

# Nuclear Management Company's Reactor Pressure Vessel Head Replacement Project

---

July 2003

United States Nuclear  
Regulatory Commission  
Region III

# Agenda

---

- Project Organization
- Project Status
- Fabrication
- Quality Oversight
- Installation
- Summary

# Purpose

---

Communicate to NRC Region III the scope and schedule of the NMC Reactor Pressure Vessel Head Replacement Project.

# Objectives

---

- Identify required NRC regulatory activities
- Establish periodic updates to the NRC

# Project Organization

---

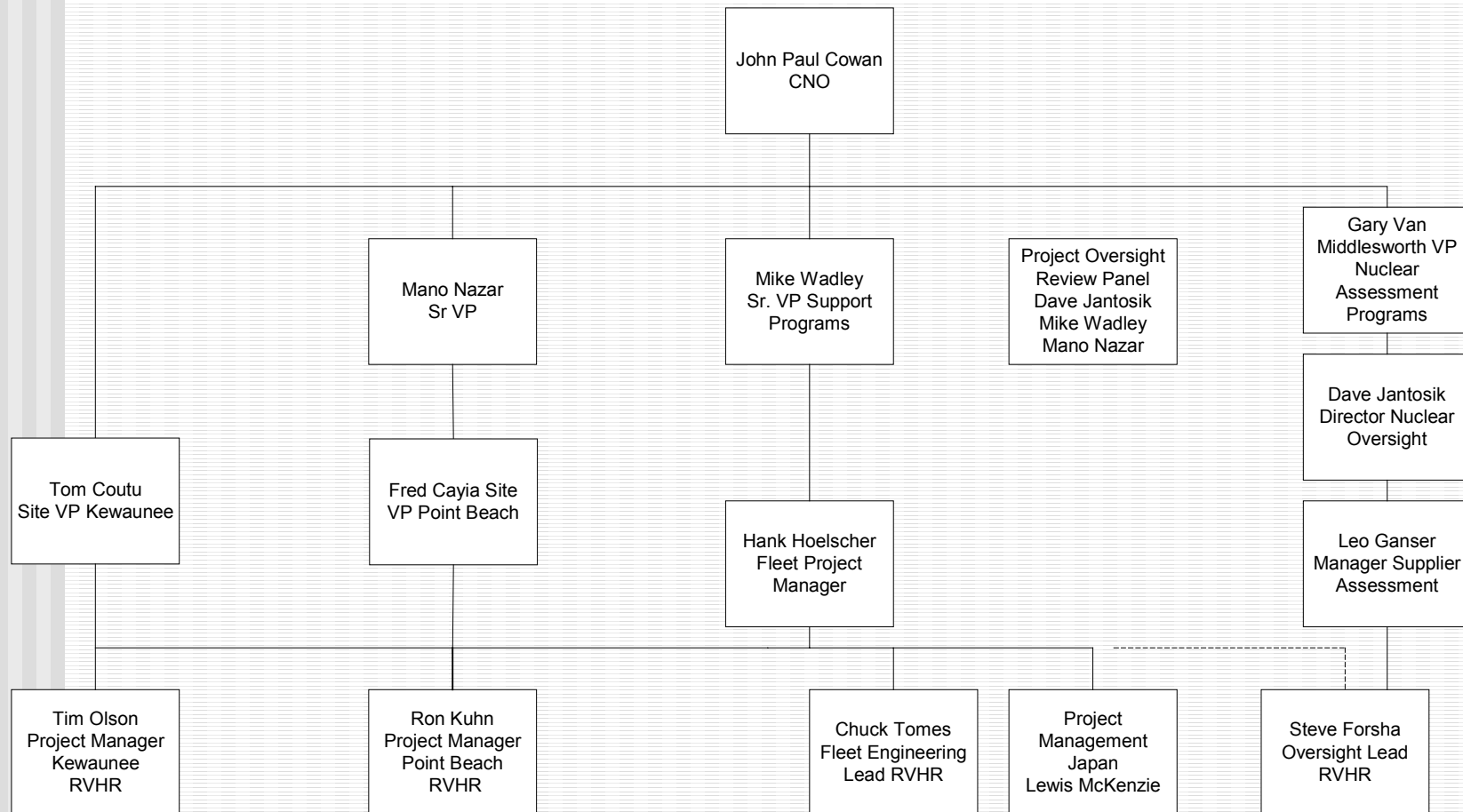
# Background

---

- Multi-site capital project for NMC
- Common fabrication organization
- Site specific installation organization

