Implementation of Equipment Based Obligations

Lessons Learned

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Dominion

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Background

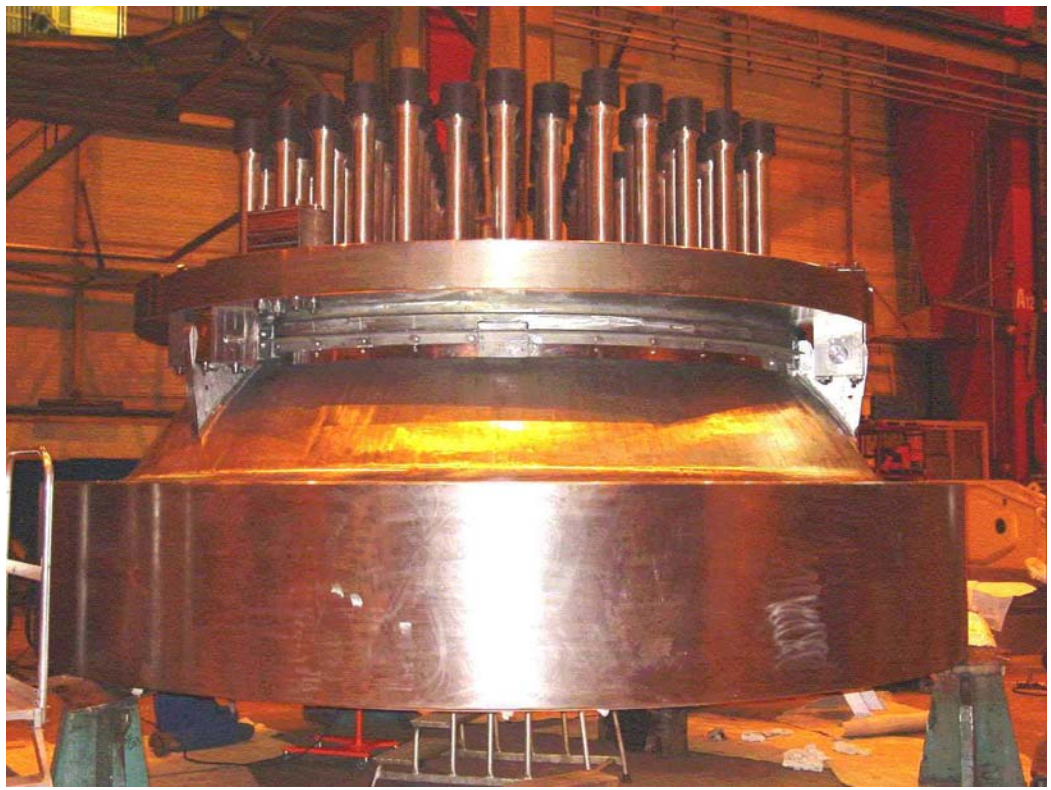
- U.S./Japan Agreement for Peaceful Nuclear Cooperation
  - Came into force on July 17, 1988
  - Identified four items as equipment that have obligations attached:
    - Reactor Primary Coolant Pumps, as complete units
    - Reactor Control Rods, as complete units
    - Reactor Fuel Charging and Discharging Machines, as complete units
    - Reactor Pressure Vessels, either as a complete unit or as major shop-fabricated part

Background

- How this started!
  - Early during the 1990s, initial indications of through wall cracks were discovered at the Control Rod Drive Mechanisms (CRDMs) penetrations on Reactor Vessel Heads
  - December 2001, Dominion ordered four Reactor Vessel Heads from Mitsubishi Heavy Industries (MHI) for initial delivery in March 2003
  - March 2002 Davis-Besse Reactor Vessel Head inspection revealed a large wastage at the CRDM penetration due to corrosion from primary coolant leak

