SAND2017-12652R

Sandia National Laboratories

Operated for the United States Department of Energy
by National Technology & Engineering
Solutions of Sandia, LLC.

P.O. Box 5800, MS-0725
Albuquerque, NM 87185-0725

P.O. Box 969
Livermore, CA 94551-0969

Phone: (505) 844-7955
Fax: (505) 845-9968
Email: jlmoya@sandia.gov

Jaime L. Moya
Director
Chief of Safety

October 10, 2017

Mr. Jeffrey P. Harrell
Manager
U.S. Department of Energy
National Nuclear Security Administration
Sandia Field Office
P.O. Box 5400
Albuquerque, NM 87185

Dear Mr. Harrell:

Subject: ***Transmittal First Quarter Fiscal Year 2018 (Q1FY18) Startup Notification Report (SNR)***

Enclosed for your review and approval is the Q1FY18 SNR. This SNR was prepared in accordance with Sandia National Laboratories ESH100.2.SB.4, *Implement the Startup and Restart Process for Nuclear Facilities, Activities, and Operations*, which requires compliance with GN470109, *Implementing the Startup and Restart Process for Nuclear Facilities, Activities, and Operations*.

If you have any questions regarding this submittal, please contact Marilyn Bange at (505) 845-9211. Please copy Jaime Moya and Marilyn Bange on your response to this interim SNR submittal.

Sincerely,

Enclosures:
1. First Quarter Fiscal Year 2018 Startup Notification Report
2. Startup/Restart Notification Report (SNR) Form: Annular Core Research Reactor Facility, Reactivity Control Systen Upgrade, SF 2001-SNR (06-2016)
3. Readiness Criteria Form: NA-SFO-SNL-ACRR-2014-002, Reactivity Control System Upgrade, SF 2001-RCF (01-2016)
4. Activity Description: Reactivity Control System Upgrade Project

NNSA National Nuclear Security Administration

Exceptional Service in the National Interest

Copy to:

Duvall, Michael	DOE/NNSA/SFO	Michael.Duvall@nnsa.doe.gov
Hamilton, Mark	DOE/NNSA/SFO	Mark.Hamilton@nnsa.doe.gov
Rast, David	DOE/NNSA/SFO	David.Rast@nnsa.doe.gov
Todd, James	DOE/NNSA/SFO	James.Todd@nnsa.doe.gov

First Quarter FY2018 Startup Notification Report (SNR) for Nuclear Activities or Facilities

Facility and Hazard Category (HC)	Unique Identifier (Activity Description #) NA-SFO-SNL-	Short Title	Date of Last Operation	Reason for Non-Operation	Projected Startup Date	Projected Date for Submittal of POA	Proposed Type of RR / Justification for proposed type of RR	Proposed Startup Authorization Authority
Auxiliary Hot Cell Facility (AHCF) / HC-3	None							
Annular Core Research Reactor Facility (ACRRF) / HC-2	NA-SFO-SNL-ACRR-2014-002	Reactivity Control System Upgrade	N/A	Upgrade to the Reactivity Control System to increase operation performance and reliability.	August 2018	October 2017	SNL personnel proposed a Level 2 RA and SFO has directed a Level 1 RA	SFO has determined they will be the SAA. SFO to provide the name of the individual assigned to be the SAA.
Sandia Pulsed Reactor Facility (SPRF) / HC-2	None							

Sandia National Laboratories

Startup/Restart Notification Report (SNR) Form

Note: The SNR shall be unclassified. Contact the Nuclear Facility Safety Basis Program Manager for further instruction if classified information is required.	
Facility Title:	Annular Core Research Reactor Facility
Date:	8/22/2017
Org./Department:	1381
Contact:	Rick Freeman – 844-2192

Index	Item	Description			
1	**SNR Unique Identifier**	NA-SFO-SNL-ACRR-2014-002			
2	**Facility and Hazard Category (HC)**	Facility: ACRR	HC: 2		
3	**Short Title**	Reactivity Control System Upgrade			
4	**Date of last Operation (for restarts only)**	N/A			
5	**Reason for Non-Operation**	Planned outage for system modification			
6	**Projected Startup Date**	August 2018			
7	**Projected POA Submittal Date**	October 2017			
8	**Proposed RR Type and Justification**	☐ ORR	☐ Level 1 RA	☒ Level 2 RA	☐ Level 3 RA
		DOE RR required? ☒ Yes ☐ No			
		Justification: The score from the RCF recommends a Level 3 RA. The TA-V management team had considered conservatively escalating the recommended RR type to a Level 2 RA (limited modification). However, prior to this consideration, the SFO informed SNL personnel of its intent to perform the role of Startup Authorization Authority and to perform a Level 1 RA.			
9	**Proposed Startup Authorization Authority**	There is no proposed SAA. SFO has determined they will be the SAA.			
10	**SFO Approval Status**	Pending			

