the: Systematic Approach to Training Checklist (10/8/15) and LANL Training Analysis for Institutional course: Course Title: RCRA TSDF Inspection Record Form OJT Series May 2015. This corrective action will be sustained by assigning the OJT Training module to TSDF staff. Training assignments and completion will be checked during Quarterly RCRA Self-Assessment inspections.

The CRA team verified the JONs are closed in PFITS. Document review by the CRA team showed that WM-QS-003, *LANL Waste Management Coordinator Qualification Standard*, was updated to meet the findings of the WIPP AIB (JON 9/10-2). Course #28426, "RCRA Refresher for Waste Managers" was developed and delivered. Note that Courses #21464 and #28426 were updated with the course material from Course #28426. The WMC and DEP were trained to Course #21464, thus satisfying the AIB findings (JONs 9/10-3). In addition, through document reviews, it was verified that an OJT module for RCRA inspectors was developed. A review of training records indicated that the WCRRF WMC, DEP, and two of three of the WCRRF nuclear operators have received the OJT; this satisfies JONs 9/10-4. The TPP was not revised as a result of the WIPP AIB; however, the TPP is an upper-tier document that describes the SAT. Changes to the TPP to satisfy the findings were not appropriate and the TPP was not changed.

This criterion was met.

CONCLUSION

Current implementation of the Hazardous Material and Waste Management SMP, upon closure of WM1-PRE-1, will support safe restart of RNS operations at WCRRF. The WCRRF facility operations personnel, waste disposition operations personnel, and support personnel have demonstrated sufficient knowledge and ability to commence processing RNS waste safely and compliantly. Procedures implement the requirements of the HWFP and the safety basis and provide adequate technical direction to perform WCRRF RNS processing safely. There is adequate staffing to safely process RNS waste under current conditions. However, expanding operations to additional shifts will require additional operations staff. Line management has set clear expectations and commitment to comply with public and worker safety, health, and environmental protection requirements. WCRRF facility and support personnel have clearly defined R2A2s within the organization. Current implementation of the waste management, hazard management, & environmental compliance SMP will support safe restart of RNS operations at WCRRF.

This objective was met. One finding was identified.

FINDINGS

Pre-Start
WM1-PRE-1: The version of WCATS currently being used is a beta version of the software. The production version must be tested and in use prior to beginning RNS operations.

Post-Start
None

Assessed by:	Nolan Cagle **CRA Team Member**	**Approved by:**	Greg Stephens **CRA Team Leader**

Appendix 2: Review Team Biographies

GREG STEPHENS (TEAM LEAD)

Mr. Stephens has over 30 years of experience in facility and process operations, maintenance, and engineering, in both Department of Energy (DOE)/National Nuclear Security Administration (NNSA) and commercial facilities, including facility and program operations management, engineering program management, process operations optimization, change management, strategic planning, and LEAN manufacturing with Owens-Corning, General Electric Aerospace, and DuPont. He has led and served as a member on numerous independent assessments including Operational Readiness Reviews (ORR), Management Self Assessments, Conduct of Operations assessments, Conduct of Maintenance assessments, Work Control assessments, Safety Conscious Work Environment (SCWE) assessments, accident/event investigations, causal analysis investigations, sustainability assessments, supply chain assessments, effectiveness assessments, ISMS verifications, monitoring and evaluation of shift operations/evolutions/drills, and has provided extensive mentoring of senior management and shift supervisory personnel in the areas of Operations, Engineering, Maintenance, Nuclear Safety, and Security. Currently Mr. Stephens is Vice President, Consulting Solutions with AECOM Nuclear & Environment Technical Services.

