Implementation of Equipment Based Obligations

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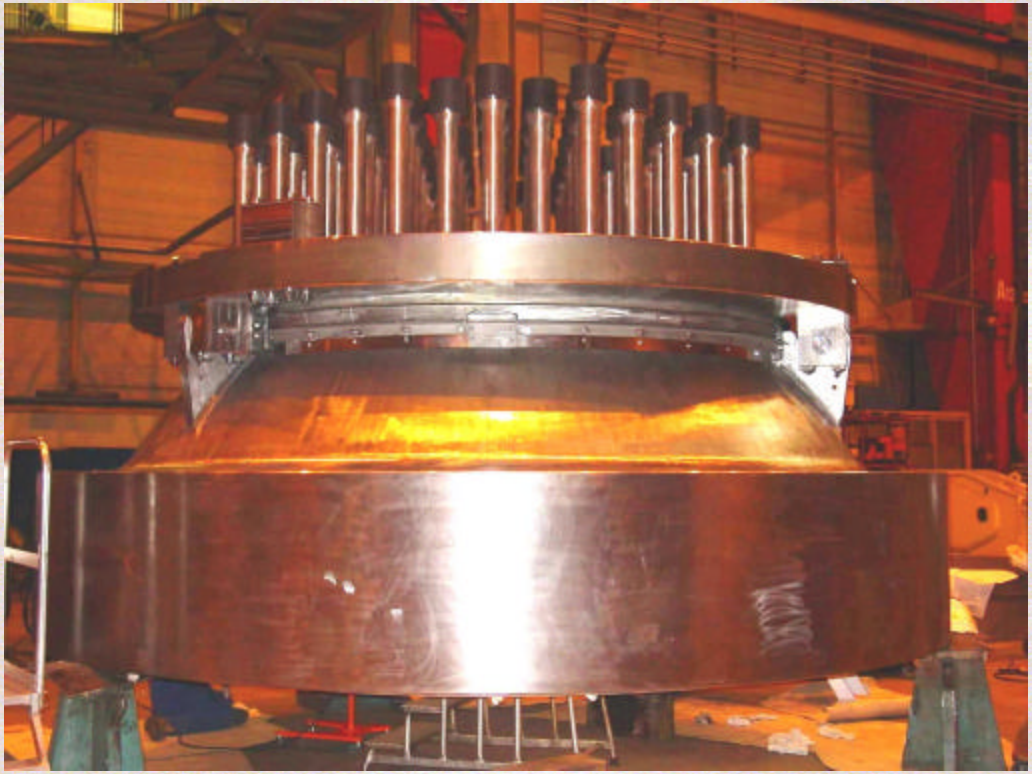
Background

- 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 order four Reactor Vessel Heads from Mitsubishi Heavy Industries (MHI) for initial delivery in March 2004
  - 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 elected
    - Obtained replacement Reactor Vessel Head from Framatome
  - 2003, Three more Reactor Vessel Head replacements were complete
    - North Anna 1 and Surry 1 with Reactor Vessel Heads from Framatome
    - Surry 2 with Reactor Vessel Head from MHI

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 Pressure Vessels, either as a complete unit or as major shop-fabricated part
    - Reactor Fuel Charging and Discharging Machines, as complete units
    - Reactor Control Rods, as complete units
    - Reactor Primary Coolant Pumps, as complete units

Background

- Dominion's Notification and Actions
  - The Project Manager for the Reactor Vessel Head Replacement was verbally notified by the Dept. of State that Dominion would come under the U.S./Japan Agreement
  - SNM Program Administrator was contacted
  - Discussions ensued:
    - Dept. of State ➔What does this really entail?
    - NRC ➔What are the requirements?
    - NAC ➔How do we communicate with the NMMSS?
    - Dominion ➔How do we accomplish this?

What does this really entail?

