THE NATION'S URANIUM PROCESSING FACILITY

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Name: Chuck Heatherly Date: 07/29/22

REVISION LOG

Revision 5 ☒ **Intent** ☐ **Non-Intent**

- Guidance contained in this document aligns with requirements flowed down from Y70-160, *Criticality Safety Approval System*, and Y70-68-001, *Criticality Safety Approval/Requirements Development, Review, and Approval*
- This revision is a result of project completion evolution
- UCN-23331, *UPF CSE Analyst Checklist*, was revised in accordance to the following changes
- This revision revises expectations for facility walkdowns
- This revision adds discussion to acknowledge OT-EN-801768-A022, *UPF Nuclear Criticality Safety CSPS/DC-to-CSE Requirements Matrices*
- Other changes include:
  - Updated references
  - Editorial changes

Revision 4 ☒ Intent ☐ Non-intent

- Updated the Criticality Safety Evaluation development and approval process to:
  - Address Criticality Safety Evaluation revisions
  - Delete Scope of Work package requirement
  - Delete section on transitioning from the Criticality Safety Process Study to Criticality Safety Evaluation
  - Indicate that new and revised Criticality Safety Evaluations may be implemented and made effective
  - Indicate that Nuclear Criticality Safety management, Project, and informal validation reviews are all performed simultaneously
  - Remove reference to the Preliminary Documented Safety Analysis
  - Add a requirement for closing out Safety Analysis Engineering database comments that have been incorporated in a new or revised Criticality Safety Evaluation
- Updated acronyms
- Updated references
- Editorial changes
- This revision is a total rewrite; due to the extent of changes, revision bars are not shown

Previous revisions on record

CONTENTS

1.0 INTRODUCTION

1.1 Purpose

This Desktop Instruction (DI) provides additional guidance beyond that contained in Y70-160, *Criticality Safety Approval System*, and Y70-68-001, *Criticality Safety Approval/Requirements Development, Review, and Approval*, for authorizing, developing, validating, approving, and implementing Uranium Processing Facility (UPF) Criticality Safety Evaluations (CSEs).

1.2 Scope

This DI details the Nuclear Criticality Safety (NCS) organization's responsibilities for authorizing, developing, validating, approving, and implementing CSEs for the UPF. Guidance from this DI helps the NCS organization meet the requirements of Y70-160 and Y70-68-001 throughout all portions of the CSE process, and provides direction for those parts of the process not covered by Y70-160 and Y70-68-001.

This DI is applicable to CSEs being prepared or revised to support operations at the UPF.

2.0 RESPONSIBILITIES

2.1 NCS Management

NCS Management is responsible for:

- Assigning an NCS Analyst and Peer Reviewer to complete a CSE task
- Assigning NCS staff to support CSE validation and implementation work, as appropriate
- Reviewing and approving requests to not perform process walkdowns, as appropriate
- Reviewing and approving the listing of changes for a CSE revision
- Reviewing and approving the scope of a new CSE
- Reviewing design changes resulting from CSE development work
- Reviewing and approving CSEs
- Reviewing and approving the UPF CSE Analyst Checklist

2.2 NCS Analyst

The NCS Analyst is responsible for:

- Performing CSE analysis, document development, and approval activities
- Addressing CSE reviewer comments
- Supporting CSE validation and implementation activities, as requested
- Approving CSEs

2.3 Peer Reviewer

The Peer Reviewer is responsible for:

- Performing a peer review of CSE documentation
- Providing approval of final CSE after all review comments are addressed
- Supporting CSE validation and implementation activities, as requested

2.4 NCS Staff

The NCS staff is responsible for supporting CSE validation and implementation activities, as requested.

3.0 PROCESS

3.1 CSE Preparation

3.1.1 Identify the Need for a New or Revised CSE

Before work begins on the development of a new or revised CSE, NCS Management assigns a responsible NCS Analyst and Peer Reviewer to the task. The NCS Analyst utilizes UCN-23331, *UPF CSE Analyst Checklist*, as a guide to assist in preparation of the CSE.

All new UPF CSEs are authorized in UPF Project schedules and budgets. As such, no additional management authorization is required for new CSEs. The need for revisions to CSEs will be authorized via UPF Project processes (e.g., P6 planned activity, or Engineering Change Proposal [ECP]). No additional management authorization is required. Preparation of new or revised CSEs, should be performed in accordance with the requirements of UPF-3DP-G04B-00901, *UPF Technical Change Control*.