Background

- Reactor Pressure Vessel Head



Background

- How this started! (Con't)
  - Fall 2002, North Anna 2 Refueling Outage
    - Reactor Vessel Head inspection revealed anomalies
    - Repairs waived, Reactor Vessel Head replacement option accelerated
    - Obtained replacement Reactor Vessel Head from Framatome/Areva (no obligations attached)
  - 2003, Three more Reactor Vessel Head replacements were complete
    - North Anna 1 and Surry 1 with Reactor Vessel Heads from Framatome/Areva (no obligations attached)
    - Surry 2 with Reactor Vessel Head from MHI (obligations attached)

Reporting

- Reporting to NMMSS
  - This is the first time foreign obligations have been attached to equipment in the U.S.
  - Guidelines For Reporting:
    - Obligation not applied until initial criticality
    - Obligation changes to be posted by end of year or in accordance with requirements set in NRC letter of notification
    - NMMSS processes as an Onsite Gain and Loss

Reporting

- Reporting to NMMSS (Con't)
  - Create a Nuclear Material Transaction Report
  - For each material type and country attaching obligations
    - One line entry will be the removal of the original obligated quantity of material
    - Next line entry will restore that same quantity of material with the new obligation
    - If the material was originally un-obligated, one line entry will add the new obligation

Reporting

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FILE NAME:YNX56.TXT
CREATION DATE:      12/10/2003
YNX YNX     56 A M100                                                  12102003
YNX YNX     56 A M70120  -87370100    -96230031
YNX YNX     56 A M70220   87370100     96230081
YNX YNX     56 A M70320-1981484800  -7656340033
YNX YNX     56 A M70420 1981484800   7656340083
YNX YNX     56 A M70520-1653397100  -3310720091
YNX YNX     56 A M70620 1653397100   3310720084
YNX YNX     56 A M70720-1074892500  -2268110092
YNX YNX     56 A M70820 1074892500   2268110085
YNX YNX     56 A M70920 2293346500   6018040034
YNX YNX     56 A M71050    -914100           31
YNX YNX     56 A M71150     914100           81
YNX YNX     56 A M71250   -2215300           33
YNX YNX     56 A M71350    2215300           83
YNX YNX     56 A M71450  -12978400           91
YNX YNX     56 A M71550   12978400           84
YNX YNX     56 A M71650   -8089200           92
YNX YNX     56 A M71750    8089200           85
YNX YNX     56 A M71850   12559600           34
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Reporting

- Reporting to NMMSS (Con't)
  - The Nuclear Material Transaction Report was uploaded to the NMMSS
    - An error message was created (as expected)
    - A phone call was placed to Dominion
    - An explanation was given
    - The error was over-ridden and the processing was completed

Lessons Learned

- Issue
  - Material Balance Report created for July 2004
    - Ending Inventories for Obligated materials were examined
      - All ending inventories looked reasonable, EXCEPT
      - Uranium Inventory (E1) for Euratom material (33) was negative
    - What's up with that?

Lessons Learned

- Investigation
  - Examined the BIN, EOC, BOC, and EIN TOTE runs
    - Search for anomalies in data
  - Verified material quantities layered with Japanese Obligation
    - Reviewed Nuclear Material Transaction Report
  - Obtained copy of NMMSS Obligation Material Balance Report
    - Showed activities associated with the obligated inventory

Lessons Learned

- Discovery
  - The only Uranium with Euratom Obligations, under irradiation, was in Surry Unit 2 (Unit with the Japanese Head)
  - Unit 2 had a refueling outage during the reporting period
  - The negative Euratom inventory equaled the Fission & Transmutation (F&T) of Uranium from the BIN to EOC for Unit 2
  - Plutonium was also affected by this same issue
  - The code used to create the MBRs did not differentiate between the cycles where the obligations were applied

Lessons Learned

- Solution
  - Separate the isotopic changes
    - By cycle
    - By Fuel Assembly
  - Apply obligations based on the cycle where the changes occurred
  - Recalculate the Obligation based Ending Inventory
  - Re-distribute the ICTs on the Nuclear Material Transaction Report based on the recalculated obligations

Lessons Learned

- Conclusion
  - Changes to reporting software may be necessary to address the implementation of equipment based obligations
  - Attention must be given to isotopic changes that occur before and after implementation of obligations

- Comments or Questions?