Index	Item	Description	
11	**Description and Comments**	System design and process documents are under development. Facility outage is being coordinated with experimenters and other customers. See the attached Activity Description.	
12	**Approved by**	Nuclear Facility Line Manager:	Shannon Kawane
		8/24/17 Date	

Sandia National Laboratories

Readiness Criteria Form

Unique Identifier:	NA-SFO-SNL-ACRR-2014-002
Date:	8/21/2017
Facility:	Annular Core Research Reactor
Description of Activity:	Reactivity Control System Upgrade (RCSU) Project

Part A – Determine if the Activity is Routine (i.e., does not require an RR)

No.	Criteria	Answer
	If both Questions 1 and 2 are answered "Yes," and NFO Management does not opt to conduct an RR (i.e., question 3 is answered "No"), the activity is routine and screening is complete. Fill in the comment/justification portions of this section, and proceed to Part E, "RR Type Recommendation." In Part E, "Part A Answers," select "None" in the "Type of RR Required" column, and document justification in Part E "Remarks." If the Answer to Question 3 is "Yes," (i.e., NFO Management opts to complete an RR), proceed to Part F, "Final Determination of Readiness Review (RR) Type," select the RR Type, and sign/approve. If either Question 1 or 2 is answered "No," proceed to Part B, "Determine if an Operational Readiness Review (ORR) is Required."	
1	Can the restart be completed using existing approved procedures with limited changes that provide specific direction for operating systems and equipment under normal conditions? **Note:** The procedures should verify that systems are properly aligned and prepared to start or restart the activity. **Comment/Justification:** The activity of replacing portions of the Reactivity Control System (RCS) and Instrument &Control (I&C) subsystems will be performed utilizing existing maintenance procedures for installation and will not require revisions. However, procedures for calibration and operations will require significant revisions. In addition, there will be multiple Acceptance Test Plans that will require development and SNL management approval that is specific to this activity.	☐ Yes ☒ No

Part A – Determine if the Activity is Routine (i.e., does not require an RR)		
No.	**Criteria**	**Answer**
2	Is the restart a resumption of routine operations (i.e., maintenance activities governed by existing maintenance procedures or process) after a short interruption? The determination as to whether this condition is met should include the following in aggregate: • The interruption is less than six months for hazard category (HC) 1 facility; and less then than twelve months for HC 2 and HC 3 facilities. • Maintenance procedures and maintenance work packages are complete and include preoperational checks as components of the contractor-approved operating procedures. • Personnel replaced, as the result of turnover, are qualified. • Modifications completed during shutdown do not require process or substantive (i.e., number and significance) safety basis changes. **Note:** Examples of modifications that typically **do** require an RR: Changes to processes that are complex; changes to procedures that require new or significantly different operator task(s); safety basis changes that require new controls; new hazards and hazard controls; and the first time startup of new systems. • Modifications completed during shutdown do not require process or substantive (i.e., number and significance) safety basis changes. • Number and types of changes to operational procedures are evaluated for significance and complexity. When changes are substantive and complex, a fewer number of them could trigger an RR. **Comment/Justification:**	☐ Yes ☐ No
3	**NFO Management Preliminary Readiness Review (RR) Decision** Does NFO Management opt to complete an RR even though the two preliminary screening questions above indicate the activity is routine (i.e., both are answered "Yes")? **Comment/Justification:**	☐Yes ☐ No

Part B - Determine if an Operational Readiness Review (ORR) is Required		
No.	**Criteria**	**Answer**
If the answer for any of Questions 1 through 6 is "Yes," the screening is complete. The activity shall require an ORR. Proceed to Part E, "RR Type Recommendation." In Part E, "Part B Answers," select "ORR" in the "Type of RR Required" column and document justification in Part E "Remarks." If all of the answers for Questions 1 through 6 are "No," proceed to Part C, "Determine if a Level 1 Readiness Assessment (RA) is Required."		
No.	**Criteria**	**Answer**
1	Is this an initial startup of a newly constructed nuclear facility with a new documented safety analysis (DSA) and technical safety requirements (TSRs)?	☐Yes ☒ No
2	Is this an initial startup after conversion of an existing facility to a new nuclear mission with a new DSA and TSRs?	☐Yes ☒ No
3	Is this a restart of a nuclear activity/facility/operation that has upgraded its hazard categorization to HC 1, 2, or 3?	☐Yes ☒ No
4	Is this a restart after a Department of Energy (DOE) management official had directed the shutdown of a nuclear activity/facility/operation for safety reasons?	☐Yes ☒ No
5	Is this a restart of a nuclear activity/facility/operation after violation of a Safety Limit, as defined in 10 CFR 830.3, **Definitions**?	☐Yes ☒ No
6	Is an operational readiness review (ORR) deemed appropriate by DOE or contractor line management officials?	☐Yes ☒ No