In this role, he ensures technical consulting solutions delivery to a wide array of DOE, NNSA, Department of Defense (DOD), Department of Homeland Security (DHS), NASA, UK-NDA, Research University, and commercial entities. He also chairs the URS Global Management & Operations Services Engineering Functional Coordination Team (FACT), providing engineering solution integration for URS projects and operations, and is the Design Authority Chief Engineer for URS-GMOS. He also serves on the Business, Operations & Security Committee for the LLNL/LANS Board of Governors. Prior to joining AECOM, he was the Manager of Engineering Programs – Process and Control Engineering for Savannah River Remediation, LLC, and was Chief Engineer, Tritium Programs for Savannah River Nuclear Solutions, LLC, both at the Savannah River Site. Mr. Stephens holds a Bachelor of Science Degree in Electrical and Computer Engineering from Clemson University.

CHIP LAGDON (SENIOR ADVISOR)

Mr. Lagdon joined AECOM in January 2016 after retiring from the Department of Energy in December 2015. Since joining AECOM, Mr. Lagdon has provided support to the Nevada Test Site, Savannah River Site, and Los Alamos National Lab. He has provided performance assurance support for NSTec and SRR and served as an engineering advisor to a panel convened to look at Waste Management issues at Los Alamos. Previously, at the Department of Energy, Mr. Lagdon was appointed Chief of Nuclear Safety for Energy in January 2006, where he is responsible for nuclear safety of the Office of Environmental Management nuclear facilities until he retired. He also served as the Central Technical Authority for the Office of Environmental Management. He is responsible for a staff of technical experts that oversee all aspects of nuclear safety, provides technical advice to the Under Secretary and Secretary of Energy, the Secretary of Energy, and the Assistant Secretary for Environmental Management. Mr. Lagdon also led

periodic Construction Project Reviews for the Department on EM's major nuclear construction projects to evaluate management systems, technical issues, and project performance. He also served as the Director for the Office of Quality Assurance Programs with responsibility for Department's Implementation Plan for DNFSB Recommendation 2002-1, Software Quality Assurance. In addition, he served as the Deputy Director for Special Projects and Investigations where he was responsible for the Operational Readiness Review program, Criticality Safety, Safety Concerns, and the Accident Investigation Program. Mr. Lagdon conducted several Accident Investigation Training courses as well as serving as Board Chairperson for Type A and Type B Accident Investigations. He was one of the original authors of the Operational Readiness Review Order and has been involved with many operational readiness reviews since joining DOE in 1992.

Prior to joining the Department in the Office of Nuclear Safety in 1992, Mr. Lagdon served as a Reactor Plant Shift Test Engineer at Newport News Shipbuilding & Drydock Company. He was certified as a Shift Test Engineer by Naval Reactors on S6G and A4W reactor plants. He conducted the overhaul of the USS Eisenhower (CVN-69) and the construction of the USS Roosevelt (CVN-72) reactor plants.

Mr. Lagdon also has commercial nuclear power experience having held the position of NRC licensed Senior Reactor Operator at Georgia Power Company's Hatch Nuclear Power Plant where he shut down unit 2 from a world record run for boiling water reactors. He was also designated as Emergency Director and Fire Brigade Commander for the plant. He led the NRC Annual Emergency Response Drill for two consecutive years. His tenure as the Senior Nuclear Licensing Engineer for Florida Power & Light's Turkey Point Nuclear Plant involved project management of the security and emergency diesel upgrades, conducting containment analysis for hydrogen buildup following an accident, performing core reload calculations and preparing the Fire Probabilistic Risk Assessment.

Mr. Lagdon graduated from the U. S. Merchant Marine Academy where he received a Bachelor of Science in Marine Engineering with a Nuclear Engineering minor. He holds a Master's Degree in Engineering Administration from George Washington University and completed the Senior Executive Fellows Program at Harvard University. Mr. Lagdon retired from the US Navy Reserve in 2012 after 30 years of service where he was an Engineering Duty Officer and holds the rank of Captain. His last assignment supported the Future Carrier Program evaluating lifecycle maintenance options based on an integrated product model for the new aircraft carrier. He was involuntary recalled to active duty to support Operation Noble Eagle and Enduring Freedom following September 11, 2001 and staffed the Operations Center and conducted fleet operations support.

