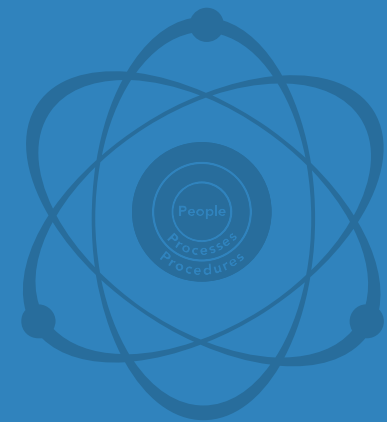


# Davis-Besse Steam Generator Replacement Project

**Project Overview/Public Meeting  
NRC Region III Office  
March 20, 2013**



# Agenda

- Project Scope – 18RFO
- Organization
- Major Contracts
- Project Milestones
- Steam Generator Design
- Reactor Coolant System Hot Leg Piping Design
- Operating Experience
- Fabrication
- Design Change Packages
- Shield Building Opening
- Level 1 Schedule
- Implementation Plan
- Project Video
- Pre-service Examinations
- Transportation and Storage
- Radiation Protection
- Site Protection
- Quality Assurance Oversight



# Project Overview

Dave Petro

Manager, Steam Generator Replacement

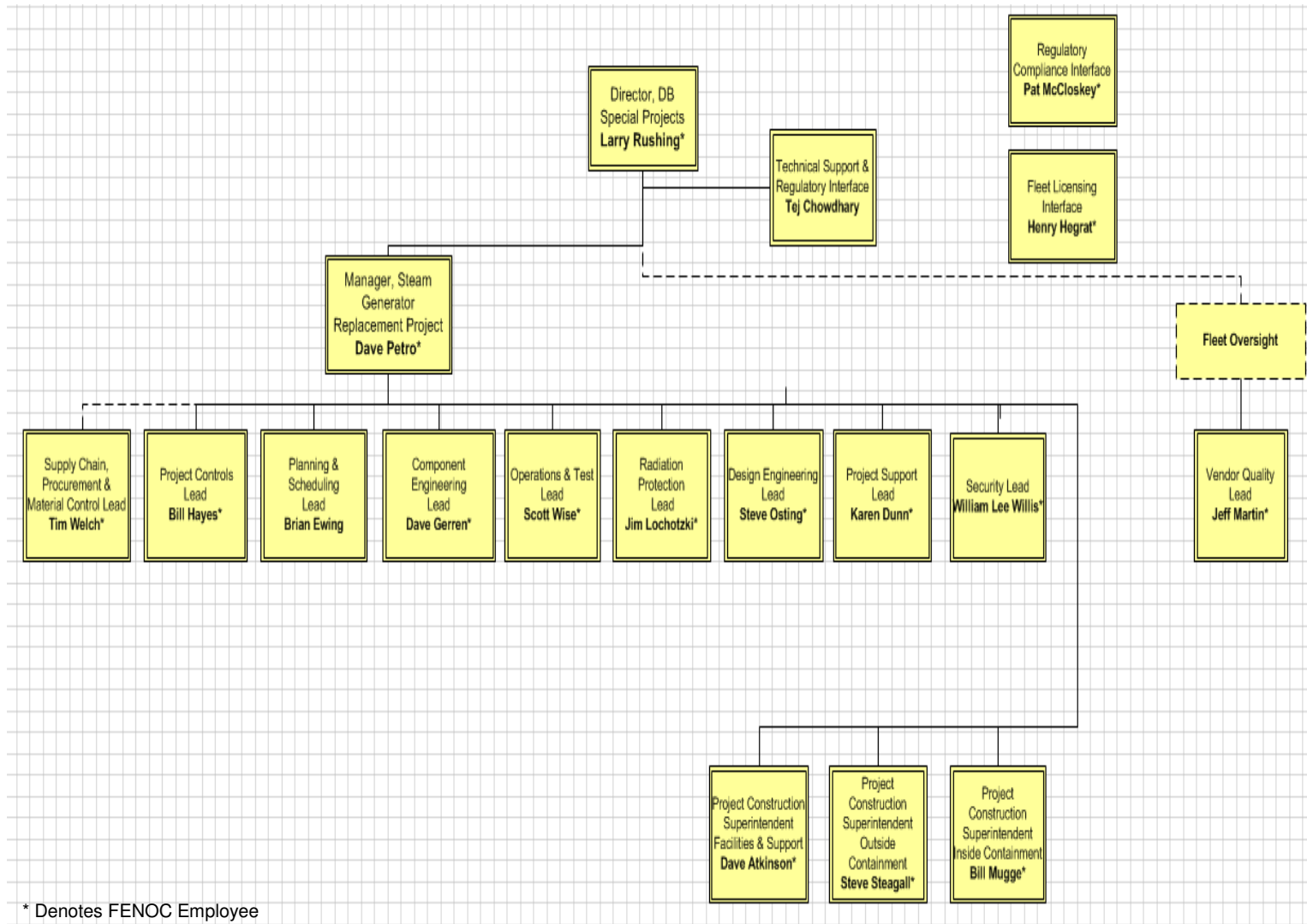


# Project Scope – 18RFO

- Steam Generator Replacement
- Reactor Coolant System Hot Leg Piping Replacement
- Reactor Head Continuous Vent Line Replacement in D-ring
- Main Feedwater Pipe Replacement within the D-rings
- Reactor Coolant Pump Motor 1-1 and 1-2 Replacement
- Steam Generator Insulation Replacement
- Small Bore Piping and Valve Replacement
- Instrumentation and Cabling Replacement



# Project Organization



# Major Contracts

- AREVA
  - Engineering Analysis
- Babcock & Wilcox Company
  - Replacement Steam Generators and Reactor Coolant System Hot Leg Piping subassemblies
- Bechtel Power Corporation
  - Installation services for Steam Generator Replacement
- Westinghouse
  - Reactor Coolant Pump Motor Replacement

# Project 18RFO Milestones

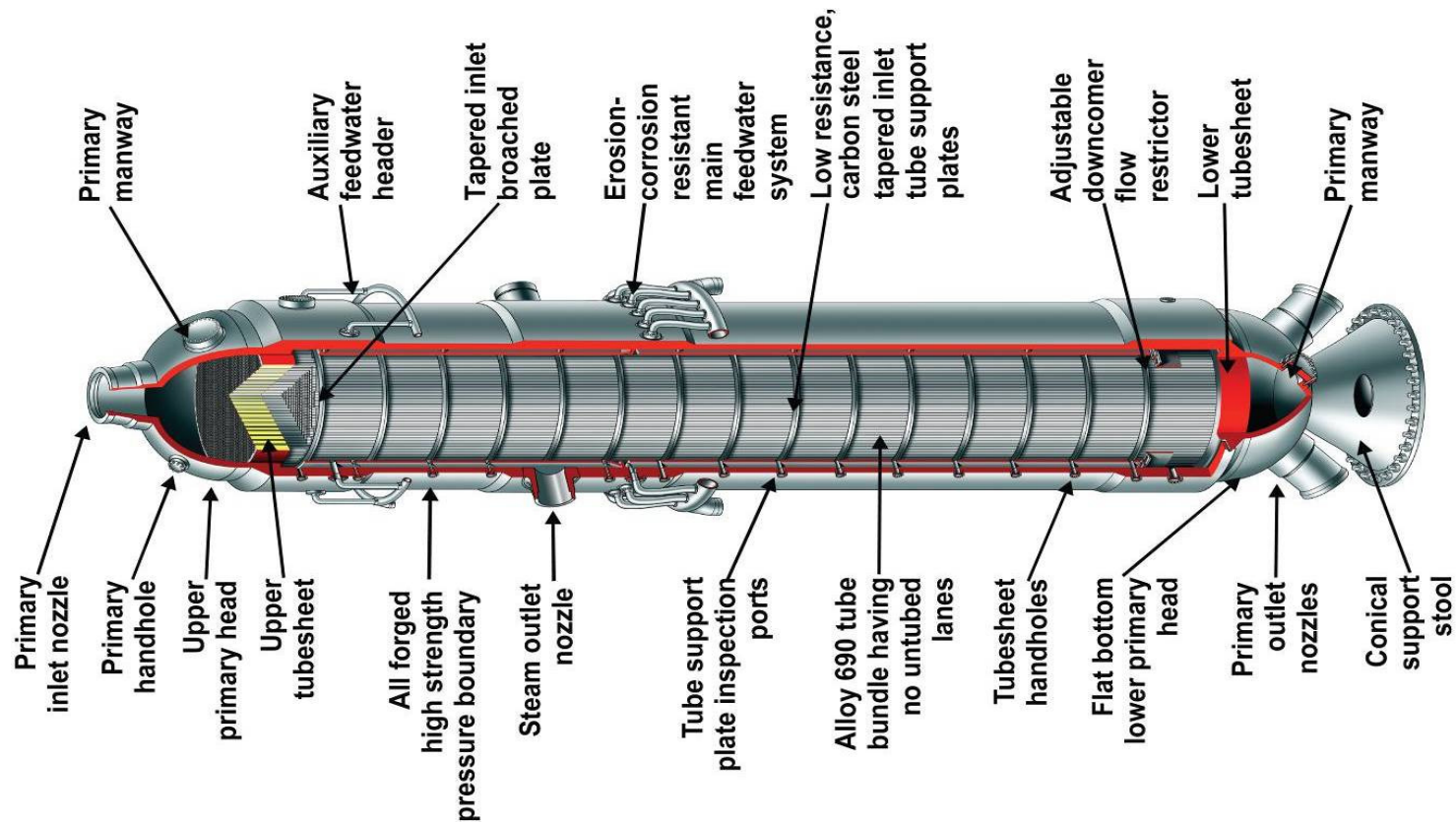
Milestone Description	Milestone Owner	Milestone Due	Milestone Complete
All Bechtel REV 0 ECPs In Filenet	S. Osting	12/14/2012	12/17/2012
Long Lead Material Identified	L. Thomas	2/15/2013	2/15/2013
Plant Improvement Modifications Issued	J. Hook	3/11/2013	3/11/2013
Plant Improvement Modification Order Planning/Lead Work Group Reviews Complete	D. Saltz	6/10/2013	
Outage Clearance Preparation Complete	T. Summers	6/24/2013	
Mock-up Plans Developed	W. Mugge	8/12/2013	
Level 3 18R Schedule Developed	B. Ewing	9/4/2013	
Horizontal Schedule Reviews Complete	G. Kendrick	9/30/2013	
Vertical Schedule Reviews Complete	G. Kendrick	10/28/2013	
Level 3 Schedule Issued	G. Kendrick	11/4/2013	
Contingency Plans and Decision Trees Identified	D. Saltz	11/11/2013	
Radiation Work Permits Approved / Final Dose Estimate Complete / Dose and PCE Goals Developed	D. Noble	11/11/2013	
Site Safety/Human Performance Plan Approved	B. Boles	11/29/2013	
Level 3 Resource Leveled Schedule Issued	G. Kendrick	11/29/2013	
Contingency Plans and Decision Trees Approved	G. Kendrick	12/11/2013	
Work Packages Ready To Execute (Parts Verified)	D. Saltz	1/6/2014	