The need for a revised CSE may be identified by any affected organization within the UPF Project and may be based upon any of the following:

- Design-related changes
- Construction-related changes
- Operational strategy changes
- Management discretion

3.1.2 Define the Scope for a New CSE or Changes Needed in a CSE Revision

The second step in the preparation of a new or revised CSE for the UPF Project is to develop the scope for a new CSE or define the changes needed in a CSE revision.

A proper scope for a new CSE should:

- Describe the processes covered by the new CSE, including:
  - Provide the process name and corresponding process acronym
  - Provide a brief summary of the process function, including a statement of the purpose of the process, the process inputs received from other parts of the facility, and the expected process products

- Describe the boundary of the process to clearly delineate what should and should not be evaluated in the CSE
- List the other CSEs that interface with this CSE and consider processes that:
  - Physically connect to the CSE process
  - Provide an input to the CSE process
  - Receive a product from the CSE process
  - Receive waste/scrap from the CSE process
  - Provide an off-gas or ventilation service to the CSE process
  - Provide a utility service to the CSE process
  - Provide a transport or transfer service to the CSE process
- Describe the technical basis for the processes covered in the new CSE
- Provide a description of applicable Piping and Instrumentation Diagrams, Process Flow Diagrams, Mechanical Equipment Drawings, etc.
- Provide a description of applicable System Design Description (SDD) or other similar documentation

A proper listing of changes for a revised CSE should:

- Provide a brief summary of any changes to the process function, including any changes to the purpose of the process, changes to process inputs received from other parts of the facility, and any expected changes to the process products
- Identify boundary changes
- Identify additions to the process not evaluated previously in the CSE
  - Other deviations from the process description or control set documented in the previous CSE revision
  - Describe any impacting changes to drawings involved in a CSE revision
  - Provide relevant information on any changes to the SDD or other similar documentation that may impact a CSE revision

The development of the scope for a new CSE, or the listing of changes for a revised CSE, could require a significant research effort and require participation and input of all Project organizations.

Therefore, the following actions should be taken by the NCS Analyst:

- Review the 90% SDDs, or later, for the relevant system(s) within the scope of the CSE, if available
- Review the Rev. A, or later (if available) Operational Procedures for the relevant system(s) within the scope of the CSE
- Review the Safety Analysis Engineering (SAE) Database and identify open items to be incorporated in this version of the CSE
- Review Project ECPs to identify any needed outstanding changes
- Seek the input of other NCS Engineers and Project staff who worked on previous CSE revisions for the process
- Review UCN-23408, *UPF CSE Hazard Evaluation Checklist*, to identify hazards and conditions to be addressed in the CSE. If the form utilized for the previous CSE revision is available, it can be reviewed and updated as necessary

- Based on current, available information, and the elements bulleted in this section, produce an initial draft of the scope of a new CSE or list of changes for a CSE revision
- Review the draft scope or list of changes with NCS Management
- Provide a copy of the draft scope or listing of CSE changes to the UPF NCS Management Approver for review prior to the kickoff meeting
- Convene a kickoff meeting to further develop the scope or listing of required CSE changes, using the initial draft as a starting point. A quorum to hold the kickoff meeting includes representatives from the following UPF Project organizations: NCS, Operations, Design Authority, Process, and Facility Safety. The kickoff meeting should be conducted using DI-PM-801768-A008, *UPF Task Previews and Job Briefs*, as a guide. During the kickoff meeting, the NCS Analyst reviews the draft scope or listing of CSE changes and facilitate a team discussion of any changes that need to be made. If time allows during the kickoff meeting, the NCS Analyst may review hazards identified on UCN-23408. If it has been decided a process walkdown should not be performed (as discussed in **Section 3.1.3, *Perform a Process Walkdown***), then the NCS Analyst reviews the hazards identified on UCN-23408 during the kickoff meeting
- As necessary to obtain input information applicable to the new CSE or revision, assign action items and realistic due dates to appropriate members of the kickoff meeting team and track the action items until all input information is obtained (i.e., track all kickoff meeting action items to completion)
- Seek Project management assistance, as necessary, to drive the action items to completion

3.1.3 Perform a Process Walkdown

A walkdown of the process being evaluated in the CSE is performed to evaluate the accuracy and completeness of the input information and the draft scope or list of changes for the new/revised CSE. A physical walkdown of the process should be performed if the construction/installation of the process is complete. If the construction/installation of the process has not started, the physical walkdown can be substituted with a virtual walkdown using the UPF 3D models and/or design documentation. If construction/installation is partially complete, a physical walkdown should be performed. In every case, a virtual walkdown to assure all relevant features of the process have been viewed should be performed.