NOLAN CAGLE (WASTE MANAGEMENT)

Mr. Cagle has over 30 years of experience in TRU waste management, project management, training, reactor operations, conduct of operations, D&D, and environmental remediation. He provided operations oversight for Readiness Self-Assessment and Operational Readiness Reviews during the startup of the E Area vaults at Savannah River, and was the Regulatory

Compliance Manager for the Nuclear Materials Processing Division there. Mr. Cagle has also led training and operations organizations, including responsibility for the startup and operations of solid and liquid waste management facilities at both Savannah River and Y-12 Waste Treatment Operations. He was responsible for day-to-day operations on the TRU Waste Retrieval Project in Oak Ridge, which removed 204 casks, drums, and oversize items from 22 trenches at the Oak Ridge National Laboratory. In addition, he was the Operations Manager and Technical Lead for the Solid Waste Management Unit #4 at the Paducah Gaseous Diffusion Plant. His experience also includes oversight of the ORNL Hot Cells project, East Tennessee Technology Park D&D of K33, D&D of G2 and H2 facilities at SPRU, and 34 ORNL buildings. Mr. Cagle was a licensed reactor operator at Palo Verde Nuclear Generating Station, completed Naval Nuclear Power School, and has previously been a licensed general contractor. He has participated on and led numerous readiness assessments and reviews.

DIANE M. CATO (SAFETY BASIS, ENGINEERING)

Ms. Cato has 28 years of experience in nuclear facility engineering, operations, and projects at DOE facilities. She is currently the Tank Farms Production Operations Engineering Manager for Washington River Protection Solutions, Tank Farms contractor at the Hanford site. In this role she manages the ~90 person engineering organization that supports the facility operations for the Tank Farms, Evaporator, Analytical Laboratory and the Effluent Treatment Facility, which includes the Cognizant System Engineers and the Shift Technical Engineers. In her previous assignment as Nuclear Safety Manager, her responsibilities include managing the development and maintenance of safety basis documents, and the criticality safety and un-reviewed safety question programs for the Hanford high-level waste storage tanks, evaporator, and laboratory facilities. She was an active member of the AECOM Nuclear Safety functional area team, and the Safety Analysis Working Group of EFCOG. While at the Savannah River Site, Ms. Cato held positions within reactor operations, which included serving as shift manager, and providing on-shift engineering support (Shift Technical Advisor) for reactor restart operations. While in the shift manager role, she had the added responsibility for Safety Basis implementation for the reactor facilities. She held positions within various facility engineering organizations to include Engineering Manager for HB-Line Neptunium line. Additionally, she served as a member of the independent assessment team (Facilities Evaluation Board) that was responsible for assessing facility compliance (engineering and operations) for Savannah River Site nuclear facilities for two years, and served on a contractor Operational Readiness Review team evaluating Engineering and TSR implementation while at the Savannah River Site. In addition to experience at Hanford and Savannah River site, she also worked at Idaho as Engineering Manager for the dry and wet fuel storage facilities.

Ms. Cato holds a BS degree in Nuclear Engineering from the University of Illinois and an MBA from NOVA Southeastern.

ROBERT H. DESCHAMBEAULT, P.E (FIRE PROTECTION)

Mr. Deschambeault has over 24 years of fire protection engineering experience. He has extensive experience from implementing fire protection programs, design and evaluation of fire protection

systems and construction, determining code equivalences utilizing computer based fire models, to fire investigations and cause analysis. He has performed these functions for various occupancies, including industrial, business, and health care. His experience includes consulting and site work for Department of Energy facilities, an authority having jurisdiction at one of the largest bio-medical research facilities in the nation, and as a system designer.

Mr. Deschambeault's project experience includes administration of a site fire protection program, preparation of fire hazards analysis, fire protection assessments, hazard analysis calculations, sprinkler system design and evaluation, life safety reviews, hydraulic analysis, fire alarm design and acceptance testing procedures, specialty suppression system design, computer-based fire modeling and fire investigation.

Mr. Deschambeault has experience as a Cognizant Systems Engineer for fire protection system at Department of Energy facilities. The systems include dry and wet-pipe sprinkler systems and high-pressure water mist systems.

