

Lessons Learned from Crediting Safety Programs for NCS

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Safety Programs at Y-12

Examples of the 13 Safety Programs that NCS can credit include:

- **Large Geometry Exclusion Areas (LGEA)**
 - Small geometry items/equipment in chemical processing areas.
- **Inadvertent Accumulation Prevention Program (IAPP)**
 - Team of Subject Matter Expert (SMEs) determine ways to prevent uranium accumulations in unfavorable geometries.
- **Uranium Holdup Survey Program**
 - Non-destructive Analysis techniques employed to determine uranium holdup in hard to reach/observe areas (e.g., ventilation).
- **Configuration Management**
 - Equipment and documentation tied to safety systems and/or processing systems are maintained to certain specifications.
- **Conduct of Operations**
 - Prescribes how work is accomplished (e.g., procedural requirements, training, etc).

Ownership of Safety Programs

- **Large Geometry Exclusion Area**
 - Primary – Criticality Safety Officer (CSO)
 - Secondary – NCS
- **Inadvertent Accumulation Prevention Program**
 - Primary – NCS
 - Secondary – CSO
- **Uranium Holdup Survey Program**
 - Primary – NDA Engineering
 - Secondary – NCS and NMC&A
- **Configuration Management**
 - Primary – Production Operations
- **Conduct of Operations**
 - Primary – Production Operations

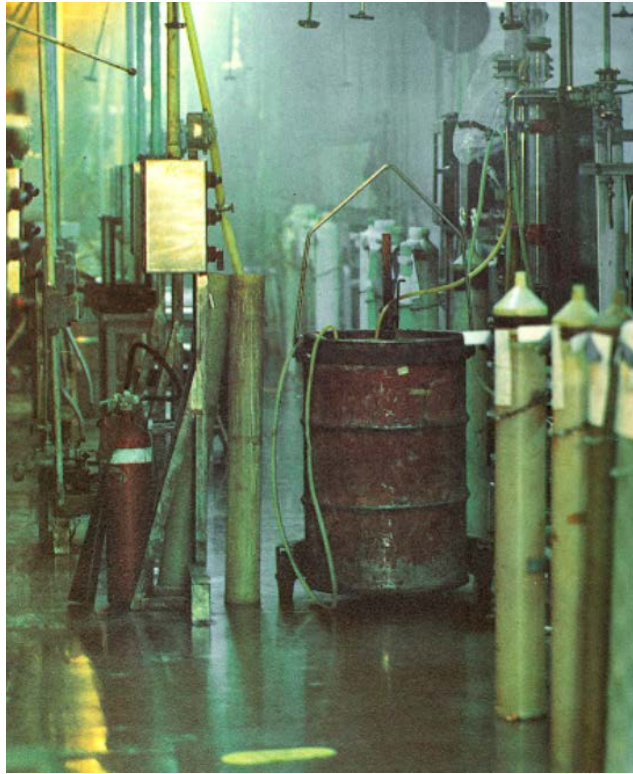
What is the Large Geometry Exclusion Area (LGEA) Program?

- A program that NCS relies on at Y-12 that prevents large geometry equipment from being brought into chemical processing areas without NCS approval.
 - Large electrical boxes
 - Cabinets
 - Foam padded chairs
 - Drums



Background for the LGEA Program

- **1958 Criticality accident**
- **1958-1990s**
 - Restriction on geometries
 - Reliance on NCSE judgement
 - Limited controls
- **1990s to 2000s**
 - Formality established
 - Documented information
 - Drain holes
 - Floor elevation
 - Berm heights



Background for the LGEA Program

- **2000s to Present**
 - Very minor changes for 20 years to the formal program documentation
 - NCSE judgement still a large factor for justification for safety
 - Formal training developed for all people with access to LGEAs
 - Formally placed on Configuration Management documentation