# Replacement Once Through Steam Generator Design

Dave Gerren  
Component Engineering Lead



# Project Scope



# ROTSG Design

- ASME Section III, 2001 Edition Through 2003 Addenda
- The Replacement of the two Once Through Steam Generators (ROTSGs) is planned to be installed under 10 CFR 50.59 with performance characteristics that are similar to the original Once Through Steam Generators (OTSGs).
- The ROTSG has no tube inspection lane, improving upper span tube flow induced vibration margin and an additional tube support plate (16 vs. 15) to shorten the tubing span distance in regions of high steam crossflow to also improve flow induced vibration margin.
- The ROTSG contains 15,607 tubes vs. the original 15,457 tubes. The new tubes are made from thermally treated Alloy-690 material providing increased corrosion resistance.
- The tube to tubesheet joint is established with a hydraulic expansion and an autogenous tube to tubesheet weld that is flush with the tubesheet. The hydraulic expansion depth is set to achieve adequate tube preload to prevent tube bowing/buckling during normal and transient operation.

# ROTSG Design

- The ROTSGs are built with two inspection ports at each tube support span to improve future secondary side access.
- The secondary inspection ports and manways that are not normally accessed will be seal welded and prepared for use as a gasketed joint if later opened.
- The ROTSG lower primary bowl bottoms are flat to drain to the cold legs, eliminating the lower bowl drain, which was a crud trap.
- Each ROTSG primary head is electro-polished to lower dose rates.
- The ROTSGs are supported by a Pedestal Cone vs. the original Cylindrical Skirt to improve lower primary manway accessibility for personnel safety.

# ROTSG Design

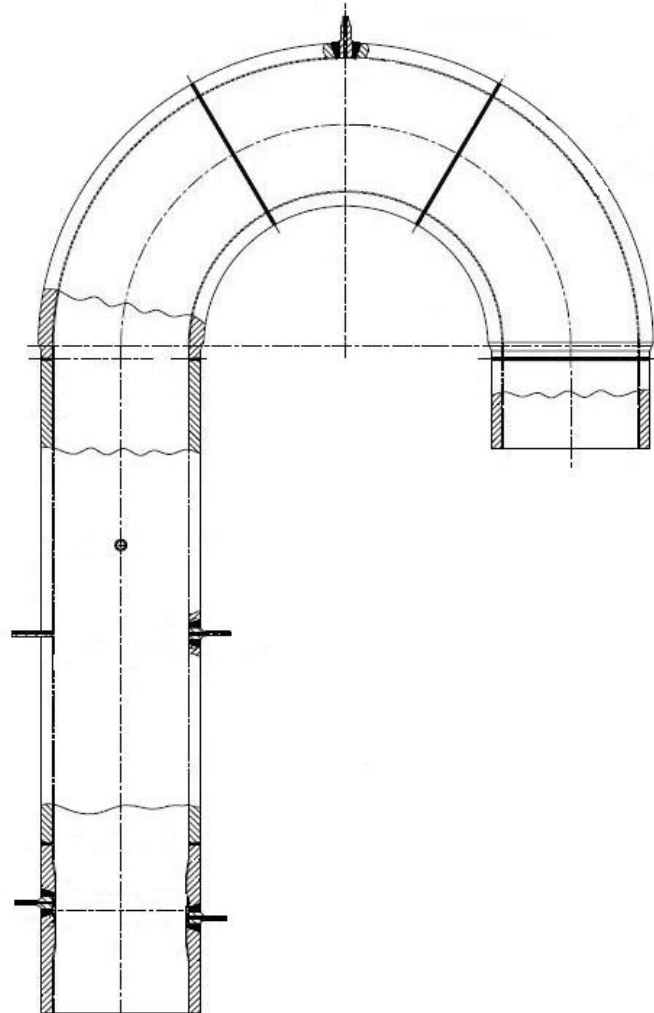
- The #2 ROTSG will have an integral forged nozzle for the Reactor Head continuous vent line connection which eliminates the bolted connection to the steam generator shell.
- The ROTSG shells are made of high strength steel resulting in a reduction of thickness of approximate 2 inches. This reduces each ROTSG's weight by approximately 90 tons compared to the original Once Through Steam Generators.
- The ROTSG tube support arrangement was a contributor to the accelerated wear issues observed in the Oconee replacement OTSGs after only one cycle of operation. The tube support system for the Davis-Besse ROTSGs was modified from the Oconee ROTSG design to mimic the original OTSGs to eliminate this issue.
- Integral primary manway handling jib booms will be included in the design to improve personnel safety and reduce manway handling time and dose.



# RCS Hot Leg Piping Design

- ASME Section III, 2001 Edition Through 2003 Addenda
- The upper portions of the Reactor Coolant System (RCS) Hot Leg Piping will be replaced to mitigate Alloy 600 concerns in instrumentation and piping nozzle connections.
- The new Hot Leg Piping subassemblies will be essentially a like-for-like replacement.
- The nozzles will be made from Thermally Treated Alloy 690 vs. Alloy 600 material.
- The 180° elbows will be manufactured from three 60° forged elbows, eliminating the long seams on the intrados and extrados.

# RCS Hot Leg Subassembly



# ROTSG Licensing Actions

- License Amendment Request
  - Submitted January 18, 2013; Acceptance Review completed February 14, 2013
  - Approval requested by February 1, 2014; to be implemented prior to startup from 18RFO
  - Limited to Technical Specification changes necessary to accommodate materials and construction of Replacement Once Through Steam Generators

# ROTSG Licensing Actions

## Proposed Technical Specification Changes

- TS 3.4.17, “Steam Generator (SG) Tube Integrity”
- TS 5.5.8, “Steam Generator (SG) Program”
- TS 5.6.6, “Steam Generator Tube Inspection Report”
  - Implement monitoring, inspection and reporting requirements appropriate for the construction and materials of the ROTSGs
  - Eliminate all references to repair options for tubes meeting specified criteria
  - Administrative changes and clarifications
- TS 3.7.18, “Steam Generator Level”
  - Impose inventory restrictions appropriate for the dimensions and materials of the ROTSGs.
- All changes are consistent with TSTF-510 “Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection,” approved by the NRC in October 2011.

# ROTSG Licensing Actions

- 10 CFR 50.55a(a)(3)(i) Request - Post-Repair Testing of Containment Vessel Opening
  - Proposes alternative to Type A Integrated Leak Rate Test following Containment Vessel restoration
  - Includes a 100 percent radiograph of the closure weld, followed by a Structural Integrity Test [ASME Boiler and Pressure Vessel (B&PV) Code, IWE 5223.4(a)]
  - Alternative provides an equivalent level of quality and safety
- Original Exemption Request (10 CFR 50.12) submitted on January 18, 2013
- Supplemented on March 11, 2013 to convert to 10 CFR 50.55a request
- Approval requested by January 18, 2014

# Operating Experience

Dave Gerren

Component Engineering Lead



# Operating Experience

- OE23675 – Tube Wear (Oconee)
  - Problem: Unexpected tube wear identified during the first In-Service Inspection of ROTSG.
  