Mr. Deschambeault also has experience in emergency response. He currently holds certifications as a Firefighter 1, Hazardous Material Operations, and in vehicle extraction. He is currently a firefighter with Chaffee County Fire Protection District and previously was a Firefighter II/EMT B with Glen Echo Fire Department in Montgomery County, Maryland.

SCOTT LONCHAR, CHP (RADIATION PROTECTION, ENGINEERING, TRAINING & QUALIFICATION)

Lonchar has over 30 years of experience in Health Physics, Radiological Engineering, Radiological Controls, and Occupational Safety & Health. He is currently Manager of the Criticality Safety, Radiological Engineering, and Risk Analysis groups for URS PS and is responsible for integrating those functions across the organization. Mr. Lonchar has recently served as the Radiation Protection, Occupational Safety & Health, and Training Lead for multiple Contractor Readiness and Management Self Assessments (CRA/MSA) held at LANL, AMWTP, SPRU, and Facility Evaluation Boards at SRS. He is trained on SAF-290 (Readiness Review Member) and SAF-291 (Readiness Review Team Leader). Before that, Mr. Lonchar managed the Accident Analysis, Fire Protection Engineering, and Emergency Planning groups. His previous assignment was as a ConOps mentor to the vice president and site general manager and her direct management staff at Waste Control Specialists. Mr. Lonchar is skilled in leading teams of engineers and scientists in tackling complex tasks and successfully executing projects. Mr. Lonchar holds a BS in Nuclear Science, an MS in Health Physics, and an MBA. Mr. Lonchar is also a Certified Health Physicist (CHP) and NRRPT qualified.

WILLIAM MATHISON (OPERATIONS, MAINTENANCE, ENGINEERING)

Mr. Mathison has over 35 years of experience in support of operations, maintenance, training, procedures, facility modifications, management and project leadership, readiness and periodic assessments, and special projects in technically and physically complex environments. His working experience includes positions of increased responsibility within the military,

government and private sector commercial industry nuclear propulsion and power production, nuclear waste treatment and disposal, and education. His background includes operations, maintenance, training, procedures, project management, and emergency preparedness, with positions in United States Navy (USN), commercial nuclear power, and Department of Energy (DOE) facilities at the Savannah River Site, Richland/Hanford sites, Nevada National Security Site, Waste Isolation Pilot Plant, and DUF6. His experience includes managing groups of varying sizes and multiple disciplines including engineers, operators, maintenance, laboratory, IH, and RCTs, procedure writers, work planners, and trainers to achieve assigned objectives, milestones, and performance initiatives. Mr. Mathison has worked in higher education as an Adjunct Professor providing dynamic nuclear power generation simulator training for Westinghouse and Asea Brown Boveri ABB-Combustion Engineering Primary Plant designs for utility operator pipeline programs. Mr. Mathison has over 20 years of experience as a manager in nuclear industries with diverse experiences in training/education, project management, operations management and assessments, and maintenance and operations procedure development. He holds a Bachelor of Science degree from Southern Connecticut State University.

STEVEN MCNITT (RADIATION PROTECTION, QA, EMERGENCY MANAGEMENT)

Mr. McNitt has nearly 30 years of combined experience in the U.S. Department of Energy Nuclear Complex, the U.K. Nuclear Industry, the U.S. Commercial Nuclear Industry, and the U.S. Nuclear Navy, implementing practical, real-world application of Integrated Safety Management (ISM), Integrated Work Control, and Conduct of Operations principles. He has protracted experience in the areas of Management and Strategic Planning for Radiological and D&D Operations, Readiness Reviews and Assessments, Regulatory Interface, Radiological Safety, ESH, Emergency Preparedness, Safety Basis, Plutonium Processing, D&D, Training & Qualification, and Security.

Mr. McNitt's broad technical expertise is augmented by his experience in effectively planning, coordinating, and interfacing at senior management levels while team building and motivating supervisory and floor-level personnel to achieve extraordinary results. He has led and focused personnel on the importance of teamwork and the practical, real-world application of ISM, Integrated Work Control, and Conduct of Operations principles.