Issues Identified through LGEA Program Review

- Roles and responsibilities for the LGEA program were not understood by all required disciplines.
- LGEA program was not kept up to same standards as other NCS documentation.
 - Informal LGEA practices not placed into LGEA program
 - Holes in walls (e.g., bolt hole not filled in after maintenance)
 - Inspections/Oversight
 - Maintenance activities
 - Limit engineering judgement
- Baseline of all LGEAs was not performed with each change to the program.
 - Lack of fixed and portable equipment being identified and uniquely labeled
 - Over 200 items not identified in the LGEA equipment list

Lack of changes to program due to unclear roles and responsibilities propagated issues with documentation and oversight.

IAPP Program

- **Team of Subject Matter Experts (SMEs) for a given process determine the past method of preventing accumulation of fissile material from occurring.**
 - Performed through walk downs, inspections, and NDA measurements.
- **Formal report documents the SMEs findings and any recommendations from the SMEs.**
 - Recommendations are reviewed by a council made up of NCS, CSO, Engineering, and Production Operations Management for implementation of the recommendation.
- **Accumulation is typically prevented by housekeeping and filtration.**
- **Nondestructive monitoring is used to keep accumulations within subcritical limits for areas that cannot be observed (e.g., ventilation).**

Background for the IAPP Program

- Long established UHSP for accountability of fissile material
- **2007 – Dollinger Filter accumulation issue**
 - 2,200 grams unexpectedly held up in filter housing
- **IAPP established to prevent unexpected accumulation issues from being identified.**
 - IAPPs recommendations were placed into an issues tracking system
 - Only the most significant issues remained in the tracking system (most issues removed or corrected)
- **2017 Reduction and Casting accumulation issues**
 - Reduction – 2018 Winter ANS Paper “*Concurrent Uranium Overmass and Hydraulic Fluid Leak*”
 - Casting – 2019 ICNC Paper “*Uranium Accumulations in Casting Operations*”
- **IAPPs were reevaluated**
 - All recommendations were placed in an issues tracking system

Accumulation Issues



Issues Identified through Accumulation Issues

- IAPP was not kept up-to-date
 - Recommendations not fully addressed
 - Continual NCS oversight of program not performed
- Process change led to out of date IAPP Reports
 - No emphasis to perform IAPP walk downs periodically or when processes changed
- Lack of IAPP Awareness
 - No formal training for all organizations that have a defined role.

Lack of program ownership led to recommendations not being addressed and program being maintained.

Uranium Holdup Survey Program

- Established as a non-destructive assay method to monitor accumulations of fissile material for accountability purposes.
- NCS uses data to aid in CSE evaluations and establishing cleanout limits.
- UHSP went through an assessment as part of a management directed review of credited programs.
 - Contrary to IAPP and LGEA the UHSP program had multiple strengths.
 - Training of operators by NDA Engineering personnel was continuously occurring.
 - Data from monitoring and the program was continuously updated to ensure the UHSP program is responsive to changes
 - Clear roles and responsibility established through strong communication from the NDA Engineering organization.
 - Minimal opportunities for improvement or weaknesses identified.

Program has clear ownership which propagates better understanding, training, and continuous improvement.

Lessons Learned

- Update documentation for safety programs
- Clear roles and responsibilities.
- NCS needs to provide oversight of every credited program
- Ensure that programmatic changes are vetted prior to implementation.

With clear roles and responsibilities safety programs will stand a greater chance at being kept up to date and continuous improvement maintained.

Corrective Actions Applied for Lessons Learned

- Update documentation for safety programs
 - Programmatic changes have been made to ensure safety program reliance
- Clear roles and responsibilities.
 - Training updates
- NCS needs to provide oversight of every credited program
 - Formal assessments established
- Ensure that programmatic changes are vetted prior to implementation.
 - LGEA reviews by SMEs

With programmatic changes happening the IAPP and LGEA programs will be on the right path for sustained success and continuous improvement.

Any Questions?



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