

Y-12 INFORMATION CONTROL FORM

DOCUMENT DESCRIPTION (Completed by Requesting Organization)

Document No. None Date of Request 6/7/2011 Requested Date of Release (Allow 5 to 10 Working Days) 6/22/11 Page Count 14

Unclassified Title Inadvertent Accumulation Prevention Program at the Y-12 National Security Complex

Author's / Requestor's Name Sandi Larson User ID LLS Telephone No., Pager No. and Fax Number 574-3401 / 916-3448 / 576-1785

INTENDED AUDIENCE: [X] Public [ ] Environmental Regulators [ ] NSE\* [ ] DOE Contractors [ ] Other

TYPE: [ ] Abstract [ ] Brochure [ ] Co-op Report [ ] Formal Report [ ] Informal Report [ ] CD [ ] Invention Disclosure [ ] Journal Article [ ] News Release [ ] Photograph/Visuals [ ] Technical Progress Report [ ] DVD [ ] Thesis/Term Paper [ ] Videotape [ ] Other [X] Oral Presentation (identify meeting, sponsor, location, date): American Nuclear Society Annual Meeting, Hollywood, Florida, June 26-30 2011 (Abstract previously released for publication)

PATENT OR INVENTION SIGNIFICANCE [ ] Yes [X] No (Identify) Document will be published in proceedings [ ] Yes [X] No Document has been previously released [ ] Yes [X] No (Reference) Document will be distributed at meeting [X] Yes [ ] No

This document contains unclassified controlled information: [ ] YES [X] NO (If yes, please identify below.)

- [ ] Unclassified Controlled Nuclear Information (UCNI) [ ] Intellectual Property Information [ ] Internal Use Only [ ] Export Controlled Information [ ] Proprietary Information [ ] Official Use Only [ ] Privacy Act Information [ ] Applied Technology Information [ ] Work For Others or CRADA [ ] Copyrighted Information [ ] Other Sensitive Information

ORGANIZATION REVIEW AND APPROVAL (Completed by Requesting Organization)

DERIVATIVE CLASSIFIER (DC) & UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION REVIEWING OFFICIAL (UCNI ROI) REVIEW TITLE Level U Category ABSTRACT Level N/A Category DOCUMENT Level U Category Chris Hought Chris Hought # 6/7/11 Please Print Name Signature Date DOCUMENT REQUEST APPROVED (Organization/Department Mgr.) Chris Hought, NCS Chief Engineer Please Print Name and Title Chris Hought 6/7/11 Signature Date

APPROVAL AND RELEASE (Completed by the Classification and Technical Information Office)

CLASSIFICATION OFFICE REVIEW TITLE ABSTRACT DOCUMENT Level Category Weapons Data Sigma Y-12 Classification Office Date Operations Security (OPSEC) Date Date Received

DISTRIBUTION: [ ] UNLIMITED [ ] LIMITED [ ] SPECIAL LIMITED [ ] DOE-OSTI: Distribution Category [ ] OTHER

Distribution Remarks:

- [ ] Release subject to use of the following admonitory markings and conditions [ ] Disclaimer [ ] Copyright [ ] Patent Caution [ ] Other

Request Approved Y-12 Technical Information Office Date

\* NSE - Nuclear Security Enterprise

Conditions/Remarks:

---

# **Inadvertent Accumulation Prevention Program at the Y-12 National Security Complex**

**Sandi Larson – NCS Engineer  
Bev Lomax – Criticality Safety Officer  
Cynthia Gunn – Non-Destructive Analysis**



---

This work of authorship and those incorporated herein were prepared by Contractor as accounts of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor Contractor, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, use made, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency or Contractor thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency or Contractor thereof.



# Origination of IAPP

---

- Identification of excess holdup in various components occurred in 2005-2006 timeframe
- IAPP was one of the corrective actions
- Provides a comprehensive review of areas where holdup can accumulate to
  - 1) consider need for additional engineered features to reduce accumulation
  - 2) select mechanism for managing holdup such as periodic cleanouts, filter changeouts, or equipment monitoring
  - 3) review holdup monitoring points surveyed under the Uranium Holdup Survey Program (UHSP)

# UHSP Overview

---

- Supports NCS and NMC&A
- Operations scans UHSP points with gamma monitor on scheduled frequency
- Results sent to UHSP database managed by NDA group
- Points with cps above “action value” are termed high points
- High Point Resolution
  - NDA remeasures point with gamma monitor
    - If below action value, high point is resolved
  - NDA estimates the mass at the point and in the area around it or “zone”
  - mass estimate sent to NCS and NMC&A
- If point repeatedly alarms, NDA requests action value increase
- NCS writes a peer reviewed justification before approving the increase