Part C – Determine if a Level 1 Readiness Assessment (RA) is Required		
No.	**Criteria**	**Answer**
If the answer for any of Questions 1 through 3 is "Yes," the screening is complete. The activity shall require a Level 1 RA. Proceed to Part E, "RR Type Recommendation." In Part E, "Part C Answers," select "Level 1 RA" in the "Type of RR Required" column, and document justification in Part E "Remarks." If all the answers for Questions 1 through 3 are "No," then proceed to Part D, "RA Level Determination Score Sheet."		
No.	**Criteria**	**Answer**
1	Is this an initial startup of a new HC 1 or HC 2 activity or operation with a new DSA and TSRs?	☐Yes ☒ No
2	Is this a restart after an extended shut down for an HC 1 or HC 2 nuclear activity/facility/operation? (Extended shutdown for 6 months for HC 1 and 12 months for HC 2)	☐Yes ☒ No
3	Is this a restart of an HC 1 or HC 2 nuclear activity/facility/operation after substantial processes, system or facility modifications? **Note:** If Part D result is 71 or more points, substantial modifications have occurred.	☐Yes ☒ No

Part D – Readiness Assessment (RA) Level Determination Score Sheet			
No.	**Condition Statement**	**Possible Points**	**Points Awarded**
Complete the score sheet. The total score determines the RA Level (i.e., Level 1, 2, or 3). A graded approach to scoring should be used and is dependent upon the understanding and experience of the NFO participants. A summary justification statement should be included in each block of the score sheet. For each condition statement, select only one result, unless the "Possible Points" column contains instructions stating that the score is cumulative (e.g., number 8) and document the points in the "Points Awarded" column.			
No.	**Condition Statement**	**Possible Points**	**Points Awarded**
1	(Select One) The activity causes a resumption of any HC 1 system, process, or operation that has been shut down for: A. ☒ Not Applicable (Not HC 1) B. ☐ < 1 month? C. ☐ ≥ 1 month, but < 3 months? D. ☐ ≥ 3 months, but < 5 months? E. ☐ ≥ 5 months? **Comment/Justification:** ACRR is not a HC1 facility.	If A or B is selected, record "0" points in the Points Awarded column. If C is selected, record "10" points in the Points Awarded column. If D is selected, record "20" points in the Points Awarded column. If E is selected, record "30" points in the Points Awarded column.	0
2	(Select One) The activity causes a resumption of any HC 2 or HC 3 system, process, or operation that has been shut down for: A. ☐ Not Applicable (Not HC 2) B. ☐ < 3 months? C. ☒ ≥ 3 months, but < 6 months? D. ☐ ≥ 6 months, but < 9 months? E. ☐ ≥ 9 months? **Comment/Justification:** Modifications to the facility and a readiness to proceed memorandum is currently scheduled to be less than 3 months. This schedule is being facilitated by the use of a series of maintenance outages. The shutdown period is defined from the point of ceasing	If A or B is selected, record "0" points in the Points Awarded column. If C is selected, record "10" points in the Points Awarded column. If D is selected, record "20" points in the Points Awarded column. If E is selected, record "30" points in the Points Awarded column.	**10**

Part D – Readiness Assessment (RA) Level Determination Score Sheet			
No.	**Condition Statement**	**Possible Points**	**Points Awarded**
	programmatic work and the issuance of the "Readiness to Proceed" memo from the NFO manager to the SAA. Due to unforeseen circumstances this activity could extend past the 3 month criteria therefore management has selected C for points awarded.		
3	There is a positive unreviewed safety question determination associated with the activity. A. ☐ Yes B. ☒ No **Comment/Justification:** A preliminary unreviewed safety question determination (USQD) has been initiated and it appears based on the current modification design and proposed procedural revisions that the final USQD will be negative.	If A is selected, record "10" points in the Points Awarded column. If B is selected, record "0" points in the Points Awarded column.	0
4	(Select One) The activity involves modification of safety-class structures, systems, and components (SSCs) identified in the DSA, **and**: A. ☐ The modification involves changes in controls, limits, or conditions. B. ☐ The modification involves a commonly used piece of equipment (e.g., leak detector, continuous air monitor). C. ☐ The modification requires a routine annual update to the description in the Final DSA. D. ☒ N/A. The activity does not modify any safety-class SSCs. For not applicable (N/A) provide justification below. **Comment/Justification:** As a Hazards Category 2 facility the ACRRF does not contain safety-class SSCs. Therefore, the activity does not modify any safety-class SSCs.	If A is selected, record "25" points in the Points Awarded column. If B is selected, record "10" points in the Points Awarded column. If C is selected, record "5" points in the Points Awarded column. If D is selected, record "0" points in the Points Awarded column.	0
5	(Select One) The activity involves modification of safety-significant SSCs or Specific Administrative Controls identified in the DSA. A. ☒ Yes B. ☐ No	If A is selected, record "10" points in the Points Awarded column. If B is selected, record "0" points in	**10**