  - Probable Cause: ROTSG tube wear is due to the precise alignment of the tube support plates. The tube support plate geometry of the Oconee ROTSGs decreased the stability of the tubes and increased the tube vibration.
    - Davis-Besse Fix: The tube support system for the Davis-Besse ROTSGs was modified from the Oconee ROTSG design to mimic the original OTSGs to eliminate this issue.
  
  - Secondary Cause: Periphery tube support plate bowing. Tube Support Plates are attached with blocks to the steam shroud.
    - Davis-Besse Fix: Tube Support Plates move independent of the steam shroud.

# Operational Experience

- OE34784 - Tie Rod Bowing (ANO)
  - Problem: Unexpected tie rod bowing identified during the first in-service inspection of the AREVA designed Enhanced Once Through Steam Generators (EOTSGs)
  - Probable Cause: Vendor fabrication was less than adequate for the Tube Support Plate to steam shroud gap design
    - Davis-Besse Fix: The ROTSG Tube Support Plate Steam Shroud gap and steam shroud roundness was closely controlled during fabrication



# Operational Experience

- OE34946 - Tube-to-Tube Contact Wear (ANO & TMI)
  - Problem: Unexpected tube to tube wear identified during the first in-service inspection of EOTSG at TMI and later confirmed to exist at ANO.
  - Probable Cause: Still being investigated by EOTSG Manufacturer, however is likely the result of excessive tubing compressive loads during power operation.
  - Possible Contributor: Long spans between Tube Support Plates near cross flow regions.
  
- Davis-Besse Design:
  - ROTSG tube expansions apply more pretension load than an EOTSG through the installation sequence of the partial depth hydraulic expansions.
  - ROTSG has 16 Tube Support Plates vs. 15 in EOTSG which reduces the Tube Support Plate span distance in regions of cross flow, increasing stability margins and margin to tube bowing/buckling.

# Operational Experience

- Recent Tube-to-Tube Contact Wear Update
  
- NRC Information Notice 2012-07: Tube-to-Tube Contact Resulting in Wear in Once Through Steam Generators
  - This IN distributed information associated with the events at TMI and ANO that were discussed in OE 34946, presented on the previous slide.
    - No new information was provided for the events at these two plants.
  
  - This IN also discussed a more recent discovery of tube-to-tube contact wear at Oconee.
    - The Replacement Steam Generators for all three Oconee plants were designed and fabricated by B&W Canada, Ltd – the company that is providing Davis-Besse’s ROTSGs.
    - Oconee tube-to-tube wear does not appear as significant or widespread as ANO and TMI.

# Operational Experience

- Because of the similarity of the Oconee ROTSG design to the Davis-Besse ROTSG, this event is of increased interest:
- Davis-Besse Fix: The design of the Davis-Besse ROTSGs has been modified by lengthening the tube-to-tubesheet expansion length to increase the tube preload and provide additional margin.
  - Additionally, Davis-Besse's operating procedures already implement restrictions that ensure the tube-to-shell temperature differential and resulting tube compressive loads remain bounded by design analyses.

# Operational Experience

- OE 36028 – Steam Generator Tube Leak During First Cycle After SG Replacement (San Onofre 3)
- San Onofre Unit 3 was shutdown due to increasing primary-to-secondary leakage after approximately one year of operation following SG replacement.
  - Investigations determined that the tube leak was due to tube-to-tube contact wear.
    - San Onofre Steam Generators are a U-tube design.
    - Cause of the tube-to-tube contact wear was determined to be flow-induced vibration (FIV) of the tube bundle, rather than tube bowing as has been seen in the Once Through SGs, discussed above.
  - Numerous design changes had been implemented in the San Onofre replacement SGs:
    - Some of the design changes resulted in flow conditions taking the new SG tube bundle beyond the threshold for Flow Induced Vibration.

# Operational Experience

- The first replacement Once Through Steam Generators provided for Oconee by B&W Canada experienced Flow Induced Vibration tube wear, as discussed under OE 23675 above.
  - This was a different type of Flow Induced Vibration than experienced at San Onofre.
  - The Oconee wear issue has been resolved for the Davis-Besse ROTSG design.
- The San Onofre event was evaluated for applicability and any concerns beyond those previously identified.
  - The fundamental cause was determined to be vibration of the entire tube bundle and resulting tube-to-tube contact in the U-bend region.
    - This was due to excessively high steam flow and an inadequate support structure for the bundle.
  - The evaluation concluded that it is not physically possible for this type of tube bundle movement and wear to occur in an OTSG.

# Fabrication Status

Dave Gerren

Component Engineering Lead



# Steam Generator Fabrication

## ■ 1st Unit

- Current Activity: Lower Primary Head to Tubesheet Welding is in progress
- Next Activity: Post Weld Heat Treatment of Lower Primary Head to Tubesheet weld

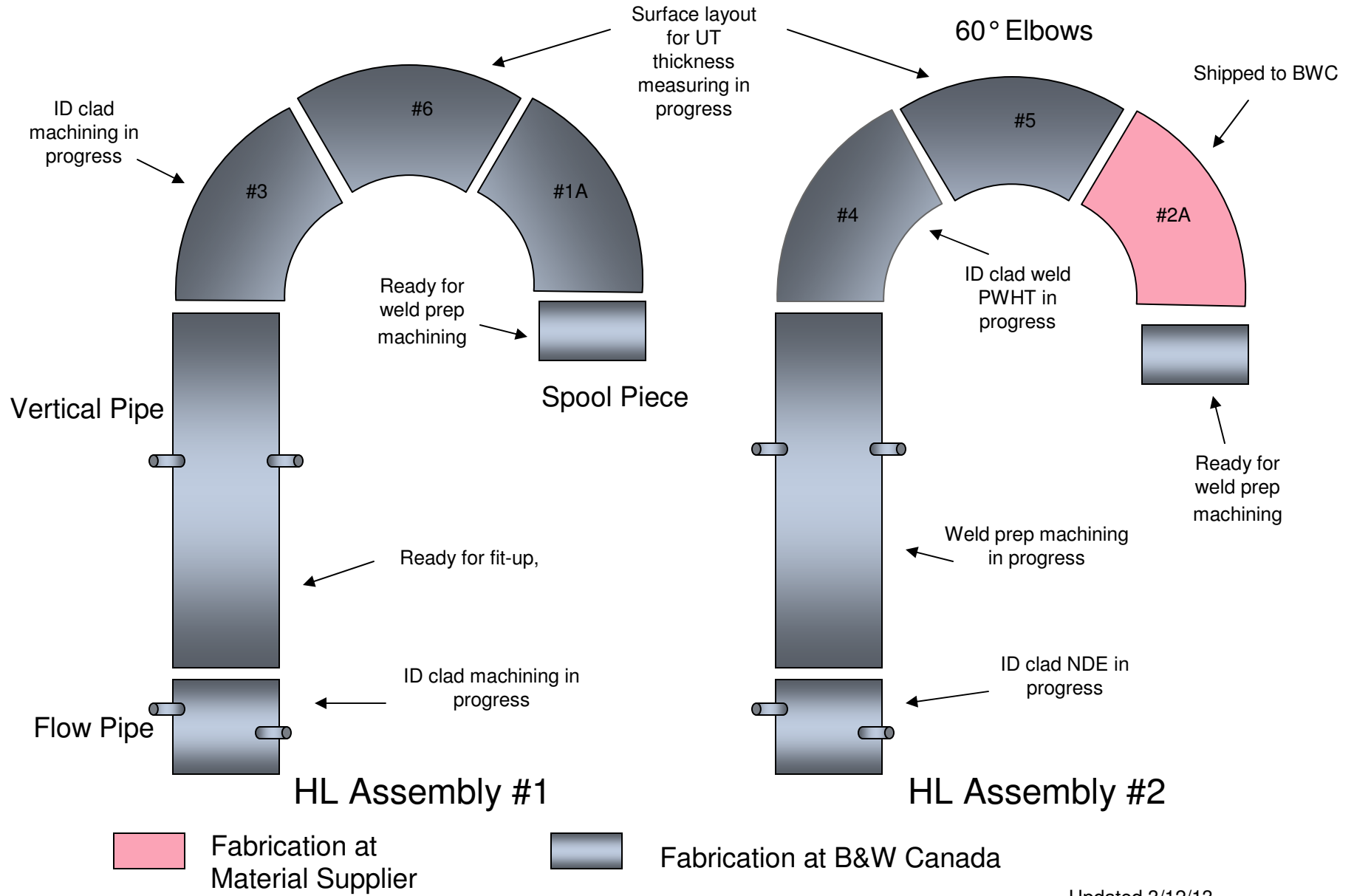
## ■ 2nd Unit

- Current Activity - Local Post Weld Heat Treatment set up for Lower Primary Head is in progress
- Next Activity – Hydraulic expansion of tubing into the Upper and Lower Tubesheets

