

**Nuclear Criticality Safety Program Roadmap 2021 Report and Status of Improvements** 

Mission Engineering

**Y-12 Operations** 

**Performance Excellence** 

4/8/2021

This document has been reviewed by a CNS Dual Authority DC/RO and confirmed to be UNCLASSIFIED and contains no UCNI.

Name: Michael Crouse Date: 04/22/2021

CNS eDC/RO ID: 306333

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# Y-12's mission invests in NCS people, processes, and systems to ensure safe mission delivery

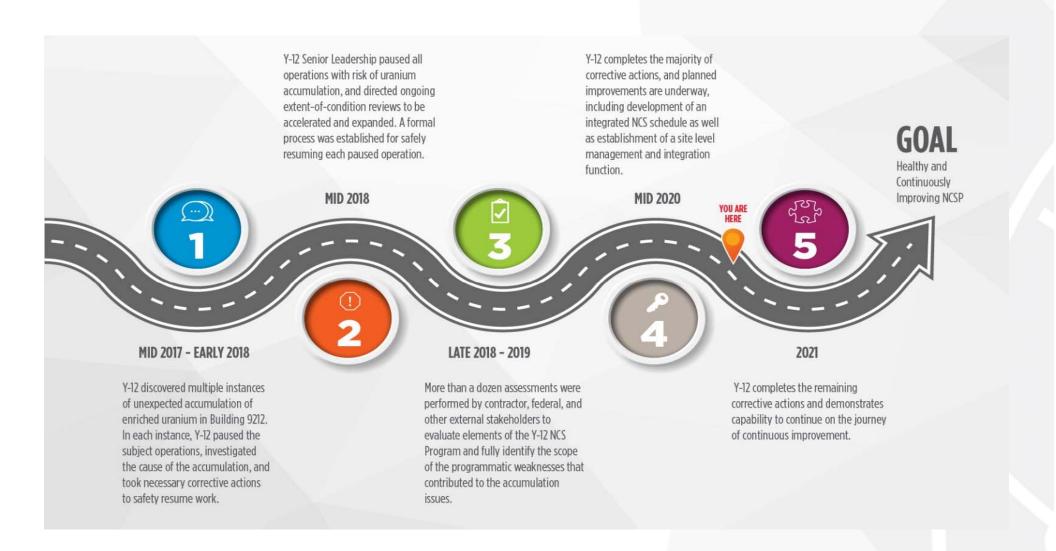
#### To fulfill this mission, we have:

- ✓ Established ownership and standards
- ✓ Improved Nuclear Criticality Safety Program (NCSP) oversight
- ✓ Increased NCSP support
- ✓ Developed and maintained a resource loaded, integrated schedule
- ✓ Completed Inadvertent Accumulation Prevention Program (IAPP) revitalization

#### In addition we will:

- Complete implementation of remaining key elements for addressing process drift, Sep 2021
- Complete prove in of the 5 year cycle for Criticality Safety Evaluation (CSE) updates, Sep 2021
- > Establish the foundation for integrated production training, Sep 2021

# **Our Journey**



# **Personnel Training and Qualification**

#### **Completed Actions:**

2018 2019 2020 2021 Practical Evaluation Completed ANSI 8.19 training Conducted Production Initiated training on the Curriculum updated for supervisors and support Pauses CSE controls for hands-on personnel Briefed Lessons workers and supervisors Updated NCS Fissile Learned Improved Supervisor/operator Developed formal training Worker training qualifications for field walk down Updated NCS Training Established On-the-Job training instructions for Supervisors Issued Process Engineering •Implemented oral board Conducted One improvement plan process for Production Mission Pauses Initiated Statistical process Supervisors Issued NCS and control program Issued Process **Production Training**  Initiated Familiarization Engineering training and Improvement Plan Briefings qualification program

## **Actions in Progress:**

- Institutionalize formal training to hands-on workers and supervisors on CSE controls (Apr 2021)
- ➤ Update Criticality Safety Officer (CSO) training profiles (Apr 2021)
- ➤ Conduct briefings on the CSE controls for technical staff (Sep 2021)
- Transition on-the-job training (OJT) responsibilities from Production to Training (Sep 2021)

## **Execution of NCS Duties and NCS Program Maintenance**

### **Completed Actions:**

2020 2021

- •Established an integrated, resource loaded schedule
- Added CSE implementation to schedule
- •Established clear roles, responsibilities, accountabilities, and authorities
- Dedicated role for NCS programmatic integration
- Initiated Systematic Review process

- •Established a comprehensive metric for tracking NCS deficiencies and minor non-compliances and understanding the causes
- •Identified weaknesses in container and material handling
- Issued guidance for accomplishing systematic reviews
- Update integrated schedule for systematic reviews

### **Actions in Progress:**

- Complete improvements to the general handling procedure (Jul 2021)
- Conduct an independent assessment of the improved general handling procedure (Sep 2021)

# Inadvertent Accumulation Prevention Program (IAPP) Revitalization

## **Completed Actions:**

2018	2019	2021
<ul> <li>Reviewed all open recommendations</li> <li>Performed walk downs of operations</li> </ul>	<ul> <li>Improved guidance (Y70-162, Inadvertent Accumulation Prevention Program)</li> <li>Created links between Criticality Safety Evaluations (CSEs) and IAPP for consistent reports</li> <li>Required IAPP report review during annual Operational Review</li> <li>Updated qualification and trained NCS Engineer and Criticality Safety Officer</li> </ul>	<ul> <li>Conducted independent assessment of IAPP</li> <li>Completed revision of all IAPP reports</li> </ul>