When performing the virtual walkdown using the UPF 3D models, the NCS Analyst should secure the services of a member of the Project (i.e., Plant Design and/or Specialty Mechanical) who has expertise in the operation of the model. A quorum to conduct the virtual process walkdown includes representatives from the following UPF Project organizations: NCS, Operations, Design Authority, and Facility Safety. Any physical walkdown of the process may be limited to only NCS and Operations personnel.

The type(s) of walkdown performed and the results of the walkdown are documented in meeting minutes as discussed in **Section 3.1.4, *Document the Kick-off and Walkdown***. If a physical walkdown of the process was not performed, then the reason for not performing the walkdown should be documented on UCN-23331 and approved by NCS Management. If the hazards identified on UCN-23408 were not

reviewed during the kickoff meeting, then the NCS Analyst does so with the members of the virtual walkdown team.

Guidelines for performing the process walkdown are addressed by the following questions:

- Has anything in conflict with the process summary in the process description of the existing CSE been observed?
- Is the observed process consistent with the process boundary described in the scope for a new or revised CSE?
- Is there any equipment present that has not previously been associated with the process being evaluated?
- Are any of the observed interactions in conflict with the list of interface CSEs in the scope of a new CSE or boundaries description in Section 2 of an existing CSE?
- Do any portions of the process appear to be particularly susceptible to unwanted fissile material accumulations?
- Do any portions of the process appear to be difficult to monitor for fissile material accumulation?
- Does any equipment appear to be susceptible to unwanted damage or other upsets because of facility operations?
- Have any design changes been identified that would cost-effectively improve the overall safety of the process?
- Have any other changes or discrepancies been noted?

3.1.4 Document the Kick-off and Walkdown

After all kickoff meeting and process walkdown activities have been completed, the NCS Analyst documents the results in the meeting minutes template provided by NCS Management (used in lieu of UCN-23230A, *Pre-Job Brief/Mid-Job Brief and Task Preview Form*). The NCS Analyst provides a review copy of the meeting minutes to all team members and the UPF NCS Management for review and approval. The NCS Analyst works with each reviewer to resolve any comments.

3.2 CSE Development

The new or revised CSE is developed in accordance with the requirements of Y70-160, Y70-68-001 and Y70-150, *Nuclear Criticality Safety Program*, as well as the guidance of DG-EN-801768-A004, *UPF Criticality Safety Evaluation (CSE) Writer's Guide*, as supplemented by this DI. As discussed previously, the NCS Analyst utilizes UCN-23331 as a guide to assist in preparing the CSE. The NCS Analyst also utilizes UCN-23408 to help evaluate hazards for the operational process.

3.2.1 Perform Analysis of the Process Covered by the CSE and Generate New or Revised CSE Documentation

The NCS Analyst performs the CSE analysis and document the CSE in a manner consistent with Section B.4 of Y70-160, Section B of Y70-68-001, and DG-EN-801768-A004. The NCS Analyst also ensures the requirements noted in Appendix B of Y70-150 are followed during development or revision of the CSE. If, at any time, the analysis or the review of the CSE identifies required design changes, NCS

Management should be notified as soon as possible to minimize any delays in addressing the identified issue.

3.2.2 Perform Peer Review of the CSE

When the draft of the CSE is complete, the assigned Peer Reviewer performs a technical review. A full review of a new CSE is required. However, if a CSE revision, the scope of review may be limited to only the changes. Comments on unchanged portions of the CSE are permitted but are only addressed with agreement from SAE management. The Peer Reviewer utilizes all applicable technical basis documents for the process being reviewed and should have participated in the walkdown presented in **Section 3.1.3, *Perform a Process Walkdown***. If not, a separate walkdown for the peer reviewer is necessary at the start of the peer review activity.

After completing the Peer Review, the NCS Analyst and the Peer Reviewer work together to resolve comments from the technical review. Any comments or conflicts that cannot be resolved are presented to the UPF NCS Management Approver for final resolution.

Prior to submitting the document for NCS Management Review, Project Review and Validation, the analyst schedules a briefing with SAE Management to perform a cursory review of the following, as applicable:

- Any changes to the control set
- Modifications to credible abnormal conditions evaluated in the CSE
- Any reductions in margin between calculated k_{eff} and the Upper Subcritical Limit associated with a previously evaluated contingency

After all Peer Review comments are satisfactorily resolved and any required NCS Management briefing has occurred, the NCS Analyst and the Peer Reviewer sign the draft CSE and prepare the document for concurrent UPF NCS Management, Project, and Validation reviews.

