



An Overview of the

Palisades Reactor Head Replacement Project

Presented by NMC to NRC Staff
December 21, 2005
NRC Region III Headquarters
Lisle, Illinois

Agenda

- Purpose
- Mission Statement
- Project Organization
- Project Status
- Engineering
- Quality Oversight
- Summary
- Conclusion



Purpose

- Communicate the scope and status of the Palisades Reactor Head Replacement Project (RHRP) to NRC Region III
- Provide NRC with information necessary for planning inspection activities of the Palisades RHRP project



Mission Statement

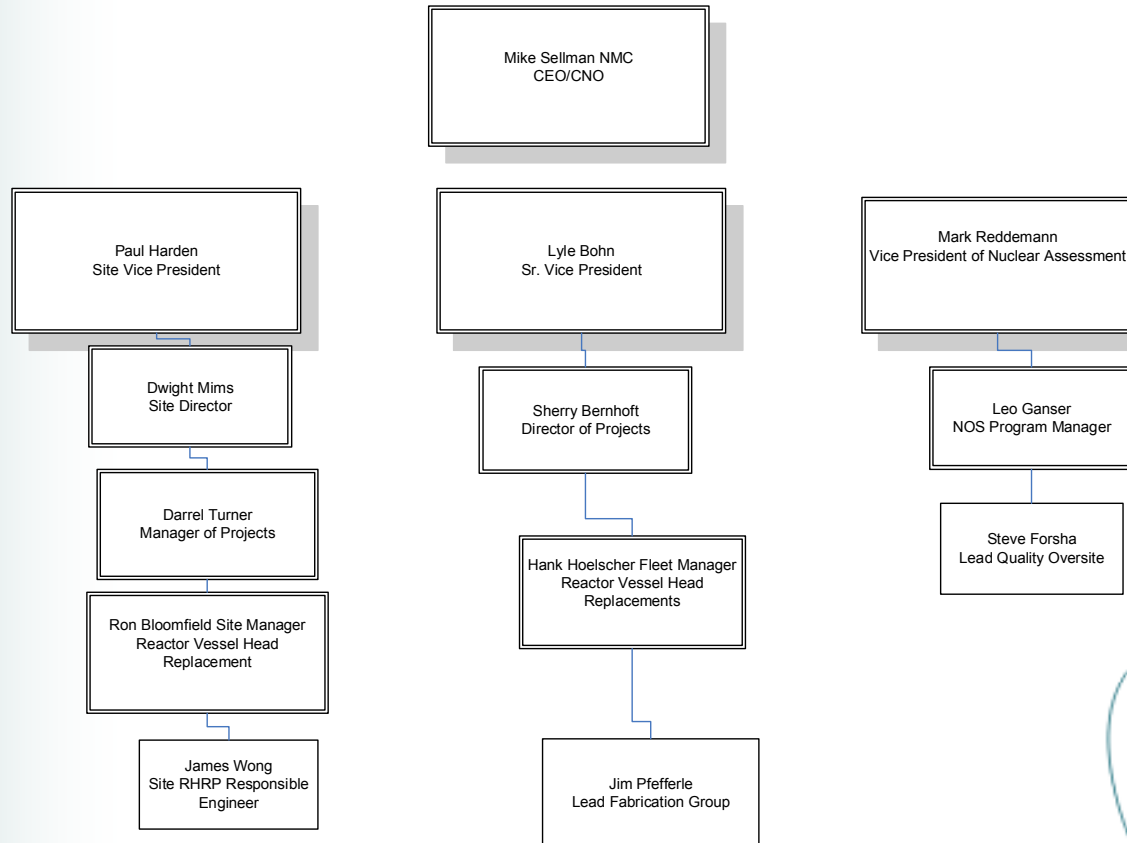
Replace the NMC Reactor Head Closure Systems in a world-class manner and with a team that fulfills the customers' expectations for safety, reliability and cost effectiveness

Background on NMC Head Replacements

- Multi-site capital project for NMC
- Common fabrication organization
 - NMC's Fleet approach allows for the transfer of operating experience to our current head replacement projects
- Site specific installation organizations
 - Key personnel, experiences and resources are being utilized on Palisades head replacement



Project Organization



Head Replacement Lessons Learned

- NMC Fleet
 - J-groove weld quality
 - Head drop analysis issues
- Industry
 - Vendor oversight
 - Containment restoration



Project Status



Project Status

- Scope
 - New reactor pressure vessel head (nearly like-for-like)
 - New control rod drive mechanism (CRDM) pressure housings, supports and in-core instrument (ICI) closures
 - “Through-the-wall” replacement
- Schedule
 - Installation in Fall 2007 (est. 50 days)
 - N-1 walkdowns in Spring 2006