## ■ Delivery

- Current Delivery to site: November 2013 for both generators

# Hot Leg Fabrication Status



Updated 3/12/13



# Design Change Packages

Steven Osting  
Design Engineering Lead



# DESIGN: Facility Changes

- Engineering Change Packages:
  - 10-0474, Qualification of ROTSG and Hot Leg
  - 10-0468, Old Steam Generator Storage Facility
  - 12-0789, New Steam Generator Storage Facility
  - 10-0462, Install Auxiliary Crane in Containment
  - 11-0811, Control Rod Drive Mechanism Fan Removal
  - 12-0663, Aux Bldg Train Bay Entrance Door – Weather Enclosure
  - 12-0662, Aux Bldg 603 Elevation Mezzanine Deck
  - 12-0470, Haul Route Upgrades
  - 12-0065, Shield Building Construction Opening
  - 12-0066, Containment Vessel Construction Opening
  - 12-0067, Rigging and Transport
  - 10-0466, Steam Generator / Hot leg / Instrumentation Replacement
  - 10-0467, Steam Generator Insulation Replacement
  - 10-0463, Small Bore Piping
  - 12-0064, Large Bore Piping

# DESIGN: Qualification

ECP 12-0474, Qualification of ROTSG and Hot Leg

## ■ Design Review & Qualification

- Comprehensive Evaluation of Changes
  - Design & Licensing Bases/ Current OTSG Design
  - 10CFR50.59
- Design Analytical Review Summary
  - BWC & AREVA Design
  - OTSG & Hot Leg Design/ Accident Analysis/ RCS Piping Analysis/ Leak Before Break
- Plant Interface Evaluation
- Configuration Control
- Operating Experience Evaluation Summary

# DESIGN: Site Preparation

ECP10-0468, Old Steam Generator Storage Facility  
ECP12-0789 New Steam Generator Storage Facility





# DESIGN: Site Preparation

## ECP 10-0462, Auxiliary Crane

- Installation of Auxiliary Crane in CTMT in 2012.



# DESIGN: Site Preparation

## ECP 11-0811, Control Rod Drive Mechanism Fan Removal

- CRDM Fan/  
Ductwork





# DESIGN: Site Preparation

ECP 12-0663, Aux Bldg Train Bay Entrance Door – Weather Enclosure





# DESIGN: Site Preparation

ECP 12-0662, Aux Bldg 603 Elevation Mezzanine Deck



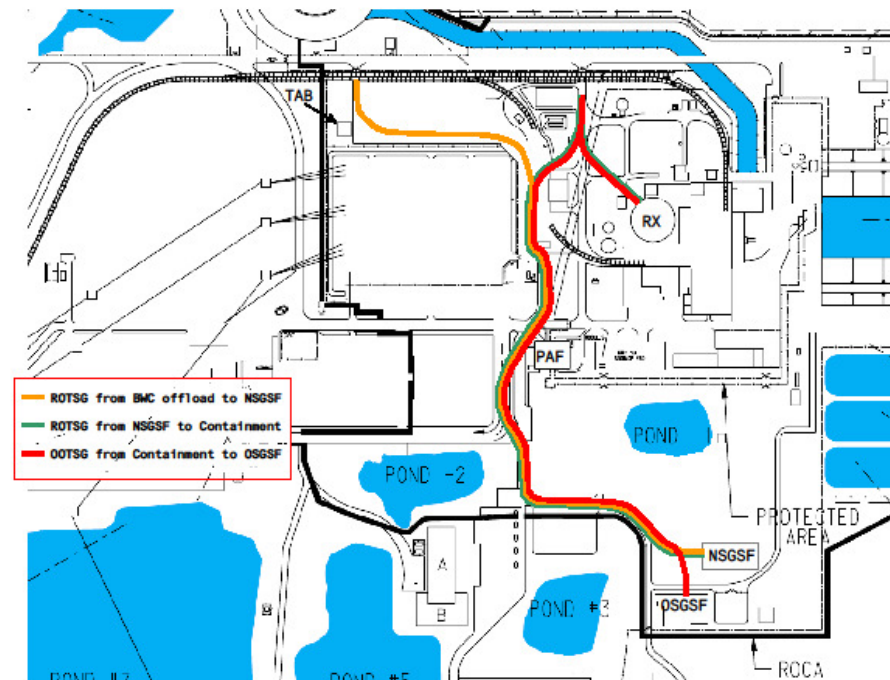


# DESIGN: Rigging & Transport

ECP 12-0067

## Haul Route Study

- Underground utilities
- Load path grade elevations
- Interference removal
- Ground/ Soil Capacity
- Load test



# DESIGN: Site Preparation

## ECP 12-0470, Haul Route Upgrades



**Rail Road – Permanent Removal**

**Duct Bank Bridge**





# DESIGN: Shield Bldg/Containment Opening

ECP 12-0065 / 12-0066





# DESIGN: Rigging & Transport

ECP 12-0067

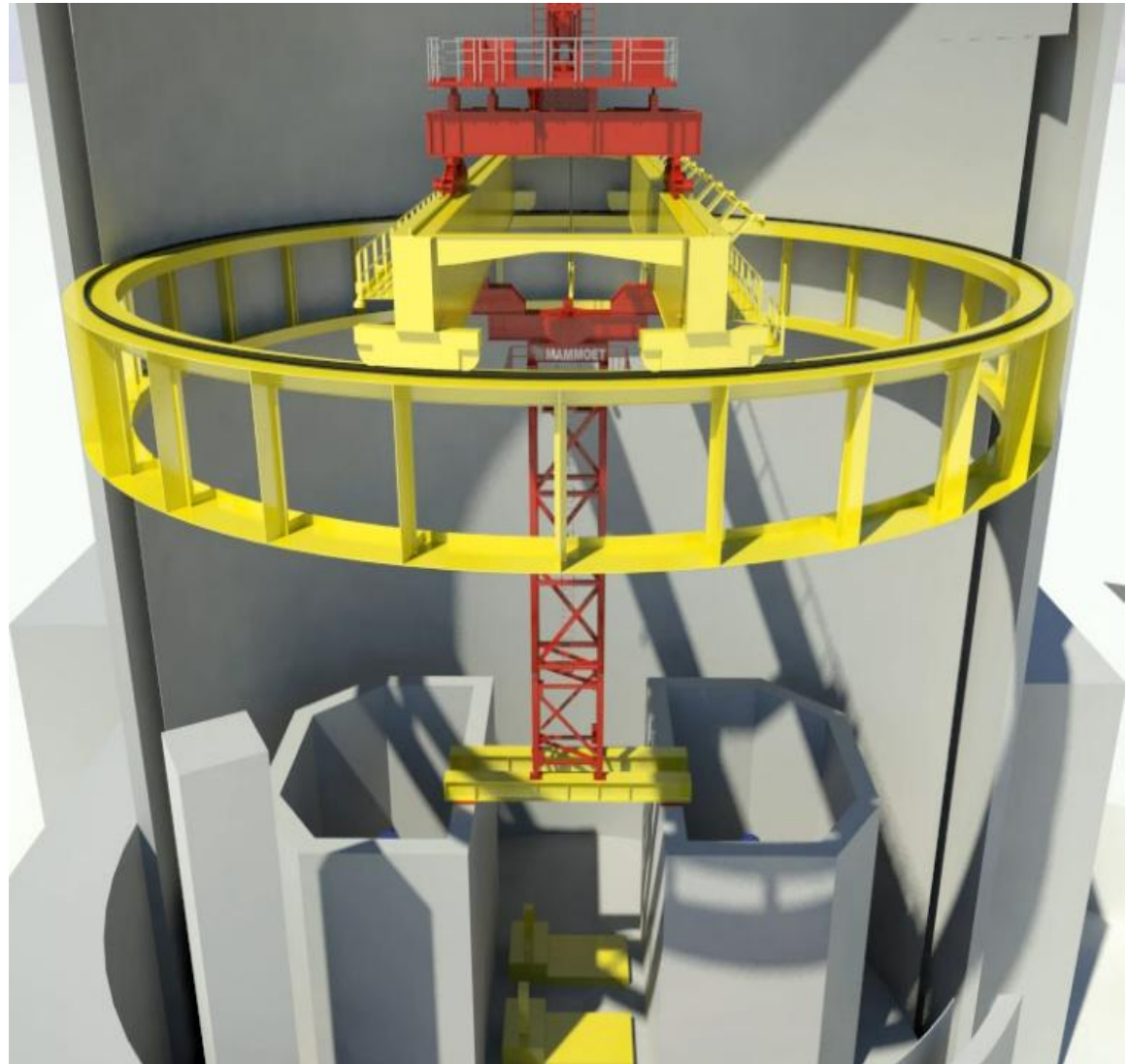
- Self Propelled Modular Transporter
- Outside Lift System
- Work Platform Structure
- Hatch Transfer System