3.3 NCS Management Review and CSE Project Review

During NCS Management Review, NCS Management reviews the CSE control set, at minimum, for consistency and reasonableness. The NCS Analyst and Peer Reviewer work together to resolve any NCS management comments

Simultaneous with NCS management review the draft CSE is submitted for UPF Project Interdisciplinary Review in accordance with the requirements of APA-UPF-3DP-G04B-00025, *UPF Engineering Interface Control*. ML-EG-801768-A017, *UPF Engineering Document Coordination Guide and Matrix*, should be consulted to ensure all appropriate disciplines participate in the Project Review process.

3.4 CSE Validation

Informal CSE Validation occurs concurrent with the Project review and NCS management review discussed in **Section 3.3, *NCS Management Review and CSE Project Review***, above, and in accordance with the Project schedule. According to Y70-160, the objective of the validation process for draft CSEs is to ensure the associated activity and equipment description is accurate and the requirements can

be correctly interpreted, understood by Operations personnel, field-verified, and implemented. This is the same as the Project Review objective, and therefore, can be conducted concurrently. Any comments that result from simultaneous Project Review, NCS management review, and informal validation are addressed by the NCS Analyst. The NCS Analyst and Peer Reviewer work together to develop proposed resolutions to any comments that require modification to the CSE.

Any proposed comment resolutions that result in any of the following conditions should be reviewed and accepted by the NCS Management Approver, and SAE Management, prior to NCS approval of UCN-21692, *CSR/CSA/CSE/TD Validation Checklist*:

- Changes in CSE controls
- Changes in process description
- Addition or removal of normal conditions and/or contingent conditions

When the draft CSE is a revision, reviewers should be asked to focus on the changes to the CSE; however, comments on other portions of the CSE should be accepted for inclusion in agreement with SAE Management. After all review comments are received, the NCS Analyst should work with reviewers to resolve comments. Any changes made to Section 6.1 or Section 6.2 of the CSE as a result of the review process should be discussed with SAE Management.

When all NCS Management, Project, and Validation review comments have been resolved, the CSE Peer Reviewer confirms all comments have been appropriately incorporated into the CSE. The NCS Analyst and Peer Reviewer work together to resolve any remaining comments.

After the NCS Analyst and Peer Reviewer agree all comments are appropriately addressed, Comment Resolution Forms and the Comment Resolution Package should be processed using guidance from DI-EG-801768-A031, *UPF Engineering Comment Resolution Package Routing.*

Disposition of comments by placing the comment into the SAE Tracking Database for inclusion in the next revision of the CSE may only be used with SAE Management agreement.

Any necessary design changes should be addressed via the formal Project change control process governed by UPF-3DP-G04B-00901.

3.5 CSE Implementation

The typical purpose of CSE implementation is to ensure:

- All passive and active engineered controls are in place and functional in accordance with the CSE
- Administrative controls have been appropriately incorporated in process operations
- Required procedures and postings are in place
- Required training of operating personnel has been completed
- Facility management is ready to accept the CSE as effective

The NCS Controls Crosswalk, which is part of the implementation process, involves a review and reconciliation of all requirements to ensure each is implemented in a consistent and effective manner.

The development and execution of the CSE implementation plan and the completion of the NCS Controls Crosswalk review is typically directed by a Criticality Safety Officer (CSO) from the Operations organization. CSE Implementation activities are conducted in accordance with Y70-160, Y70-07-001, *Criticality Safety Officer Operations*, and Y70-68-001 and make use of the following forms:

- UCN-22962, *CSE Requirements Implementation Plan*
- UCN-22963, *NCS Controls Crosswalk*

NCS organizational support of CSE Implementation work includes the following activities, as necessary:

- Perform facility walkdowns in support of implementation plan activities
- Approve and issue the CSE, along with any associated documentation
- Support the development and approval of the CSE implementation plan and NCS Controls Crosswalk
- Complete any NCS-assigned items on the CSE implementation plan

3.6 CSE Approval

Following the completion of CSE comment resolution activities and prior to the approval of the CSE, the NCS Analyst prepares UCN-23193, *UPF Engineering Change Proposal (ECP)*, to address the new or revised CSE. The Proposed Resolution section of the ECP should explicitly address the following, at minimum:

- Clear identification of the CSE being approved
- Any design requirement changes from the previously approved requirement and, when applicable, the previously approved ECP which authorized the change
- Any design requirement change that falls into the following categories as described in OT-EN-801768-A022, *UPF Nuclear Criticality Safety CSPS/DC-to-CSE Requirements Matrices*, such that it impacts requirement verification documents:
    - a “physical change”
    - a “prior-to-requirement verification”
    - a “prior-to-final verification” where any previous revision of the CSE requirement identified the requirement as “prior-to-requirement verification”
- Identification of any new (i.e., neither issued nor currently planned by either the Project design team or an equipment vendor) design document(s) necessary to demonstrate implementation of a design requirement