## Organization

# Project Organization



# Project Status

---



# Contractors

---

- Westinghouse is prime contractor providing new replacement reactor pressure vessel (RPV) heads
- Mitsubishi Heavy Industries (MHI), Kobe Japan, subcontracted to design and fabricate RPV heads

# Scope

---

- Kewaunee – New RPV head and CRDM
  - No Head Assembly Upgrade Package (HAUP)
- Point Beach – New RPV heads and CRDMs
  - HAUP
  - Control Rod Drive Mechanism (CRDM) coil stacks
  - Thermocouple cables
  - Rod Position Indicator (RPI) and CRDM cables

## Scope (continued)

---

- New heads and CRDMs will be made and fabricated in Japan under Mitsubishi Heavy Industries' quality program
- HAUP will be fabricated in Pittsburgh under Westinghouse's quality program

## Project Status

# Details of RPV Head Scope

---

- Single Piece Forging
- Electro-Slag Welded Strip cladding
- Alloy 600 Prohibited
- Use alloy 690 tubing versus alloy 600 tubing
- Use alloy 690 weld material versus alloy 600 weld material
- Use narrow J-groove weld bevel
- One piece L-106A CRDM's (one butt weld on latch mechanism)
- Eliminate vent on each CRDM
- Eliminate all seal welds
- Eliminate spare and part length penetrations
- Vent and Reactor Vessel Level Indication System Taps
- Core Exit Thermocouple Nozzle Assembly (CETNA)

# Details of Scope (continued)

---

## Plant specific differences

- Kewaunee has eliminated plutonium recycle ports and part length penetrations
- Kewaunee will have four capped spare penetrations on the new RPV head

## Project Status

# Project Schedule - Kewaunee

---

- |   |          |
|---|----------|
| ■ Reactor Vessel Head Forging                   | Complete |
| ■ Fabrication CRDM Head Adapter & Housing       | 12/13/03 |
| ■ Shrink Fitting of the head penetration tubing | 12/15/03 |
| ■ Hydro Test                                    | 05/01/04 |
| ■ Site Delivery                                 | 09/01/04 |
| ■ Outage  | 09/25/04 |

## Project Status

# Project Schedule – Point Beach

---

	Unit 2	Unit 1
■ Reactor Vessel Forging	8/23/03	1/15/04
■ Fabrication CRDM Head Adapter & Housing	4/10/04	9/25/04
■ Shrink Fitting of the head penetration tubing	4/15/04	9/30/04
■ Hydro Test	9/15/04	2/20/05
■ Site Delivery	2/01/05	7/01/05
■ Outage	4/02/05	10/08/05

# Fabrication

---



# Overall Responsibilities

---

## RPV Head and CRDMs

- Design Specification – Westinghouse
- Material Procurement – Mitsubishi Heavy Industries
- Design Review – Westinghouse
- Technical and Quality Oversight - NMC

# Overall Responsibilities (continued)

---

### RPV Head and CRDMs

- Mitsubishi Heavy Industries
  - Fabrication
  - Certified Design Report
  - Stamping
  - Preservice Inspection
  - Packaging and Shipping
- Installation - Westinghouse

# Overall Responsibilities (continued)

---

### Head Assembly Upgrade Package

- Fabrication-Westinghouse
- Design-Westinghouse
- Installation-Westinghouse
- Technical and Quality Oversight - NMC

# Design Responsibilities

---

- NMC – Scope and Technical Specification
- Westinghouse (Original Equipment Manufacturer) – Design Specification
- Mitsubishi Heavy Industries
  - Certified Design Report
  - ASME NPT Stamp

# Fabrication Status

---

## Kewaunee

- Long Lead Time Items Delivered
  - Forging – Japan Steel Works
  - CRDM Alloy 690 Penetrations – Sumitomo
- Design Specifications Issued
- CRDM Stainless Steel Pressure Boundary - Hitachi
- Fabrication in progress
  - Cladding
  - Latch housing & rod travel housing machining
  - Latch arm machining

# Fabrication Status

---

## Point Beach – Unit 2

- Long Lead Time Items Ordered
  - Forging – Japan Steel Works
  - CRDM Alloy 690 Penetrations – Sumitomo
- Design Specifications Issued