Part D – Readiness Assessment (RA) Level Determination Score Sheet			
No.	**Condition Statement**	**Possible Points**	**Points Awarded**
	Comment/Justification: The Reactivity Control System is safety significant.	the Points Awarded column.	
6	(Select One) The activity requires Criticality Safety Limits or conditions that are different from those normally observed for the facility, or require a new or revised Criticality Safety Evaluation Report. A. ☐ Yes B. ☒ No **Comment/Justification:** The criticality safety conditions will not change with the implementation of this modification.	If A is selected, record "15" points in the Points Awarded column. If B is selected, record "0" points in the Points Awarded column.	0
7	(Select One) The activity requires a new or revised primary hazard screening that includes substantive changes. A. ☐ Yes B. ☒ No **Comment/Justification:** The activity does not require a new or revised primary hazard screening.	If A is selected, record "10" points in the Points Awarded column. If B is selected, record "0" points in the Points Awarded column.	0
8	(Select All that Apply) The personnel expected to be completing this activity are different than those completing the same or similar (i.e., same type of task using the same type of control systems) activities. A + B + C + D. A. ☐ Operations supervisor is different. B. ☐ >50% of operating personnel are different. C. ☐ >25% but ≤ 50% of operating personnel are different. D. ☒ All operating personnel are the same personnel that have previously completed the same or similar operations within the past three (3) months immediately preceding the planned operation date. Personnel have maintained proficiency in this qualification for the past year.	If A is selected, enter "10" points in the formula below. If "A" is not selected, enter "0" points in the formula below. If B is selected, enter "10" points in the formula below. If "B" is not selected, enter "0" points in the formula below. If C is selected, enter "5" points in the formula below. If "C" is not selected, enter "0"	**-20**

Part D – Readiness Assessment (RA) Level Determination Score Sheet			
No.	**Condition Statement**	**Possible Points**	**Points Awarded**
	Note: The three (3) month period above could be extended up to one (1) year if the same or similar operations are planned and accounted for in the facilities training program as part of maintenance of proficiency. Provide justification below. **Comment/Justification:** The operations manager, facility supervisor and reactor operators have completed reactor operations that are similar to reactor operations with modification implemented and have maintained their qualifications within the past year.	points in the formula below. If D is selected, enter "-20" points in the formula below. If "D" is not selected, enter "0" points in the formula below. Add A + B + C + D, and enter the TOTAL in the formula below, and in the Points Awarded column. __ + __ + __ + __ = _____ A + B + C + D = TOTAL	
9	(Select One) The activity requires a qualification requirements change for personnel completing the task that is met by one of the following: A. ☐ New qualification, including classroom or on-the-job-training (OJT) training requiring written/oral or performance examinations. B. ☒ Revision to existing qualifications having classroom or OJT training requiring written/oral or performance examinations. C. ☐ Changes in training include classroom orientation (continuing training) or system walk-downs requiring attendance rosters. D. ☐ N/A. This activity did not change qualification requirements. For N/A provide justification below **Comment/Justification:** The qualification requirements for the training program have not changed. Operators will receive classroom training on the new system and procedures. OJT will be performed on-site prior to installation and testing. Operations personnel will be involved in the installation and testing of the modification.	If A is selected, record "15" points in the Points Awarded column. If B is selected, record "10" points in the Points Awarded column. If C is selected, record "5" points in the Points Awarded column. If D is selected, record "0" points in the Points Awarded column.	**10**