Design

- Babcock & Wilcox Canada (BWC) is the designer of the replacement head
- Westinghouse (WEC) supplied Certified Design Specification
- WEC providing design and advisory services to BWC (fabricator) and NMC



New Reactor Head Fabrication

- Contracted with BWC to supply replacement reactor vessel head (RVH)
- Head forged at Japan Steel Works
- Head forging recently arrived at BWC shop
- CRDM nozzle tubing by Valinox
- July 2007 head delivery to Palisades site
- QA data package available 30 days after RVH arrival on site
- Fabrication schedule available



Head Components

- WEC fabricating / supplying:
 - 45 CRDM pressure housings
 - Seismic supports for pressure housings
 - 8 ICI Grayloc closures
 - New designed incore instrumentation assemblies (compatible with Graylocs)
- Components will be installed at Palisades site
- Fabrication schedule available



Design Change Assessment

- Other WEC Services
 - Licensing support, Design Change Package (DCP) support, etc.
 - Reactor head-related DCP and 10 CFR 50.59 reviews to be completed by September 2006
- NMC leading these activities
- These activities conducted on site



Construction & Installation Activities

Currently negotiating with prime contractor to perform/support:

- Pre-outage assembly of new RVH
- Containment construction opening/close/test
- Rigging and heavy loads handling
- In-containment disassembly/reassembly of RVH
- Old RVH disposal



Pre-Outage Assembly

- Off Load from BWC truck
- Place new RVH in dry fuel storage (DFS) building
- Weld 45 CRDM pressure housings to new RVH
- Install seismic supports
- Install Grayloc closures



Containment Construction Opening

- Plant reaches Mode 5
 - Remove affected tendons
 - Relax adjacent/surrounding tendons
 - Remove concrete, rebar & tendon sheaves
- Reactor defueled
 - Remove liner plate



Containment Construction Close/Test

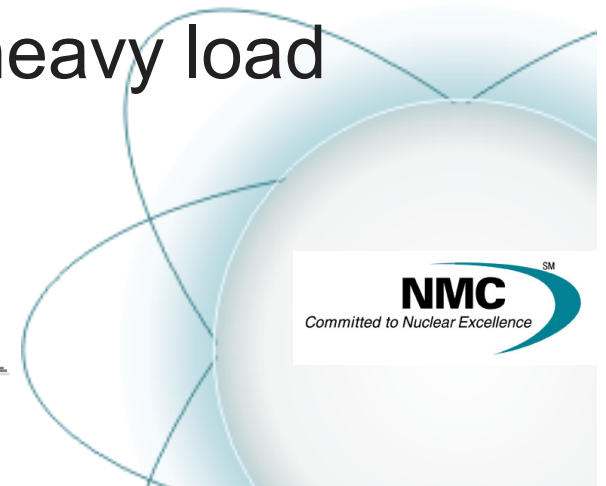
- Concrete test pour
- Liner plate prepared/reinstalled
- Install new rebar and solid tendon sheaves
- Install new tendons
- Install forms and pour concrete
- Tension tendons
- Perform Containment Integrated Leak Rate Test (ILRT)



Rigging & Heavy Loads

Pre-Outage:

- Head drop analysis recently completed
- Evaluate and prepare haul routes
- Evaluate containment lay-down area floor loading
- Analyze & establish required heavy load safe paths in containment



Rigging & Heavy Loads (cont'd)

- Major lifts
 - Place old RVH in shipping container
 - Lift Old Head in shipping canister off runway
 - Transport new RVH from DFS; lift to runway; up-end inside containment
- Other
 - Transfer RVH lift rig & service platform from old to new RVH



In-containment RVH Activities

- Project will receive old RVH when still on vessel flange
 - Remove CRDM support tubes (clean and store)
 - Remove CCW lines to CRDM pressure housings
 - Remove RVH lift rig and service platform
- New RVH will be rigged into containment and set on vessel flange (defueled)
- Above components will be installed on new RVH



Old RVH Disposal

- Currently evaluating:
 1. Leaving CRDM pressure housings on old RVH, or
 2. Removing the CRDM pressure housings prior to shipping off site
- Expect this decision by January 31, 2006
- Expect old RVH to be shipped off site very soon after removal from containment
- Duratek already contracted to dispose of old RVH



Construction & Installation Activities

- Currently negotiating construction/installation contract
- Anticipate installation contract awarded by January 31, 2006
- Anticipate Integrated Project Plan completed by April 30, 2006
- Installation-related DCPs and licensing packages will be completed by March 31, 2007