## Fabrication

### Sub Vendor Fabrication Locations

---

- Mitsubishi Heavy Industries
  - Futami Plant – Reactor Vessel Head
  - Kobe Shipyard & Machinery Works – CRDMs

# Sub Vendor Fabrication Locations (continued)

---

- Sub Vendor Facilities
  - Japan Steel Works - Forging
  - Sumitomo - CRDM Alloy 690 Penetrations tubing
  - Hitachi – Stainless Steel CRDM Pressure Boundary Components
  - Kanaski Steel - Lifting Lugs
  - Kobe Steel LTD. - Weld Material
  - Nippon Welding Rod – Alloy 690 Weld Material



# Fabrication



Japan Steel Works

NIPPON

Sumitomo

MHI

Kawasaki

Hitachi

## Fabrication

# Licensing Requirements

---

- Planned to be done pursuant to 10CFR 50.59
- Additional NRC reviews or prior approvals not expected

# Fabrication Applicable ASME Codes and Standards

---

## ASME Boiler and Pressure Vessel Code

- Section II, Section III, Section V, Section XI ASME 1998 Edition thru 2000 Addendum
- Section IX, Latest Edition

## Code cases

- ASME Code Case 2142-1, Ni-Cr-Fe (UNS N06052), November 25, 1992
- ASME Code Case 2143-1, Ni-Cr-Fe (UNS W86152), November 25, 1992

# Fabrication

## Applicable ASME Codes and Standards (continued)

---

- NRC Issued Flaw Evaluation Criteria for Examination of CRDM Tubing and J-groove Welds
- US NRC Regulatory Guide 1.28, Rev 3 - Quality Assurance Program Requirements
- US NRC Regulatory Guide 1.31, Rev 3 – Control of Ferrite Content in Stainless Steel Metal
- US NRC Regulatory Guide 1.43, May 1973 – Control of Stainless Steel Weld Cladding of Low Alloy Steel and Components
- US NRC Regulatory Guide 1.50, May 1973 – Control of Preheat Temperature for Welding of Low Alloy Steel

# Non Destructive Testing

---

- Section XI, ASME 1998 Edition thru 2000 Addendum
- Section III, ASME 1998 Edition thru 2000 Addendum
- Additional NDE Requirements Imposed By NMC
  - NRC Developed Acceptance Criteria Used for Preservice Examination of Alloy 690 Tubing and J-groove Welds
  - Capability of Examining the Alloy 690 Tubing and J-groove Welds To Be Verified With NDE & Repair Mockups

# Quality Oversight

---

# Quality Oversight

---

- NMC Project Oversight Plan
  - Establishes the program oversight and responsibilities for the project
    - Supplier qualification
    - Stop Work Authority
    - Inspections
    - Nonconformances
    - Personnel Qualification
    - Reporting

# Oversight Plan

---

- Establishes an Oversight Review Panel
  - Purpose to provide an integrated review of the project oversight
  - Panel consists of:
    - Director of Nuclear Oversight
    - Senior Vice President of Support Programs
    - One additional Vice President
  - Panel meets biannually or as conditions require



# Resident Oversight Personnel

---

- Resident Oversight Personnel for NMC and Westinghouse
  - Monitor work activities
  - Verify critical attributes at witness and hold points
  - Follow-up on corrective actions
- Resident inspector is bilingual Japanese national

# Communication and Issue Resolution Form (CIRF)

---

- Project Specific Process
- Documents and communicates issues found by NMC, Westinghouse and MHI
- Reviewed each day in Kobe by NMC, Westinghouse and MHI Project Managers for cause determination, corrective action and resolution.
- Quality issues tracked via MHI/W QA Programs. Other issues tracked via project letter, as needed.

# Installation

---

# Installation

---

- Westinghouse/ Mitsubishi Heavy Industries to arrange transportation of the new heads
- Replacement RPV heads fit through equipment hatches at Point Beach and Kewaunee – No Integrated Leak Rate Testing required
- Both sites will require interference removal

# Installation Overview (continued)

---

- Westinghouse to supervise old RPV head removal and new RPV head installation
- NMC provide tools, craft labor and oversight
- Head removal and reinstallation performed per standard outage requirements

# Installation Overview (continued)

---

- Westinghouse provides the Department of Transportation (DOT) shipping container for old RPV heads and CRDMs
- NMC will select a disposal contractor for old RPV heads

# Summary

---

# Summary

---

- Technical/quality oversight is in place
- Fabrication of RPV heads is underway
- Installation planning is just starting