Part D – Readiness Assessment (RA) Level Determination Score Sheet			
No.	**Condition Statement**	**Possible Points**	**Points Awarded**
10	(Select One) The frequency or consequences of existing hazards increase, or a different type of hazard is created, by the materials being processed or by the process itself. A. ☐ Yes B. ☒ No **Comment/Justification:** There are no new processes or materials being introduced that would increase the frequency or consequence of existing hazards with the implementation of this activity.	If A is selected, record "5" points in the Points Awarded column. If B is selected, record "0" points in the Points Awarded column.	0
11	(Select One) Currently installed equipment requires modification (not including like for like replacement) in order to support the activity. A. ☒ Yes B. ☐ No **Comment/Justification:** The current RCS system is being modified to improve performance and reliability of the critical characteristics of the RCS system.	If A is selected, record "5" points in the Points Awarded column. If B is selected, record "0" points in the Points Awarded column.	**5**
12	Equipment will be installed that requires new calibrations in order to support the activity. A. ☒ Yes B. ☐ No **Comment/Justification:** The modification activity will require calibrations of the new equipment	If A is selected, record "5" points in the Points Awarded column. If B is selected, record "0" points in the Points Awarded column.	**5**
13	The activity creates a change in the function for the affected work area (e.g., changed from packing and storage to shipping). A. ☐ Yes B. ☒ No **Comment/Justification:** There is no change in the work processes or functions as the facility returns to routine programmatic work activities.	If A is selected, record "3" points in the Points Awarded column. If B is selected, record "0" points in the Points Awarded column.	0

Part D – Readiness Assessment (RA) Level Determination Score Sheet			
No.	**Condition Statement**	**Possible Points**	**Points Awarded**
14	(Select One) The activity involves restart after an unplanned shutdown directed by management due to: A. ☐ Automatic actuation of active safety equipment. B. ☐ Failure of active safety equipment. C. ☐ Initiation of active safety equipment by an operator because of an abnormal condition. D. ☒ Not Applicable. **Comment/Justification:** The activity is a planned pause in programmatic operation.	If A, B, or C is selected, record "10" points in the Points Awarded column. If D is selected, record "0" points in the Points Awarded column.	0
15	(Select All that Apply) The activity results in requirements for a new or revised procedure that results in one or more of the following to be put in place prior to resuming operation. A. ☐ New or more restrictive controls (e.g., administrative control, limiting condition for operation, or safety limit). B. ☐ Operational requirements (e.g., operating limits found in process control plan, temperature, pressure, flow). C. ☒ Other positive actions (e.g., additional supervision, independent verification of indications). D. ☐ Not Applicable. **Comment/Justification:** There will be testing during the maintenance outages. In addition, there will be final acceptance testing once the modification is complete and prior to a return to operational status. The project lead, facility supervisor and/or NFO management will be present during the performance of these testing activities.	If A is selected, record "3" points in the Points Awarded column. If B is selected, record "3" points in the Points Awarded column. If C is selected, record "3" points in the Points Awarded column. If D is selected, record "0" points in the Points Awarded column.	**3**
16	The activity requires an environmental permit that imposes a new control or limitation on operation.	If A is selected, record "5" points in the Points Awarded column.	0

Part D – Readiness Assessment (RA) Level Determination Score Sheet			
No.	**Condition Statement**	**Possible Points**	**Points Awarded**
	A. ☐ Yes B. ☒ No **Comment/Justification:** There was no environmental permit required to support the activity.	If B is selected, record "0" points in the Points Awarded column.	
17	(Select One) The activity is significantly different than previous activity when evaluated against the below criteria: A. ☐ A new process will be used to complete existing program work (e.g., program work is transportation; a new process is loading or tie-down). B. ☐ A modification to an existing process will be used to complete existing program work. C. ☒ N/A. Activity is not substantially different from routine work. For N/A provide justification below. **Comment/Justification:** The activity of upgrading the Reactivity Control System and the I&C system is performance and reliability based. The activity does not change the process of reactor operations to perform experiments in support of routine or programmatic work activities.	If A is selected, record "15" points in the Points Awarded column. If B is selected, record "10" points in the Points Awarded column. If C is selected. Record "0" points in the Points Awarded column.	0
18	Condition statements 1 – 18 have been evaluated.	Total the Points Awarded for Condition Statements 1 through 17, and enter the sum in the Points Awarded column.	**23**
Proceed to Part E, "Part D Total Points Awarded," and use the "Points Awarded" sum determined in Condition Statement 18 to select the RR Type. Document justification in Part E "Remarks."			