# DESIGN: Rigging & Transport

ECP 12-0067

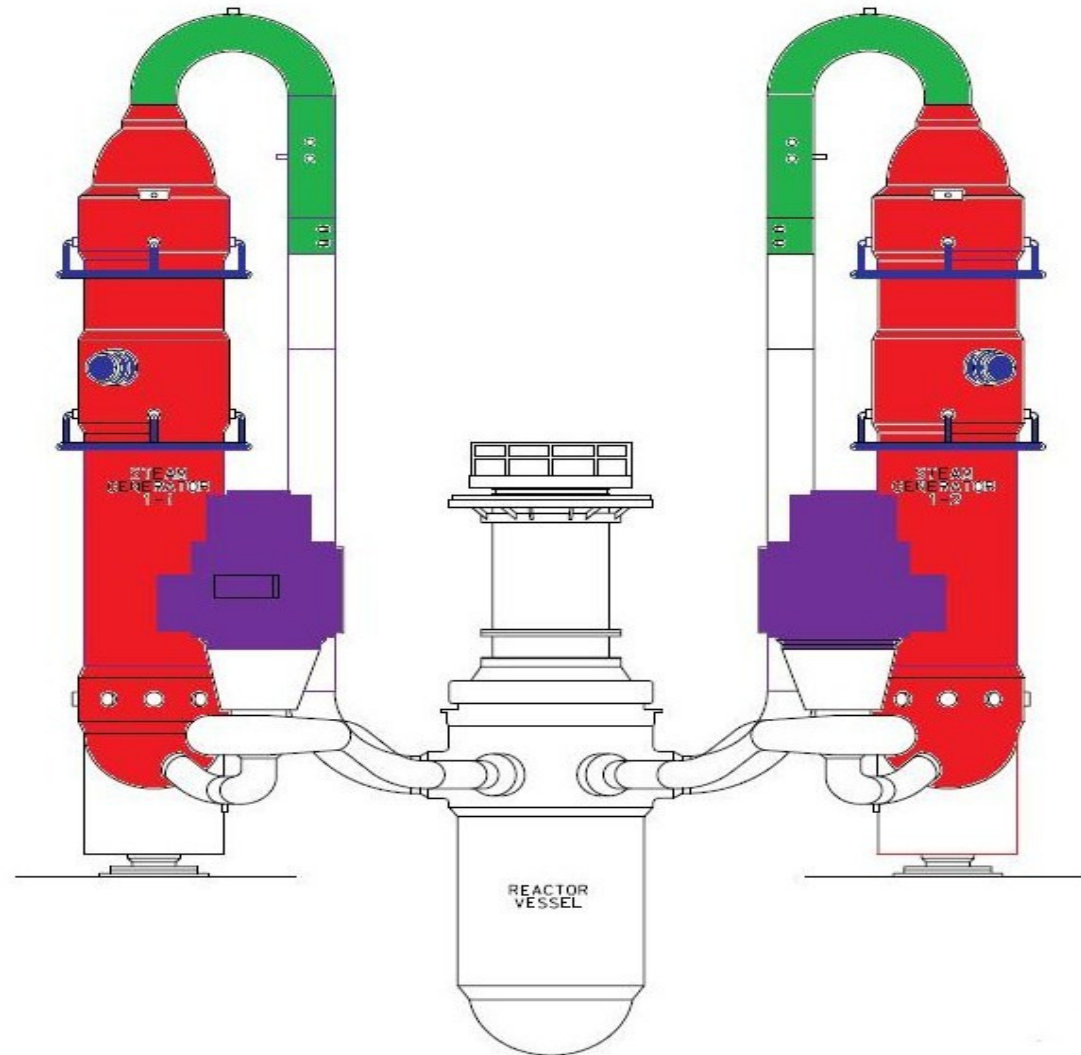
- Polar Crane Center Support Structure
- Temporary Lifting Device.



# DESIGN: SG / HL Replacement

ECPs 10-0466 / 10-0467

- Steam Generators
- Hot Legs
- Instrumentation
- Continuous Vent Line
- Insulation
- Reactor Coolant Pump Motors





# DESIGN: Small & Large Bore Piping

ECPs 10-0463 / 12-0064

- **Main Steam**
- **Main Feedwater**
  - Piping replacement
- **Auxiliary Feedwater**
  - Minor reroute
- **Whip Restraint removal**