In his most recent roles, Mr. McNitt served as Manager of Environmental Health, Safety, Security, and Quality (EHSSQ) at two Magnox Sites in the U.K., Dungeness A, and Bradwell, where he implemented numerous programmatic improvement initiatives which were recognized as best-in-class and were implemented across all ten Magnox sites. He was recognized by Magnox South (a group of five nuclear sites with 1500 employees), with the "2010 Most Impactful Employee Award" for fostering and enhancing a culture of high standards, transparency, and accountability.

Mr. McNitt is currently the Los Alamos National Laboratory Projects Manager, and Environment, Health and Safety Program Manager for Edgewater Technical Associates, LLC.

RUBY MOLINAR (TRAINING AND QUALIFICATION)

Ms. Molinar has served as a training professional in training and development at LANL for 23 years. She is currently responsible for the management, development, maintenance, and implementation of training and qualification at Weapons Facilities Operations (WFO) an organization supporting both nuclear and non-nuclear facilities and operations within the Weapons Program. WFO provides support to a diverse customer base including High Explosives, Environmental Testing, Explosive Devices, Gas Transfer, Tritium, Dual Axis Accelerator, HE Sciences, Firing Sites, and Detonator Projects. This includes WETF a Hazard Category II Non-Reactor Nuclear Facility, moderate radiological facilities, and low hazard facilities with radiological and explosive operations. As team leader, Ms. Molinar is primarily responsible for ensuring a systematic approach to training is utilized for all training developed and that all instructional material meets or exceeds the requirements found in documents such as DOE O 426.2, 10 CFR 830, DOE 414.b, DOE O 1212 and *Conduct of Training Manual*. Ms. Molinar has extensive experience with design, development, and successful implementation of qualification standards and associated on-the-job training material. She is also responsible for development and revision of all training documents such as the Training Implementation Matrix for WETF, Training Project Plan for High Explosives and Training Project Plan Weapons Facilities. Ms. Molinar has demonstrated success as primary point of contact on DOE training requests, internal/external training audits (such as ORR, CRA, FRA and MSAs, IVR and 1070 evaluations).

MIKE MONTINI (EMERGENCY MANAGEMENT, OPERATIONS, QUALITY ASSURANCE)

Mr. Montini has over thirty-four years of experience as a professional and manager in industrial/occupational safety, Quality Assurance, Integrated Safety Management, Conduct of Operations, startup/restart readiness reviews, facility engineering, project management, operations, maintenance, environmental program development and implementation, facility startup, testing, and commissioning, computer programming, and nuclear and chemical safety documentation development and implementation. He is currently the URS Professional Solutions (PS) ESH&Q Director.

Mr. Montini has extensive experience in programmatic assessments and program implementation in customer pursuit of Integrated Safety Management Verification and OSHA Voluntary Protection Program recognition. He has participated on Independent External Evaluation efforts for Savannah River Remediation in the maintenance and performance assurance Functional Areas, and facilitated several creative problem solving sessions for Savannah River Remediation (SRR) in the nuclear safety documentation and waste removal areas.

He participated on numerous Readiness Reviews for facilities and projects such as the Waste Examination Facility CORR at the Nevada Test Site and six Lab Readiness Assessments at the Los Alamos National Lab, including as the OSH and maintenance program reviewer for the Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility, the Containment Vessel Disposition (CVD) project, and most recently the red team review of the WCRRF Safety Management Programs. He assisted in evaluating the international safety program for Samsung Construction

and Trading, and presented the findings and recommendations to the President of Samsung C&T in Seoul, South Korea. He led the URS Partner, Assess, Innovate, Sustain (PAIS) assessment of the Safety Analysis and Review System program at the DOE National Energy Technology Lab, and led the PAIS Safety Case Team for a similar corporate review of the safety case program at the Sellafield site in the UK, and was the backup for the Occupational Safety and Health PAIS review team lead. He participated as lead or team member for numerous incident reviews, including events at the Separations Process Research Unit D&D project at KAPL and several incidents that occurred at the Sellafield site in the UK.