Part E – Readiness Review (RR) Type Recommendation		
Note: Results are recorded as directed by Parts A through D.		
Part A Answers	**Qualitative Score**	**Type of RR Required**
Both questions answered "Yes"	Routine. Neither a Sandia National Laboratories (SNL) nor Sandia Facility Office (SFO) RR are required.	☐ None
Part B Answers	**Qualitative Score**	**Type of RR Required**
Any question answered "ORR"	Both an SNL and SFO ORR are required.	☐ ORR
Part C Answers	**Qualitative Score**	**Type of RR Required**
Any question answered "Level 1 RA"	Both an SNL and SFO RA are required.	☐ Level 1 RA

Part E – Readiness Review (RR) Type Recommendation		
Part D Total Points Awarded	**Qualitative Score**	**Type of RR Required**
71 or more	Substantial modification	☒ Level 1 RA (HC 1 and HC 2) or ☐ Level 2 (HC 3)
41 – 70	Limited modification	☐ Level 2 RA
1 – 40	Simple modification	☐ Level 3 RA
0	Routine	☐ None

Part E Remarks

Note: State overall conclusion and summarize key discussion, justification information, or other details that support the conclusion.

Comment/Justification:

The score from Part D totals to 23 points. This objective sum recommends a Level 3 RA. But, per process, this objective score is intended to inform a subjective determination. So, the TA-V management team had considered conservatively escalating the recommended RR type to a Level 2 RA (limited modification). However, prior to this consideration, the SFO informed SNL of its intent to perform the role of Startup Authorization Authority and to perform a Level 1 RA.

Conclusion: The SFO has decided to perform the role of Startup Authorization Authority and to perform a Level 1 Federal Readiness Assessment per a letter dated 3/2/17.

Note: Types of Readiness Reviews (RRs)

ORR - Both an SNL ORR and SFO ORR are required and SNL personnel are not the Startup Authorization Authority (SAA).

Level 1 RA - Both an SNL RA and an SFO RA are required; SNL personnel are not the SAA; and an SNL Checklist RA cannot be used.

Level 2 RA - An SNL RA is required but an SFO RA is not required; the SAA is either DOE or SNL personnel; and an SNL Checklist RA cannot be used.

Level 3 RA - An SNL Checklist RA is required but an SFO RA is not required and SNL personnel are the SAA.

None - Neither an SNL nor SFO RR are required.

Rick Freeman Rick Freeman 8/21/2017

Print Signature Date

Nuclear Facility Organization (NFO) Representative

Dave Clovis 8/22/2017

Print Signature Date

Facility Supervisor

MARILYN BANGE ~~Shannon Kawane~~ Marilyn Bange 8/23/17

E S&H PLANNING MGR - CONCURRENCE

Print Signature Date

Manager

Jason Petti 8/21/2017

Print Signature Date

Nuclear Safety Technologies Mgr Concurrence

Shannon Kawane 8/23/17

Print Signature Date

~~SB Program Mgr Concurrence~~ NFO MANAGER

Matt Burger MATT BURGER Matt Burger 8/24/17

Print Signature Date

NFO Senior Manager

Activity Description

1.0 ACTIVITY

Reactivity Control System Upgrade Project

NA-SFO-SNL-ACRR-2014-002 **Revision 2**

2.0 FACILITY LOCATION

TA-V, ACRRF

3.0 ACTIVITY/STARTUP/RESTART DESCRIPTION

This activity description is being revised based on the November 2016 Project Plan and Installation Plan. These documents were developed and issued due to a change in the design responsibilities, assigned project personnel and the change in the installation of the RCS subsystems. The project plan more clearly defines the scope of the project, project team members, roles and responsibilities and provides a project milestone summary. The installation plan provides a more detailed sequence of phases of installation and testing with graphics and visual aids. Original project planning required the facility to be non-operational until the new subsystems were installed and testing was complete. The installation plan details a series of maintenance outages with partial installation and testing followed by a return of the system to original configuration. This will allow for the facility to return to programmatic operations using original equipment between the maintenance outages. These maintenance outages will follow current maintenance procedures, work planning and control process, engineering change control and safety basis processes. There are no readiness activities associated with the maintenance outages.

The activity will replace portions of the Reactivity Control System (RCS) and Instrumentation & Control (I&C) subsystems. This includes replacement of a majority of the I&C system including the existing National Instrument (NI) Fieldpoint data acquisition equipment, the existing combination process control computer and operator workstations (DAC units), and the network data communication devices. The existing RCS Programmable Multi-Axis Controllers (PMACs) will be replaced. The existing master countdown clock and timing functions across the RCS and I&C will be replaced with an integral RCS based timing feature.

The replacement hardware and software will be functionally equivalent to the existing ACRR RCS and I&C System. The activity will not replace the existing RCS rod drive motors and lead screw/magnet assemblies and related sensors. Existing I&C field instrumentation and field wiring up to the existing control panel terminal blocks or field point drawers will not be replaced. However, the field wiring (cables) will be extended and some of the terminals will be modified as part of the pre-modification activities.