# DESIGN: Small & Large Bore Piping

ECPs 10-0463 / 12-0064

- **Small Bore Piping**

- Minor reroute
- Valve replacement





# Shield Building Construction Opening

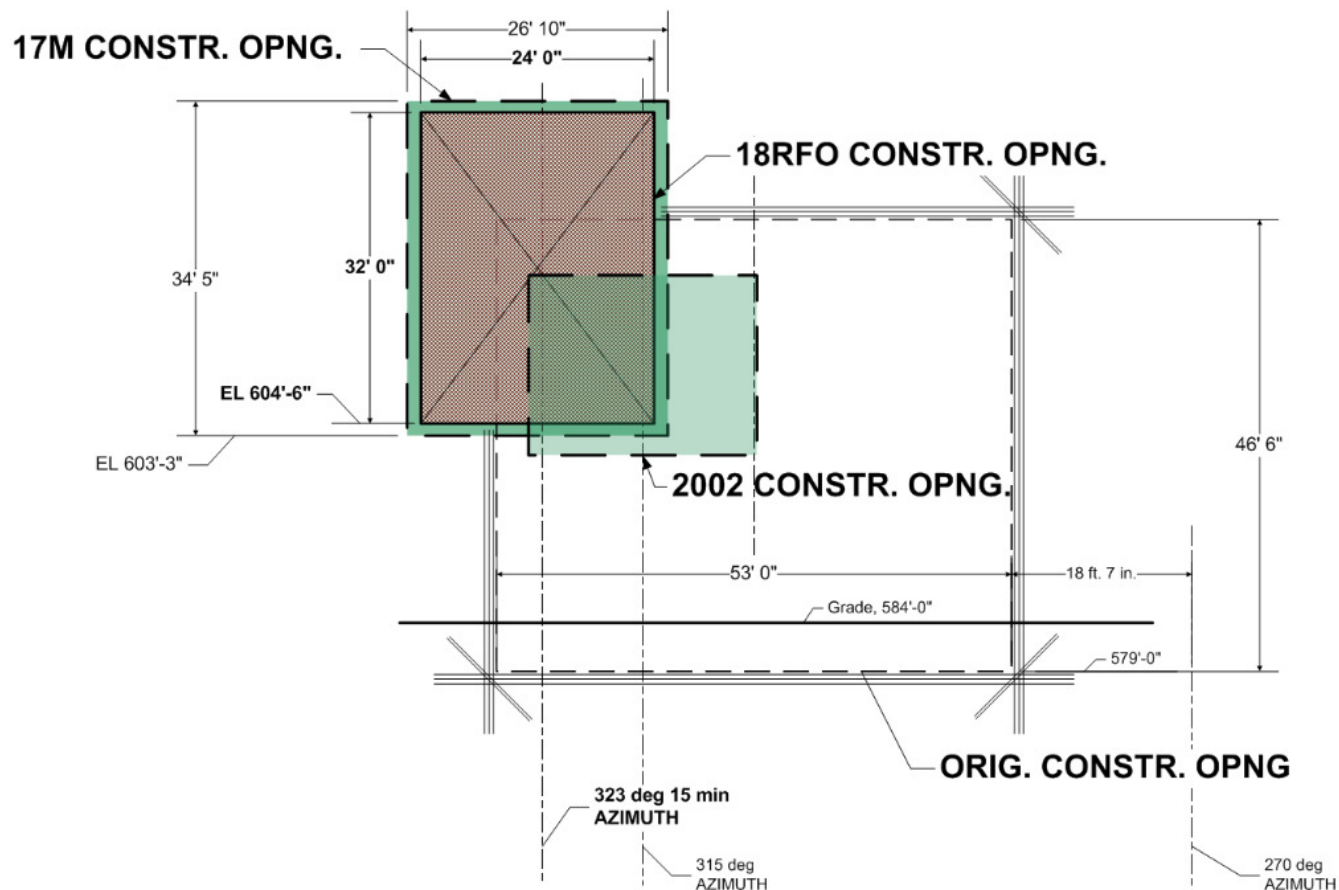
John Hook

Manager, Design Engineering



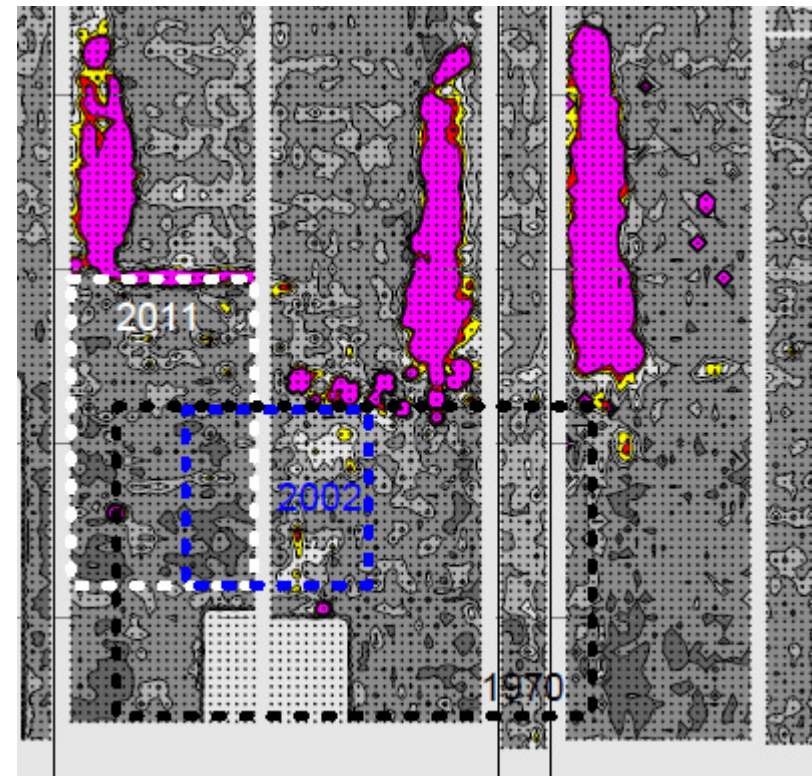
# Shield Building Openings

- The 18 RFO opening is completely encompassed by the 17 Mid-cycle opening



# Shield Building Openings

- **Impulse Response Map of the construction openings.**
  - Original Construction opening shown in Black
  - 2002 Opening shown in Blue
  - 2011 Opening shown in White
  - 2014 opening is contained within the 2011 opening



# Construction Opening Inspections

- **Construction opening perimeter will be inspected for:**
  - Cracking
  - Voids
  - Rebar deficiencies
- **Laminar cracking is not expected based on**
  - Impulse Response readings performed in 2012.
  - Root Cause contributor does not exist.
  - The 18 RFO construction opening is completely encompassed by new concrete from 2011 pour back.
- **Any deficiencies will be documented in the Corrective Action program.**

# Shield Building Monitoring

## Long Term Monitoring Program Established

- **FENOC has established a long-term monitoring plan that includes:**
  - Monitoring existing core bores for crack propagation
  - Inspection of the integrity of the Shield Building coatings
  - Inspection of the integrity of other safety related building coatings
- **No changes were noted during our completed inspections**



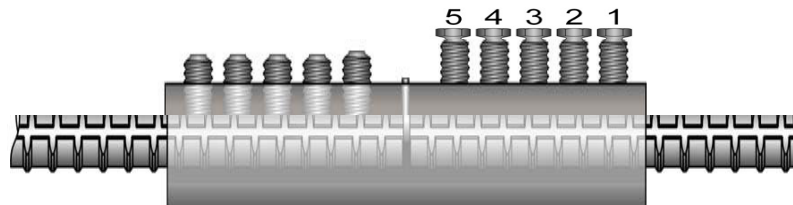
# Shield Building Openings

## ■ Restoration of the Shield Building Opening

- Reinforcing Steel will be the same size, grade, and spacing as the design configuration matching the design criteria
- Concrete compressive strength will meet the original design values
- Concrete will be placed using an on-site batch plant

# Shield Building Opening Restoration

- **Original Construction Opening**
  - Cadweld mechanical splices were used
- **2002 Construction Opening**
  - Cadweld mechanical splices were used
- **2011 Construction Opening**
  - Swaged mechanical couplers and butt welds were used
- **2014 Zap Screwlok system**



# Shield Building Opening Restoration

## ■ ZAP SCREWLOK SYSTEM

- Test-certified to exceed ACI 318 and comply with ASME Section III/ Code Case N-791 requirements
- Equal or exceeds the tensile capacity of the rebar
- Bar sizes #4 through #18
- Used to restore the containment opening at Waterford in 2012





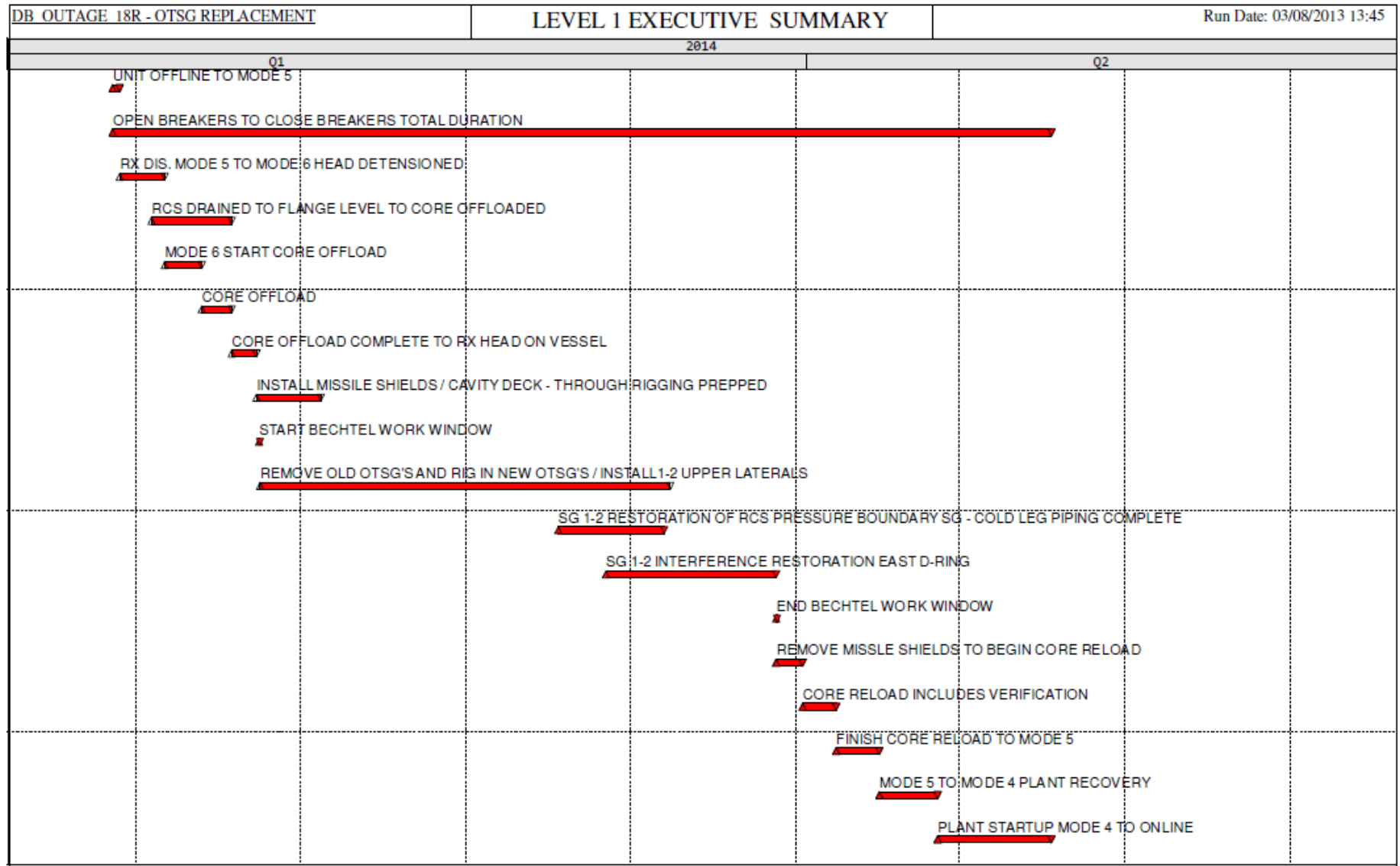
# Implementation Plan

Dave Petro

Manager, Steam Generator Replacement



# Implementation Level 1 Schedule



# Implementation Sequence

- Enter Mode 5
- Establish Shield Building opening
- Core offload
- Establish Containment Vessel opening
- Reactor Vessel Head on vessel/missile shields installed
- Install hatch transfer system/temporary lifting device
- Old Steam Generators out of Containment to Old Steam Generator Storage Facility
- New Steam Generators into Containment
- Replacement of Reactor Coolant Pump Motor 1-1 and 1-2
- Restoration of reactor coolant system pressure boundary and interference removal
- Remove temporary lifting device and hatch transfer system

# Implementation Sequence

- Missile shield removed
- Reactor vessel head to stand
- Restore containment vessel integrity
- Reload fuel
- Restore shield building opening
- Containment pressure test
- Start up testing and heatup to Mode 4

# Sub Contractors

- Mammoet – Rigging & Lifting
- Transco -Thermal Insulation System
- CBI - Containment Cutting/Welding
- Kuhlman - Batch Plant
- AMEC - Miscellaneous Testing
- Video One Productions - Project Video
- Morris Material Handling- Polar Crane Inspection
- American Hydro – Shield Building Opening
- ILRT – Containment Pressure Test
- PCI – Metrology
- Gradel – Earthwork
- Mistras – Non-Destructive Examination
- Superheat – Pre/Post Weld Heat Treatment
- PCI – Reactor Coolant System Cutting/Machining/Welding