Licensing Requirements

- RHRP planned to be completed in accordance with 10 CFR 50.59
- Additional NRC reviews or prior approvals not anticipated



Key Dates Summary

- **January 31, 2006:** Installation contract awarded
- **April 2, 2006:** Refueling Outage begins; N-1 walkdowns performed
- **April 30, 2006:** Integrated Project Plan Rev. 0 completed
- **September 2006:** RVH Design Change Packages (DCPs) and 10 CFR 50.59 reviews completed
- **March 2007:** Installation DCPs and 10 CFR 50.59 reviews completed
- **July 2007:** New reactor head arrives at Palisades site
- **September 8, 2007:** Refueling/RVH Replacement Outage begins (50 day duration)



Engineering



Replacement Head Scope Details

- Single-piece forging
- Strip cladding
- Alloy 690 tubing and weld material required
 - Alloy 600 Prohibited
- Automated gas tungsten arc welding process used for J-groove welds



Applicable ASME Codes

Replacement Reactor Vessel Head

- Sections II, III, V – 1998 Edition thru 2000 Addenda
- Section IX – Latest Edition
- Section XI – 2001 Edition thru 2003 Addenda

Containment Liner and Concrete

- Section XI - 1998 Edition thru 1998 Addenda



Applicable Regulatory Requirements

- U.S. NRC Regulatory Guide 1.28, Rev. 3 – Quality Assurance Program Requirements
- U.S. NRC Regulatory Guide 1.37 – Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants
- U.S. NRC Regulatory Guide 1.38, Rev. 2 – Quality Assurance Requirements for Packing, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants

Nondestructive Testing

- Section III, ASME 1998 Edition thru 2000 Addendum
- Section XI, ASME 2001 Edition thru 2003 Addendum
- Additional NDE requirements imposed by NMC for Alloy 690 tubing and J-groove welds
 - Implemented NRC flaw evaluation criteria
 - Utilized NRC acceptance criteria for preservice examination
 - Verified examination capabilities with NDE and repair mockups



Quality Oversight



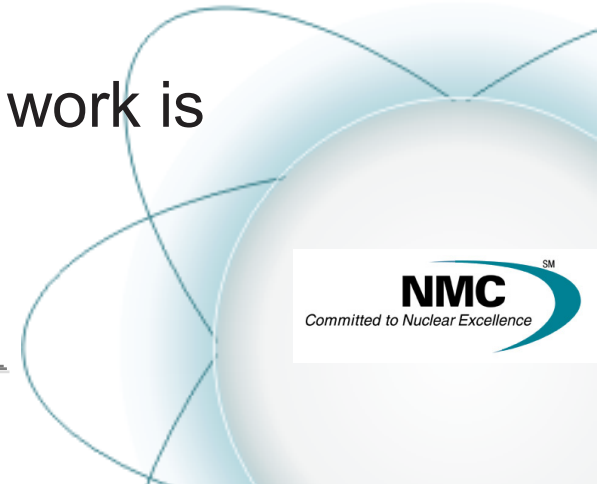
Quality Oversight

- NMC Project Oversight Plan
 - Establishes the program oversight and responsibilities for the project
 - Supplier qualification
 - Fabrication oversight
 - Installation oversight
 - Release and receipt inspections
 - Status reporting



Resident Oversight

- Resident oversight personnel for NMC
 - Monitoring work activities at:
 - Japan Steel Works – Head forging
 - Valinox – Inconel 690 head adapters
 - Patriot Forge – Head adapter flanges
 - Babcock & Wilcox Canada – Head manufacture
 - Ionics – CRDM housings
 - Verify critical attributes at witness and hold points
 - Follow-up on nonconformances and corrective actions
 - Review of quality documentation as work is completed



Quality Assurance Audits

- NMC project follow-up audit of Westinghouse in December 2005
- Nuclear Procurement Issues Committee (NUPIC) audit of Babcock & Wilcox Canada in first quarter 2006
- Project audit planned for Babcock & Wilcox Canada during 2006
- Project self-assessment



Summary & Conclusion



Summary

- Palisades Sale – no anticipated effects on this project
- NMC has monitored fabrication of five replacement heads and completed head replacement at four sites
- Fabrication of the Palisades replacement head is ongoing
- Planning and engineering for installation of replacement head at Palisades is underway



Conclusion

- We appreciate this opportunity for NMC to update the NRC on our head replacement activities
- We will continue to work with the site resident inspectors to keep them apprised of our schedules