During final switchover the facility will be placed in a safe condition for the installation and testing of the modifications. Testing will include an integration test and acceptance test of the reactor system including movement of the regulating rods in maintenance mode and for critical operations in accordance with TSRs. This testing will occur while the facility is preparing to return to programmatic operations. Operators will be able to re-qualify during this testing phase. Final switchover to RCSU and acceptance testing is expected to complete in less than 3 months. Readiness activities will be performed after acceptance testing is completed at the direction of the facility manager. Modifications will produce a few new audible and visual alarms to reactor operations however, the operators will be intimately involved with incorporating the changes and testing the modifications. Existing maintenance and operating

procedures will be revised accordingly. A new maintenance procedure will be required, however the operators will be involved in developing, testing and issuing the new procedure. There are no new processes being introduced by the modifications. The modifications do not introduce any new hazards, accident types or failure modes of a different type.

3.1 Date of Last Operation if previously operated

Not applicable.

3.2 Cause for Non-Operation if previously operated

N/A

3.3 Duration of Shutdown if previously operated

Pre-Modification work will begin December 2016. A series of maintenance outages will be performed at the completion of the pre-modification work and will continue through July 2017 with a return to programmatic operation using existing equipment between the maintenance outages. The facility will complete final modifications and testing from July 2017 through September 2017. The duration of the shutdown for final switchover is anticipated to be less than three months. The reactor will be in a shutdown or pause from programmatic operations during the final installation and testing of the equipment.

3.4 Modifications Accomplished

The planned modifications are intended to provide enhanced functionality and improve composite system reliability by minimizing single point vulnerabilities and reducing potential common mode failures. The changes to the hardware will increase the computing power and storage capacity while decreasing processing time. In relation to the programs used to monitor and control reactor conditions, the changes will improve the HMI display. The modifications to both systems will not compromise the credited safety function of either system. The modifications will be implemented with an Engineering Change Notice (ECN), ACRR-2014-006, and consist of hardware replacement and software changes.

3.5 Facility and Activity Hazard Category

ACRRF is an operational Hazard Category 2 (HC-2) nuclear facility. This activity will have no effect on radioactive material inventories or Material at Risk limits in the facility. The hazard categorization of the ACRRF is unchanged.

3.6 Changes in Hazards

This activity does not change or introduce any new form of hazardous material or energy sources that might impact existing hazardous material in the facility. The activity involves hardware and software changes to existing structures, systems, and components (SSCs), and does not change the mission or processes of the facility.

The modifications do not change or alter the safety function of the reactivity control system and the instrumentation & control system. The safety function will still be met. The modifications do not introduce any new industrial hazards, new chemical hazards or increase facility combustible loading.

The modifications do not alter the release fractions or frequency of occurrence of any identified accidents.

3.7 Effect on the Safety Basis

The activity involves hardware replacement and software changes to existing SSCs. No new controls or safety functions are required as a result of the modifications.

A preliminary unreviewed safety question determination (USQD) has been initiated and it appears based on the current modification design and proposed procedural revisions that the final USQD will be negative. Descriptions of the modification will be added to the appropriate chapters of the ACRRF DSA during the regular annual update process. The System Design Descriptions will be revised accordingly. No changes to the safety basis are required to be submitted to the Sandia Field Office (SFO) prior to executing this activity, based on the final USQD remaining negative.

3.8 Process Changes

There is no fundamental change to the process used for executing this activity. Fuel loading, startup and shutdown protocols are unchanged by this modification.

3.9 Procedure Changes

Existing procedures will be revised, reviewed and approved using the existing TA-V process. These procedures will address the operations and alarm responses. Operating procedures ACRR-OP-001, OP-003, OP-008 and maintenance procedures MP-008 and MP-010 will require substantial revisions. Operating procedures OP-002 and OP-004 will require moderate revisions. Other operating and maintenance procedures will require slight changes with the addition of a new maintenance procedure. After the final design is complete and during acceptance testing a detailed review of all procedures will be conducted to identify any other changes to procedures. A facility work plan (or plans) and engineered job safety analysis will be used to install the modifications and acceptance test plans will be used to test the equipment upon receipt and installation.

3.10 Impact on Training or Qualifications

No changes to the qualification program are required. The certified operators for ACRRF will support the installation and testing of the modifications being performed. Results of the modifications will be minimal to the reactor operators. Training on operating and maintenance procedures including functionality will be performed and documented as required by the TA-V Document Lifecycle Management Procedure. Current ACRRF certified personnel are sufficient to execute this activity.