He was program manager for a series of projects to introduce ISM at Navy, Marine, Air Force, and Defense Commissary Agency facilities in preparation for pursuing OSHA VPP recognition at various facilities. He participated on numerous ISM readiness assessments such as the Washington Closure Hanford ISMS Phase II independent verification, the Nevada Test Site contractor ISM assessment, the SRR ISM re-verification at the Savannah River Site, and the Bechtel Energy Alliance ISM Phase II Contractor ISM assessment at INL, and was the team lead for the corporate ISM verification at the Hanford Waste Treatment Plant Project. He assisted Lockheed Martin in developing and implementing Integrated Safety Management programs at the Y-12 Site, both for nuclear and non-nuclear facilities, including integration if OSH reviews into work planning processes.

He was involved in construction, testing and startup of several major Savannah River Site (SRS) projects (M-area Automated Plating Line, Replacement Tritium Facility, Defense Waste Processing Facility, and In-Tank Precipitation Facility) and restart of the Savannah River Site reactors, in engineering management, safety documentation development, QA management, readiness review and safety management program implementation roles. He developed and implemented conduct of technical programs for the Replacement Tritium Facility and Defense Waste Processing Facility, and managed an operating crew at the SRS Tritium facility. He performed Process Hazard Reviews at operating facilities and established the environmental program in the tritium facilities in the early 1980s. He also managed nuclear safety document efforts for the F and H Area tank farms at the Savannah River Site.

C. ERIC SHOGREN (MANAGEMENT, EMERGENCY MANAGEMENT, OPERATIONS, MAINTENANCE)

Mr. Shogren has 34 years of professional experience in nuclear facility HA/AA, emergency management, licensing support, readiness assessment, fire protection, operations, and maintenance. Mr. Shogren was responsible for the development and implementation planning of the innovative Conduct of Security (ConSec) program at Lawrence Livermore National Laboratory. ConSec is a first of its kind attempt to tailor the high performance enablers for DOE's Conduct of Operations and Configuration Management programs to meet the needs of a Security organization. Mr. Shogren is an AECOM Nuclear & Environment Technical Services NQA-1 qualified auditor and led the LANL Contractor Readiness Assessment (CRA) for WETF (2015). Additionally, Mr. Shogren has supported LANL ORRs, Readiness Assessments and Management Self Assessments for PF-4 IFIT CRA (2015), PF-4 T-Base 2 CRA (2015), WETF CRA (2014), Bolas Grande/CVD CRA (2013), WCRRF & RANT Safety Basis Implementation

Review (2011), WETF Safety Basis IVR (2011), WETF CRA (2010), DAHRT CRA (2009), RH-16 Canister Move MSA (2009), RLWTF CRAs (2009 & 2008), and TA 54 Remote Drum Venting CRA (2008) and a WRPS Emergency Management MSA (2010). Mr. Shogren has also preformed ISMS implementation assessments at Yucca Mountain (2000) and Y-12 (1998). In his 26 years of supporting nuclear Safety Basis documentation at SRS, Mr. Shogren has performed numerous SRS Safety Basis and Nuclear Criticality Safety Management Self Assessments. Additionally, Mr. Shogren has supported Conduct of Operations Assessments at SRS, LANL, and LLNL.

Mr. Shogren was instrumental in the development of the Lawrence Livermore National Laboratory (LLNL) Safety Basis Training program, developing, piloting and instructing many of the courses as well as serving as the LLNL USQ Instructor. Additionally, Mr. Shogren has conducted reviews of weapon system HA Reports drawing on his extensive HA, process safety analysis, and AA capabilities and his military experience with strategic missile systems. Mr. Shogren also led the AECOM N&E Technical Services Emergency Management group for 10 years, developing and directing the development of Emergency Preparedness Hazards Analyses (EPHAs) for SRS and LANL. Prior to SRS, he served as an U.S. Naval Officer where he held positions of responsibility in new construction and operations on board a Trident submarine. As a Qualified Chief Engineering Officer for naval nuclear power plants, he is experienced in all aspects of operations, testing, and maintenance of a naval nuclear power plant. Additionally, Mr. Shogren served a two-year tour as a Navy Training Specialist at the U.S. Navy Submarine School. Mr. Shogren is a Professional Member of the Society of Fire Protection Engineers. Mr. Shogren has maintained his Professional Engineer license in the state of Connecticut for the last twenty-six years.