# IAPP Process

---

- Team led by CSO with NCS, NDA, System Engineer and Operations
- Reviewed previous holdup reports
- Walked down entire system
- Wrote report with recommendations for improvement
- Baselined over 60 existing systems in 2 years
- NCS engineer determines if IAPP review needed for changes to existing systems
- IAPP review required for new systems

# IAPP Walkdown

---

- Scanned ventilation with gamma meter
- Looked at connected processes and filtration features to identify those needing improvement based on existing holdup
- Evaluated use of UHSP and the point locations
  - identified areas that were hard to measure
  - identified equipment that could be cleaned out instead of using UHSP
  - evaluated survey frequency
  - identified equipment where a mass quantification wouldn't be accurate

# IAPP Recommendations

---

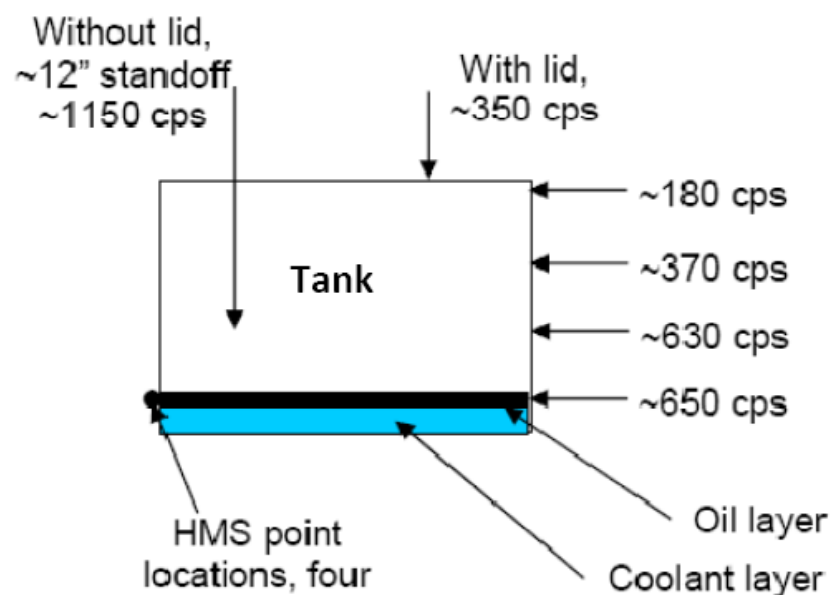
- Recommendations were binned into 5 categories

Description	Approximate Number of Recommendations
Increases Safety	2
Improved Detection	129
IAPP Methodology Change	28
Efficiency Improvement	71
Housekeeping	35
Other	3
Total	268



## Increases Safety

- One system was redesigned to add HEPA filters before a large, complex vacuum producer where internal mass could not be estimated
- Tanks of machine coolant had higher than expected NDA mass estimates with high uncertainty due to large geometry and unknowns in uranium distribution. They were cleaned out. Laboratory analysis of the coolant was within the uncertainty range of the NDA estimate. Also found higher uranium content in oil layer that separates and floats on top of machine coolant. UHSP point relocated to ensure this layer is scanned & requirement for periodic cleanout of tanks added to remove this layer.



# Improved Detection

---

- Engineering/Operations actions to reduce accumulation
  - evaluate other filtration options
  - evaluate fissile material handling practices
- NDA group actions
  - add or relocate UHSP points to areas of greater accumulation
  - re-evaluate action value
  - NDA mass estimate needed based on count rate
  - increase measurement frequency
  - improve instructions/training for monitoring a point

# IAPP Methodology Change

---

- Revision to CSE needed to change requirement
- Replace UHSP monitoring with periodic clean-out
  - roughing filters and mist eliminators
  - glovebox plenums where meter doesn't reach
- Remove UHSP monitoring downstream of HEPA filtration or on favorable geometry ductwork

# Efficiency Improvement

---

- Delete UHSP points
  - generally downstream of HEPA filtration
  - many retained for NMC&A
- Reduce measurement frequency

## Housekeeping/Other

---

- Update point description or CSE reference in UHSP database
- Replace UHSP point labels in field
- Remove old UHSP labels in field
- Update UHSP point maps

# Recommendation Progress

---

- Prioritized as High, Medium and Low
- High tracked to completion including Increase Safety category
- Medium and Low being worked as CSE is revised, etc.
- Engineering evaluations are complete but many design changes still in progress

# Conclusions

---

- IAPP Program baseline took a lot of time and resources but was necessary and valuable
- Identified several areas where engineered controls or changes in operations were needed to reduce the accumulation rate
- Validated the monitoring point locations to strengthen the UHSP program
- Gave confidence that there is not an unknown area of high U accumulation
- Consistent approach to CSE requirements for holdup