3.11 Determination for Restart Based on Similar Work

The activity involves hardware replacement and software modifications to existing SSCs in the RCS/I&C systems. These modifications are performed within the bounds of existing maintenance procedures and integrated work management processes. A facility work plan and job safety analysis will be used to install the modifications and acceptance test plans will be used to test the equipment upon receipt and installation. Similar projects have been restarted using the Level 3 RA process. A Readiness Criteria Form (RCF) will be used to determine the appropriate level of readiness review.

3.12 Facility Operating History

The reactor facility has successfully and safely operated for more than 50 years and performed over 12,500 operations with the current reactor facility (ACRR) and more than 12,000 operations of the previous reactor facility (ACPR). The facility will remain in a safe condition during the installation and testing of the modification while movement of the control rods are performed within the bounds of the

current TSRs. This extensive operational experience has created a vast library of experience and lessons learned which continue to be rolled into operational improvements.

3.13 Duration of the Activity

The hardware and software modifications will become permanent improvements to the facility. The duration of the activity is expected to be completed within three months.

3.14 Issues from Previous Readiness Activities

The most recent readiness review was completed for the ACRRF Wide Range (WR) Project. A level three readiness assessment (RA) was performed from Nov 3 to Nov 6, 2014 with no findings and three observations which were successfully dispositioned through the TA-V Condition Reporting System. Authorization to proceed for the WR project was issued November 10, 2014 by the SNL Startup Authorization Authority. An Operations Restart Plan was not utilized for the WR project. However, an Operations Restart Plan will be developed and adhered to during the performance of this activity to verify acceptance of prerequisites necessary for operations, completion of activities required for critical operations and authorization to proceed with programmatic operations. The project installation plan, approved by management, will provide additional details related to schedule and sequencing of installation and testing.

There has been one recent Operational Readiness Review (ORR-2010) conducted at the TA-V Auxiliary Hot Cell Facility. The overall conclusion was the facility and safety management infrastructure was adequate to ensure safe nuclear facility operations.

The general nuclear operations infrastructure and management core requirements were all met with no findings. This demonstrates that the TA-V and SNL processes are healthy and robust. Included in that ORR was a review of these core functions and requirements:

- management,
- quality,
- training and qualification,
- Integrated Safety Management System (ISMS),
- conduct of operations,
- conduct of engineering and maintenance,
- radiation protection,
- safety basis,
- fire protection and
- criticality safety.

The ACRRF utilizes the same nuclear facility infrastructure, Safety Management Programs (SMPs) and management system as the system evaluated in the recent ORR. None of the modifications associated with this activity change the infrastructure.

3.15 Operational Impact Caused by the Facility Shutdown

The facility will remain in a safe condition during the installation and testing of the modification while movement of the control rods are performed within the bounds of the current TSRs but will not be allowed to return to programmatic operations until all testing is complete and resumption is authorized by

the Startup Authorization Authority. The duration of the final installation, testing and resumption should be less than three months.

3.16 Programmatic Significance

The planned duration of the project with a series of maintenance outages has been scheduled such that it will have the least impact to programmatic activities in support of customers and stakeholders.

3.17 Site-Wide Issues

There are no site wide issues that impact this activity.

3.18 Status and Effectiveness of Safety Management Programs

As noted in 3.14, the most recent TA-V ORR found that TA-V and SNL's SMPs are effective and robust. Ongoing self-assessments of the SMPs are identifying opportunities to improve, and these programs are developing corrective action plans to address self-identified weaknesses. No issues identified to date would question the effectiveness of SMPs in support of this activity.

3.19 Other Pertinent Information

None

4.0 ACTIVITY START DATE

The activity start date is projected to be August 2018.

5.0 CONCLUSION

This activity consists of modifications to the reactivity control system and instrument & control systems to increase the reliability of the system to advance the mission of 1380. This activity can be conducted using contractor approved processes and procedures. There are no impacts to the facility safety basis and no new hazards are introduced.

6.0 UPDATED INFORMATION (IF APPLICABLE)

N/A

7.0 PREPARER / REVIEWER

Prepared by:

Rick Freeman, Safety Basis Engineer — June 22, 2017 — Date

Reviewed by:

Danny Beets, Engineering Project Lead — 6/26/2017 — Date

Reviewed by:

Dave Clovis, ACRR Facility Supervisor — 6/27/2017 — Date

8.0 APPROVALS

Approved by:

Shannon Kawane, Manager, 1381 — Date: 6/27/17

9.0 DISTRIBUTION

M. Bange, 0632

M. Burger, 1380

J. Barbour, 1300

J. Petti, 1383

R. Pratt, 1382 (TA-V Records)