# Pre-Service Examinations

Dave Gerren  
Component Engineering Lead



# Pre-service Examinations - Shop

## ■ Tubing

- ASME Section XI – 2007 Edition/2008 Addenda
  - Performed to EPRI 1013706 Rev. 7 *PWR Steam Generator Examination Guidelines*
  - 100% X probe (Bobbin & Array) Tube End to Tube End
  - 100% Profilometry Tube Expansion Region
- 
- Targeted for August for Steam Generator #1 and July for Steam Generator #2

# Pre-service Examinations - Shop

## ■ Component

- ASME Section XI – 2007 Edition/2008 Addenda
- Vessel Welds – UT Section V, Article 4
  - Tubesheet to Head/Shell
  - Main Steam Nozzles
  - Nozzle Inside Radius - Performance Demonstration Initiative (PDI)
- Piping Welds – UT/Surface – UT PDI Qualified
  - Main Feedwater Header
  - Auxiliary Feedwater Header & Risers
  - Reactor Head Vent Line (Dissimilar)
  - Hot Legs
  - Cold Leg Outlet Nozzles
- Vessel Support – UT/Surface, UT Section V, Article 4
  - Base Cone to Lower Head
- Currently targeted for July 2013 for Steam Generator #1 and June 2013 for Steam Generator #2



# Pre-service Examination – Site

- ASME Section XI – 2007 Edition/2008 Addenda
- Vessel
  - Primary Nozzle Inside Radius EVT-1
  - Bolting – VT1
  - Supports – VT3
- Piping Welds – UT/Surface – UT PDI Qualified
  - Main Feedwater
  - Auxiliary Feedwater
  - Main Steam
  - Reactor Head Vent Line
  - Reactor Coolant Tie In
- Piping Supports
  - Supports – VT3
  - Attachment Welds – Surface
- System Leakage Test – VT2

# Steam Generator Transportation and Storage

Dave Petro

Manager, Steam Generator Replacement



# Steam Generator Transportation and Storage

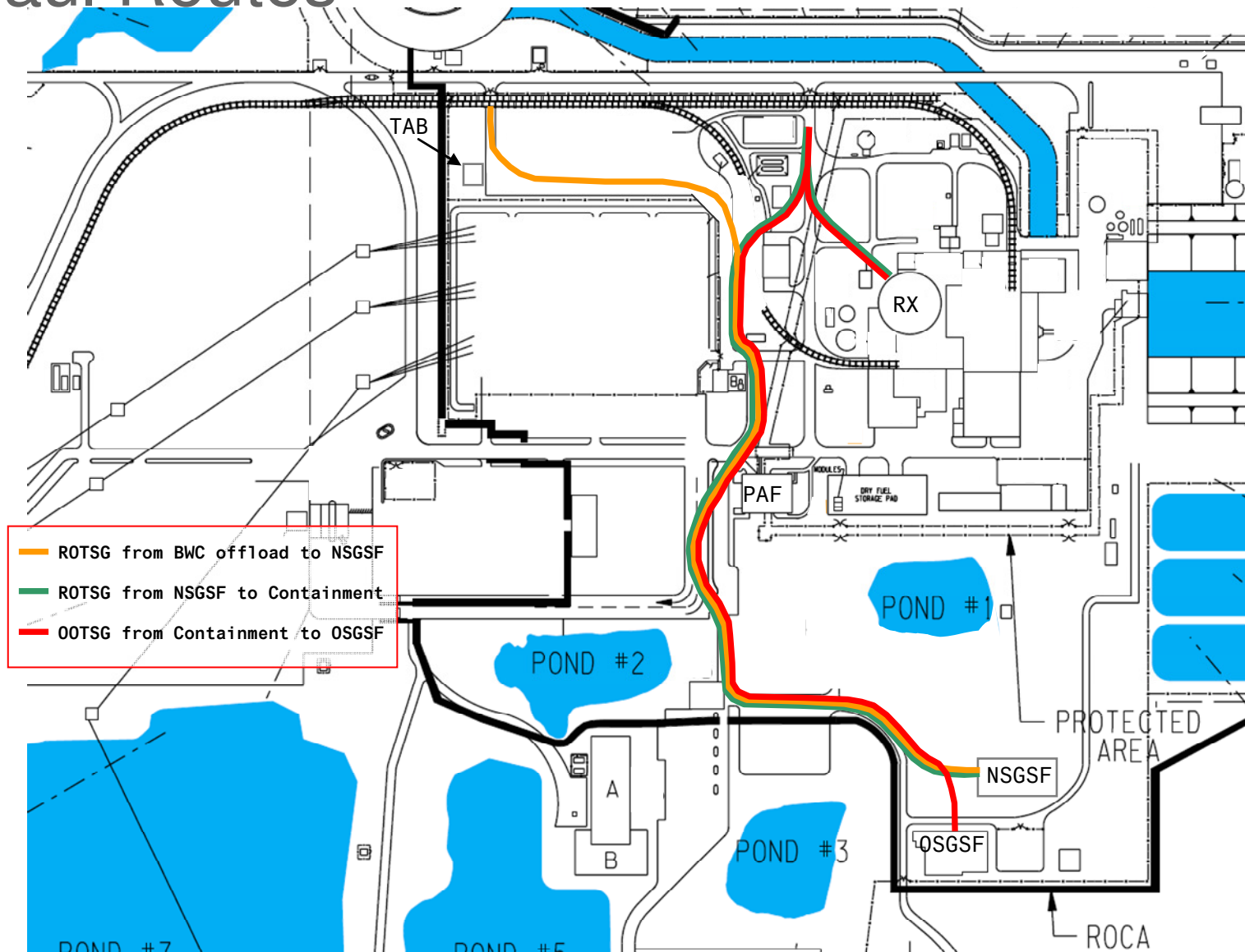
## ■ Transportation

- Via rail from BWC, Cambridge, Ontario Facility to Oshawa, Ontario.
- Via ship from Oshawa to Toledo, Ohio.
- Via rail from Toledo to Davis-Besse.
- Via transporter to New Steam Generator Storage Facility (NSGSF).

## ■ Storage

- New Steam Generator in NSGSF for Prep Activities.
- Old Steam Generator long term storage on site in the Old Steam Generator Storage Facility.

# Haul Routes



# Radiation Protection

Doug Noble

Manager, Radiation Protection



# Radiation Protection Organization/Staffing

- Station Radiation Protection Management will manage and oversee the implementation of the Radiation Protection Program.
- Supplemental RP staff assigned to project have previous Steam Generator Replacement experience.
- Dedicated RP Technicians and Supervisors (FENOC and Contract).
- Davis-Besse ALARA Specialist assigned to SGRP for past three years.

# Radiation Protection Benchmarking

- Benchmarked/lessons learned San Onofre, Waterford, Sequoyah.
- Significant use of lessons learned from Crystal River, Oconee, TMI, ANO.
- Modified Containment Access Control for High Radiation briefings implementing lessons learned from replacement of Reactor Vessel Head in 2011.



# Dose Controls

- Zinc injection for one cycle.
- Plant shutdown running Reactor Coolant Pumps, used for two outages.
- Shielding Hot Leg/Cold Leg penetration, additional shielding beyond routine outages.
- Establish Radiological Controlled Areas around travel path inside and outside Containment.
- Radiation Protection will escort and control access around the Steam Generators during transportation to Old Steam Generator Storage Facility.
- Radiography controls including communication of shot zones, additional oversight and station involvement.

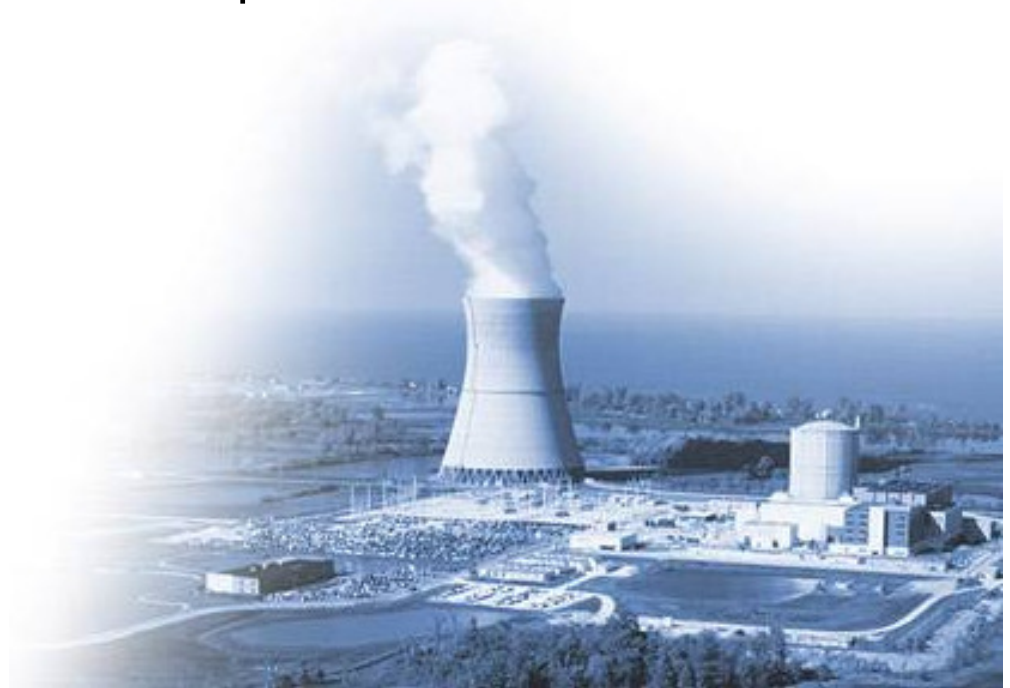
# Contamination Control

- Use of containment purge ventilation to ensure negative pressure at Access Opening.
- Encapsulate and cover Steam Generators and Hot Leg Piping prior to leaving containment.
- Continuous air monitoring and radiation protection surveillance.