- Department of State
  - Affects Nuclear Material used in or produced through the use of the reactor on which the reactor head is installed
  - Reports to the NMMSS regarding the quantities of material affected
  - Annual Reports to the Government of Japan

What are the Requirements?

- NRC
  - This is the first time foreign obligations have been attached to equipment in the U.S.
  - The U.S./Japan Agreement establishes the requirement
  - NRC letter to Dominion provided official notification
  - Equipment based obligations are not addressed in domestic documents
  - NRC, NAC, and Dominion established a method to accomplish goal

What are the Requirements?

- NRC (Con't)
  - Guidelines included:
    - Obligation not applied until initial criticality
    - Obligation changes to be posted by end of year
    - NMMSS processes as an Onsite Gain and Loss
    - Post Irradiation Exams do not require specific prior Japanese Government consent for export
    - Obligation would continue until SNM is no longer significant for safeguards
    - Installation of Control Rod Drive Mechanism will not create obligations on Nuclear Material

How do we communicate with NMMSS?

- NAC
  - Equipment based obligations were not part of the design of the NMMSS
  - NMMSS coding did not provide an easy, error free vehicle to input equipment based obligations
  - A procedure was developed to input revised obligations
  - New obligation codes were created

How do we accomplish this?

- Teamwork
  - Dominion's Nuclear Core Design Group
    - Needed to provide isotopic data associated with all of the fuel that was used in Surry 2, Cycle19
      - Burnup data was provided, by Surry, for use in the Westinghouse TOTE code
      - TOTE results were processed through an in-house code, ISOTL, to further refine the results
      - The results from ISOTL were provided to the SNM Accountability Group

How do we accomplish this?

- Dominion's SNM Accountability Group
  - New fuel values from ISOTL were modified to match previously reported values on DOE/NRC Form 741's
  - SNM Accounting database was modified by changing the obligation codes of all affected fuel assemblies
    - Fuel assemblies not previously obligated were given an obligation to Japan
    - Fuel assemblies obligated to other countries were layered with an additional obligation to Japan
  - Results from ISOTL were sorted and tabulated based on the new obligations
  - Computer-readable file was generated for transmittal to NMMSS

How do we accomplish this?

- NAC
  - Created procedure, in concert with NRC and Dominion, to provide a means to input the obligations attached to equipment into NMMSS
    - Procedure needed to be straightforward and easy to use
    - Procedure modeled after an Onsite Gain and Loss
    - The procedure was provided to Dominion in a letter from NAC with the approval of NRC and DOE
  - The Nuclear Material Transaction Report contains two records

How do we accomplish this?

- NAC (Con't)
  - The Nuclear Material Transaction Report contains two records.
    - Data Code 1 "Header Information"
      - RIS pair, sequence number, and A/M codes
      - Zero (0) Detail Lines
      - Date
    - Data Code 7 "Obligation Information
      - Line number,
      - MT 20: Element Wt. and Isotope Wt.
      - MT 50: Element Wt.
      - Country number

How do we accomplish this?

- NAC (Con't)
  - For each material type and country attaching obligations
    - One line will be the removal of the original obligated quantity of material
    - Next line will restore that same quantity of material with the new obligation
  - If the material was originally un-obligated, one line will add the new obligation
  - The number of entries in Record 7 depends on the number of obligations associated with the fuel loaded in the Reactor plus the un-obligated fuel

How do we accomplish this?

```
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
```

How do we accomplish this?

- NAC (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

Future

- Dominion
  - Material Balance Report is Schedule for August 2004
  - Nuclear Material Transaction Reports will only include the fuel that needs to have the Japanese obligation added
- Dept. of State
  - Persuade the Government of Japan to not apply obligations to the Reactor Vessel Heads
- NRC
  - Revise NUREG/BR-0006 to address foreign obligations attached to equipment
- NMMSS
  - Recognize the transaction to add obligations

Future

- More of these transactions to come!

Comments/Questions

- Comments or Questions?