LEAH J. STANLEY (MAINTENANCE, ENGINEERING)

Ms. Stanley has more than 15 years of experience in the areas of Maintenance, Systems Engineering, Configuration Management (CM), Engineering Programs, and Operations. She was the Maintenance Work Planning and Control Manager, the Manager of the Configuration Management group, and the Engineering Programs Manager at the Tritium Facilities at Savannah River. She has Six Sigma Black Belt training from the American Society for Quality (ASQ) and certifications in Lean Six Sigma, Yellow Belt and Green Belt from Honeywell. She has leadership experience in Human Performance Improvement (HPI), ISMS and Conduct of Operations and Maintenance in DOE nuclear facilities as well as experience in leading Causal Analysis and Mistake Proofing (CAMP) efforts to determine root and contributing causes of events using various Root Cause Analysis (RCA) tools.

During her time as Engineering Programs Manager at the SRS Tritium Facilities, Ms. Stanley worked closely with the Operations organization, including standing SSWs on various Shift Operations. In her most recent assignment at SRS, Ms. Stanley was responsible for the management of over 30 professionals in the Maintenance Organization to impact success in various areas of the Maintenance Excellence Plan including: Maintenance Work Planning, Maintenance Execution, Spare Parts, PeopleSoft procurement program, Chemical and Inventory Control, M&TE, and Continuous Improvement initiatives. As the manager, she utilized Lean Six

Sigma expertise to modify the Work Planning and Control organizational structure to gain improvements in workflow and execution and coordinated efforts between Operations, Engineering, Maintenance, and Support teams to move toward facility focused work groups and a Visual Management workplace. Efforts resulted in improvements in Corrective Maintenance backlog, Deferred Maintenance, Planner Effectiveness, and locked-in work completion percentage.
Prior to joining AECOM, Ms. Stanley led or participated in multiple internal audits and assessments in the areas of Maintenance, Operations, Engineering, and NQA-1 2008/2009 implementation. As a result of the assessments, she influenced many programmatic improvements in those areas. Since joining AECOM, she has participated in reviews such as the Independent Integrated Evaluation (IIE) for Conduct of Maintenance and Work Planning & Control functional areas at SRS and the Contractor Readiness Reviews (CRA) at Los Alamos National Laboratory (LANL) for the Muffle Furnace, Plutonium Casting and ARIES (FCA) Operations, and Plutonium Pyrochemical Operations (PPO). Ms. Stanley holds a BS in Mathematics from Lander University and a BS in Mechanical Engineering from Clemson University.

E. FITZ TRUMBLE (CRITICALITY SAFETY, SAFETY BASIS)

Mr. Trumble provides strategic and programmatic leadership, innovation and business development resulting in enhanced growth and profitability of the organization. He has been responsible for profit/loss, resource management/allocation, customer interface, and regulatory interaction activities for a large, diverse group of engineers supporting criticality safety, accident analysis, risk technology, fire analysis, emergency management/preparedness, and nuclear safety documentation. Mr. Trumble has thirty years of experience in the performance of applied analysis and management in the fields of safety analysis, criticality safety, reactor physics, and health physics in both the commercial and U.S. Department of Energy (DOE) sectors.

Mr. Trumble has developed and led successful teams in a variety of technical areas. Mr. Trumble has migrated DOE safety practices outside that industry, leading to support to the National Institute of Occupational Health and Safety (NIOSH) in safety/security culture change research in the life sciences. He has served as Project Manager for the Arctic Military Environmental Cooperation (AMEC) working with the FSSR and Norway in the development of innovative solutions to the dismantlement of Soviet nuclear submarines above the Arctic Circle.