# Site Protection SGRP

Dave Petro

Manager, Steam Generator Replacement



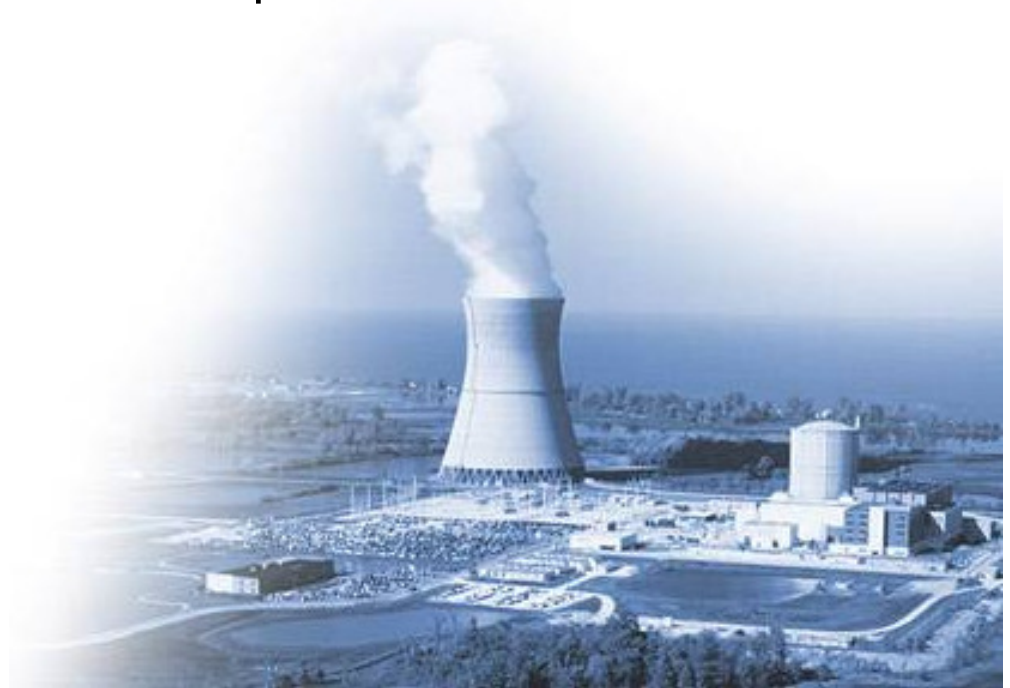
# DB Site Protection SGRP & 18RFO Actions

- Replacement Effect on Security Plan
  - Inspection and delivery of Replacement Steam Generators
  - Physical changes on site
  - Efficiency of the Primary Access Facility and Vehicle Inspection Facility
  - Construction Opening access control
- Security Resources
  - Supplemental Staffing
  - Management of Fatigue Rule
- Security Equipment
  - Purchase of additional/backup security equipment
  - Upgrade of older equipment for reliability
- Traffic Flow

# Quality Assurance Oversight

Dave Petro

Manager, Steam Generator Replacement



# Oversight of SG Fabrication Activities

- FENOC maintains four Quality Control Inspectors on-site at the B&W Canada fabrication facility in Cambridge, Ontario.
- Assigned one full time dedicated FENOC QC Supervisor.
- NUPIC joint utility audit – 2011: FENOC Lead.
- Project and Subject Matter Expert visits for project meetings, document reviews, and hold/witness points inserted within fabrication documents.
- FENOC/BWC Executive phone call to review fabrication status and project risks.

# Forward Looking Statements

**Forward-Looking Statements:** This presentation includes forward-looking statements based on information currently available to management. Such statements are subject to certain risks and uncertainties. These statements include declarations regarding management's intents, beliefs and current expectations. These statements typically contain, but are not limited to, the terms "anticipate," "potential," "expect," "believe," "estimate" and similar words. Forward-looking statements involve estimates, assumptions, known and unknown risks, uncertainties and other factors that may cause actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. Actual results may differ materially due to: the speed and nature of increased competition in the electric utility industry, in general, and the retail sales market in particular, the impact of the regulatory process on the pending matters before FERC and in the various states in which we do business including, but not limited to, matters related to rates and pending rate cases, the uncertainties of various cost recovery and cost allocation issues resulting from ATSI's realignment into PJM, economic or weather conditions affecting future sales and margins, regulatory outcomes associated with Hurricane Sandy, changing energy, capacity and commodity market prices including, but not limited to, coal, natural gas and oil, and availability and their impact on retail margins, financial derivative reforms that could increase our liquidity needs and collateral costs, the continued ability of our regulated utilities to collect transition and other costs, operation and maintenance costs being higher than anticipated, other legislative and regulatory changes, and revised environmental requirements, including possible GHG emission, water discharge, water intake and coal combustion residual regulations, the potential impacts of CAIR, and any laws, rules or regulations that ultimately replace CAIR, and the effects of the EPA's MATS rules including our estimated costs of compliance, the uncertainty of the timing and amounts of the capital expenditures that may arise in connection with any litigation, including NSR litigation or potential regulatory initiatives or rulemakings (including that such expenditures could result in our decision to deactivate or idle certain generating units), the uncertainties associated with the deactivation of certain older unscrubbed regulated and competitive fossil units, including the impact on vendor commitments, and the timing thereof as they relate to, among other things, the RMR arrangements and the reliability of the transmission grid, adverse regulatory or legal decisions and outcomes with respect to our nuclear operations (including, but not limited to the revocation or non-renewal of necessary licenses, approvals or operating permits by the NRC or as a result of the incident at Japan's Fukushima Daiichi Nuclear Plant), adverse legal decisions and outcomes related to ME's and PN's ability to recover certain transmission costs through their TSC riders, the impact of future changes to the operational status or availability of our generating units, the risks and uncertainties associated with litigation, arbitration, mediation and like proceedings, including, but not limited to, any such proceedings related to vendor commitments, replacement power costs being higher than anticipated or inadequately hedged, the ability to comply with applicable state and federal reliability standards and energy efficiency and peak demand reduction mandates, changes in customers' demand for power, including but not limited to, changes resulting from the implementation of state and federal energy efficiency and peak demand reduction mandates, the ability to accomplish or realize anticipated benefits from strategic and financial goals including, but not limited to, the ability to successfully complete the proposed West Virginia asset transfer and to improve our credit metrics, our ability to improve electric commodity margins and the impact of, among other factors, the increased cost of fuel and fuel transportation on such margins, the ability to experience growth in the Regulated Distribution segment and to continue to successfully implement our direct retail sales strategy in the Competitive Energy Services segment, changing market conditions that could affect the measurement of liabilities and the value of assets held in our NDTs, pension trusts and other trust funds, and cause us and our subsidiaries to make additional contributions sooner, or in amounts that are larger than currently anticipated, the impact of changes to material accounting policies, the ability to access the public securities and other capital and credit markets in accordance with our financing plans, the cost of such capital and overall condition of the capital and credit markets affecting us and our subsidiaries, actions that may be taken by credit rating agencies that could negatively affect us and our subsidiaries' access to financing, increase the costs thereof, and increase requirements to post additional collateral to support outstanding commodity positions, LOCs and other financial guarantees, changes in national and regional economic conditions affecting us, our subsidiaries and our major industrial and commercial customers, and other counterparties including fuel suppliers, with which we do business, issues concerning the stability of domestic and foreign financial institutions and counterparties with which we do business, the risks and other factors discussed from time to time in our SEC filings, and other similar factors. Dividends declared from time to time on FE's common stock during any annual period may in the aggregate vary from the indicated amount due to circumstances considered by FE's Board of Directors at the time of the actual declarations. A security rating is not a recommendation to buy or hold securities and is subject to revision or withdrawal at any time by the assigning rating agency. Each rating should be evaluated independently of any other rating. The foregoing review of factors should not be construed as exhaustive. New factors emerge from time to time, and it is not possible for management to predict all such factors, nor assess the impact of any such factor on FirstEnergy's business or the extent to which any factor, or combination of factors, may cause results to differ materially from those contained in any forward-looking statements. 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