The affected documents list of the ECP should contain the following documents, as applicable:

- The CSE being approved
- RP-EN-801768-B002, *UPF Criticality Control Review* (if CSE controls are affected)
- Any other CSEs that may be impacted

- *Documented Safety Analysis for the Uranium Processing Facility* (Draft)
- If any portion of Chapter 6 of *Documented Safety Analysis for the Uranium Processing Facility* (Draft) needs to be modified to ensure alignment between the CSE revision and Documented Safety Analysis, then UCN-23193, along with the draft CSE, is presented for Project management approval in accordance with the requirements of UPF-3DP-G04B-00901
- OT-EN-801768-A022

After the ECP is approved, the NCS Analyst prepares the CSE for final approval, submits the document for management signatures, and submits the final approved document to Document Control.

Upon completion of all CSE-related tasks, the UPF CSE Analyst Checklist should be signed by the NCS Analyst and NCS Management to signify proper completion of the effort, and the completed checklist should be delivered to the signing member of NCS management for final disposition.

Once the CSE has been issued, update the SAE Database for all comments addressed in the new or revised CSE by annotating them as closed/resolved.

4.0 RECORDS

Records generated by this Desktop Instruction shall be maintained in accordance with Y15-95-800, *UPF Document Management*. Record types for documents managed by the UPF Document Management Center (DMC) in InfoWorks are identified in ML-PS-801768-A004, *Uranium Processing Facility Project Records Retention and Turnover List*, as prescribed by Y15-95-806, *UPF Records Retention and Turnover*. In accordance with E-PROC-3114, *Records Management*, Quality Records are deemed Lifetime or Nonpermanent. The record Quality Type will be identified as Quality-Lifetime (QA-L) or Quality-Nonpermanent (QA-NP) for Quality Records. All non-quality records will be designated Non-Quality (Non-QA).

Records generated during the performance of this Desktop Instruction include:

Record or Form Number	Record Title	Record Holder	System/ Location	Document Type	Quality Type
Document Specific	*Criticality Safety Evaluation*	UPF DMC	InfoWorks	CSE	QA-L
Document Specific	*Meeting Minutes*	UPF DMC	InfoWorks	MM	Non-QA

5.0 REFERENCES

5.1 Source References

None

5.2 Interfacing References

APA-UPF-3DP-G04B-00025, *UPF Engineering Interface Control*

DG-EN-801768-A004, *UPF Criticality Safety Evaluation (CSE) Writer's Guide*

DI-EG-801768-A031, *UPF Engineering Comment Resolution Package Routing*

DI-PM-801768-A008, *UPF Task Previews and Job Briefs*

E-PROC-3114, *Records Management*

ML-EG-801768-A017, *UPF Engineering Document Coordination Guide and Matrix*

ML-PS-801768-A004, *Uranium Processing Facility Project Records Retention and Turnover List*

OT-EN-801768-A022, *UPF Nuclear Criticality Safety CSPS/DC-to-CSE Requirements Matrices*

RP-EN-801768-B002, *UPF Criticality Control Review*

UCN-21692, *CSR/CSA/CSE/TD Validation Checklist*

UCN-22962, *CSE Requirements Implementation Plan*

UCN-22963, *NCS Controls Crosswalk*

UCN-23193, *UPF Engineering Change Proposal (ECP)*

UCN-23230A, *Pre-Job Brief/Mid-Job Brief and Task Preview Form*

UCN-23331, *UPF CSE Analyst Checklist*

UCN-23408, *UPF CSE Hazard Evaluation Checklist*

UPF-3DP-G04B-00901, *UPF Technical Change Control*

Y15-95-800, *UPF Document Management*

Y15-95-806, *UPF Records Retention and Turnover*

Y70-07-001, *Criticality Safety Officer Operations*

Y70-150, *Nuclear Criticality Safety Program*

Y70-160, *Criticality Safety Approval System*

Y70-68-001, *Criticality Safety Approval/Requirements Development, Review, and Approval*

6.0 SUPPLEMENTAL INFORMATION

Appendix A, *Acronyms and Definitions*

APPENDIX A
Acronyms and Definitions

Acronyms

CSE	Criticality Safety Evaluation
DI	Desktop Instruction
ECP	Engineering Change Proposal
NCS	Nuclear Criticality Safety
QA-L	Quality-Lifetime
SAE	Safety Analysis Engineering
SDD	System Design Description
UPF	Uranium Processing Facility

Definitions

None