# Large Geometry Exclusion Area (LGEA)

### **Completed Actions:**

#### 2020

- Updated database of equipment items in Large Geometry Exclusion Area (LGEA)
- Performed surveillances

#### **Actions in Progress:**

- ➤ Completion of self-identified weaknesses in LGEA program (Jun 2021)
- ➤ Establish site level uranium solution control program preventing collection of concentrated uranium solution in unfavorable geometry equipment and containers (Jun 2021)
- Address identified issues with work execution and non-compliant items entering LGEAs (Oct 2021)
- ➤ Establish long-term requirements in the maintenance command media to address the concerns addressed by SO-Y-12-21-0004 (Dec 2021)

New documented standards ensure early detection and swift response

# **Out of Service (OOS) Equipment**

#### **Completed Actions:**

2019 2020

- Updated qualification and conducted training for NCSE & CSO
- Established formal criteria for cleanout and isolation
- Removed 5 systems per modern criteria

- Initiated disposition of legacy OOS equipment
- Reviewed uranium hold-up in OOS equipment
- Included disposition of legacy OOS equipment in extended life program
- Removed 11 systems per modern criteria

## **Actions in Progress:**

➤ Complete activities to bring OOS equipment into compliance with formal criteria established as part of NCS program updates (May 2021)

Enhanced OOS program requirements establish NCS compliance

# **CSE Updates & Implementation**

## **Completed Actions:**

2017 2018 2019 2021

- Evaluation and identify Potential Nuclear NCS Issues (PNI)
- Process documentation walk down
- Collaborative hazard analysis evaluation process
- Develop health of CSE metric to govern updates
- Review administrative afterthe-fact measurement-based criticality safety controls for potential improvement
- Revise CSE update scoping form to resolve legacy calculation assumptions not captured as controls

## **Actions in Progress:**

- ➤ Eliminate implementation backlog for FY 2019 and FY 2020 Criticality Safety Evaluation (CSE) updates (Sep 2021)
- Complete 25 Criticality Safety Evaluation (CSE) updates to prove-in 5 year cycle (Sep 2021)
- Implement a Non-Special Nuclear Material CSE to provide consistency across multiple buildings (Aug 2021)

CSE Updates + Implementation enable consistent field execution

# **Change Management: Unintended Process Change (drift)**



Strengthened recognition and barriers to reduce unintended process change

# **Actions to Address Unintended Process Change**

#### **Completed Actions:**

- ✓ Established collaborative hazards analysis evaluation process to support development/update of CSEs (2018)
- ✓ Included hands-on worker as part of the Operational Review Process (2018)
- ✓ Improved maintenance, update, and control of IAPP reports and established links to CSEs, UHSP monitoring reports, and Operational Reviews(2019)
- ✓ Conducted Statistical Process Control training and initiated control charts (2020)
- ✓ Updated command media for Process Descriptions (2020)
- ✓ Completed ANSI 8.19 NCS training for supervisors and support personnel (2020)
- ✓ Established training for why behind the NCS controls (2021)

#### **Actions in Progress:**

- ➤ Update all process descriptions (May 2021)
- ➤ Initiate changes to the Integrated Safety and Change Control Process and the Technical Procedure Process to strengthen process drift recognition (Jun 2021)
- ➤ Benchmark high-reliability chemical process facilities (Aug 2021)
- ➤ Complete unintended process drift training (Sep 2021)

# **Floor Level Improvements**

#### Teamwork

Tiered escalation process provides problem solving at the level closest to the work and a structure to escalate action for quick resolution

#### Communication

Value Stream Organization alignment prevents organizations from operating in silos

#### Set High Standards

NCS command media have institutionalized improved processes

#### Continuous Improvement

CSE Updates remove ambiguity in controls, ensure consistent field implementation, and revisits technical basis

Verbatim Compliance & Understanding Controls
Systematic reviews ensure balance between procedures and training

## CSO and NCS Staffing Communication **NCS** Analysis Multidisciplinary and Controls Teams **IAPP Process Procedures NCSP IMPROVEMENTS** Operational **Program** Sustainability Reviews **Process Training** Description Process Drift

#### Eliminate Undesirable

Conditions
Implemented predictive
methods to tie production
activities to cleanout
frequencies

Own the Outcome
IAPP updates tied to
Uranium Holdup Survey
Program measurements,
CSE updates, and

**Operational Reviews** 

## Participative Decision Making

Operational Reviews and Hazard Evaluations provide opportunity to communicate with hands-on worker and ensure compliance with requirements

#### **Questioning Attitude**

SMEs for processes are change agents for understood changes and recognition of process drift

# **NCS Program Continuous Improvement**

- Actions are focused on improvement and sustainability
  - ✓ We have improved oversight resulting in assessments and walk downs that
    have self-identified issues and set high standards
  - ✓ We have updated CSEs that improved/clarified control sets, incorporated operator feedback, and provided flexibility to production
  - ✓ We have changed procedures or processes that broke down stove pipes resulting in improved communications across organization reducing the likelihood of unanticipated process change
  - ✓ We have improved Production engagement and ownership of NCS Program
- While individual issues may still occur, the NCS program is in place to minimize their occurrence and respond appropriately when they do occur and CNS operations are safe to continue
- Continued management engagement and oversight will insure high standards are maintained

CNS is committed to institutionalizing long-term improvements to the NCS program