Mr. Trumble has led or supported a number of Management Self Assessments, SMP reviews, and special directed assessments across the DOE Complex. He has completed Readiness Team and Readiness Team Leader training courses.

Mr. Trumble led a team providing operating criticality support (criticality control limits, double contingency analyses, and operating procedures) for the enriched uranium separations and plutonium recovery processes. He has served on both internal and external review committees for production sites as well as in laboratory environments. He earned a Master of Science degree in Nuclear Engineering from North Carolina State University and a Bachelor of Science degree in Nuclear Science & Engineering from Virginia Polytechnic Institute and State University.

Appendix 3: Issue Classification Criteria

The team used the following criteria when evaluating issues to determine if they were findings or observations. Once and issue was determined to be a finding, it was then evaluated to determine if it was a pre-start or post-start finding.

During the initial team meeting, the team leader and senior advisor instructed the team members on the application of these grading criteria. Additionally, as issues matured during the course of the review, the team leader or the senior advisor coached the team members on the application of the grading criteria. Through this process, the team leader and senior advisor ensured each team member was fully aware that the expectation is that the individual team member be able to defend the classification of their issue(s) using these grading criteria.

1. Does the issue meet the definition of a finding as defined in DOE-STD-3006-2010?

   Finding: nonconformance with a stated requirement that represents either:
   a) A systematic failure to establish or implement an adequate program or control; or
   b) A significant failure that could result in unacceptable impact on the safety of personnel, the facility, the general public, or the environment during nuclear operations.

   If the is answer is **YES**, the issue meets the definition of a finding; proceed to step 2.

   If the answer is NO, the issue will be discussed in the report Form 1 results section and, in the case of a noncompliance, this discussion will cite the noncompliance and the reason why it does not rise to the level of a finding.

2. Is the finding pre-start or post-start?

   A. Initial Screening

   1. Does this issue negatively impact on the operability of a credited safety system?
   2. Does this issue negatively impact on processes, functions or components identified in the TSRs, safety requirements, or nuclear safety control procedures?
   3. Does this issue have a direct adverse environmental impact that exceeds regulatory or site-specific release limits?
   4. Does this issue impact non-SSCs that could adversely impact safety related SSCs?
   5. Is this issue in noncompliance with LANL or DOE-approved startup documents (e.g. POA, justification for continued operation or conditions of approval)?
   6. Does this issue indicate inadequate procedures or safety related administrative systems?
   7. Does this issue indicate operational or administrative noncompliance with safety related procedures or policy?

8. Has this operational issue occurred with a frequency that indicates a pattern of past corrective actions that have been ineffective?
9. Is this a training issue that would call into question the ability of operators to conduct nuclear operations safely?
10. Does the issue involve a previously unknown risk to worker or public safety and health or a previously unknown threat of environmental insult or release?

If the response to any of the above is **YES**, further evaluation in accordance with the issue impact criteria below is required. If the answer is **NO** to all of the above questions, the issue is considered a post-start finding; however, based on its significance and with approval by the Team Leader, the issue may still be classified as a pre-start finding.

B. Issue Impact

1. Does the loss of operability of the item prevent a safe shutdown, or cause the loss of essential monitoring?
2. Does the loss of operability of the item require operator action to prevent or mitigate the consequences of events described in the safety analysis?
3. Does the loss of operability of the item cause operation to be outside the TSRs or safety analysis?
4. Does the loss of operability of the item result in a reduction of the margin of safety as described in the safety analysis?
5. Does the issue have a potential impact on the operability or functionality of safety related systems?
6. Does the issue involve a violation or potential violation of worker safety or environmental protection regulatory requirements that pose a significant danger to workers, the public, or of environmental insult or release?

If the response to any of the above questions is **YES**, the item should be considered a pre-start finding. If the response all of the above questions is **NO**, the item should be considered to be a post-start finding; however, based on its significance and with approval by the Team Leader, the issue may still be classified as a pre-start finding.