Oconee Nuclear Station

Major Projects Update, August 28, 2013

DUKE ENERGY®

Duke Participants

- Preston Gillespie, Senior VP, Nuclear Operations
- Scott Batson, Site VP, Oconee Nuclear Station
- Dave Baxter, VP, Regulatory Project Completion
- Ed Burchfield, Engineering Manager, Oconee Nuclear Station
- Jim Fuller, General Manager, Oconee PSW Project
- Bob Guy, Manager, Oconee Organizational Effectiveness
- Dean Hubbard, Licensing Manager, Oconee Nuclear Station
- Chris Nolan, Director, Fleet Regulatory Affairs

Agenda

Opening Remarks	Scott Batson
Protected Service Water (PSW)	Jim Fuller
PSW Licensing Update	Dave Baxter
Digital Reactor Protective System/Engineered Safeguards (RPS/ES)	Ed Burchfield
National Fire Protection Association (NFPA) 805	Ed Burchfield
Main Steam Isolation Valves (MSIVs)	Ed Burchfield
Fukushima	Ed Burchfield
External Flooding	Dean Hubbard
Closing Comments	Preston Gillespie

Scott Batson

Site Vice President, Oconee Nuclear Station

Jim Fuller

General Manager, Oconee PSW Project

PSW Project – Current Overall Status

- Milestone One required items completed and turned over to Operations on August 2nd
- Remaining five milestones on track

Milestone 1 – Commercial Power Path to the Standby Shutdown Facility – October 1, 2013

- Completed Items
  - Milestone One required items completed and turned over to Operations on August 2nd
  - Selected Licensee Commitment 16.9.22 implemented July 31, 2013 to track unavailability of PSW power via Maintenance Rule
  - 13% Estimated Fire Core Damage Frequency improvement

Milestone 1 – PSW Building

Milestone 1 – PSW Building 13.8KV, 4160VAC and 600VAC Switchgear Equipment and Transformers

Milestone 1 – PSW Building 125VDC System Equipment

Milestone 1 – PSW Building HVAC Equipment

Milestone 2 – Power Path From Keowee Hydro – July 18, 2014

- Completed Items
  - Keowee Unit 2 outage implementation of Keowee AC Power Tie-ins and Keowee Control Cable Re-route
  - Completed 6 of 14 discrete online control cable blocks of work
- Scheduled Activities
  - Keowee Unit 1 outage
  - Keowee Unit 2 bus tie-in outage
  - Completion of remaining online Keowee Control Cable Re-route work scopes
  - PSW Building outage for Keowee power cable tie-in
  - Completion of integrated load test

Milestone 2 – PSW Project Keowee Unit 2 13.8KV Switchgear Control Switches

Milestone 2 – Keowee Unit 2 Transition Junction Box External

Milestone 2 – PSW Project Keowee 13.8KV Switchgear Cabinet

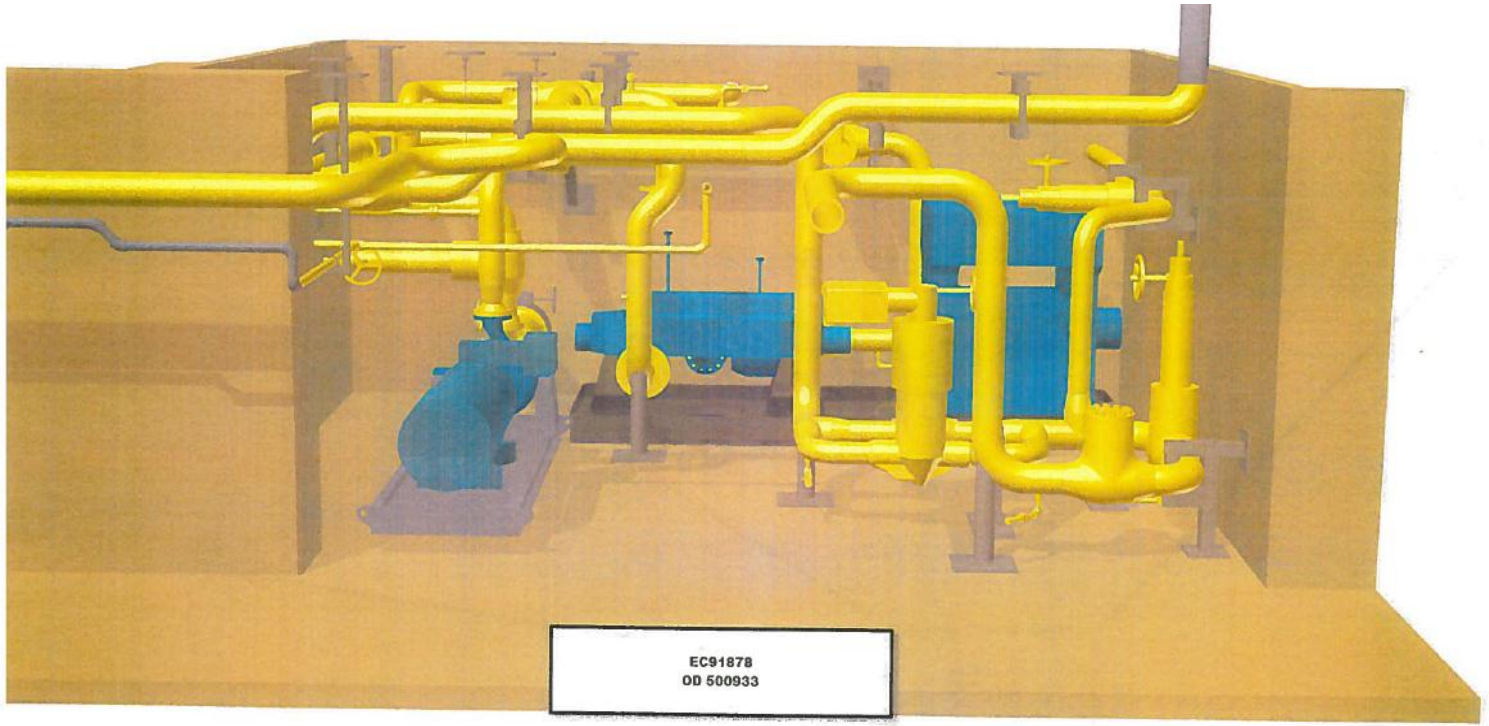
Milestone 3 – Power Path From PSW to HPI System – October 1, 2014

- In Progress Items
  - Unit 2 pre-outage work
    - Termination of 4160VAC power cable and control circuit installation and testing
    - Testing on PSW Power AC and DC panel boards
  - A PSW engineered equipment qualification issue has been recently identified
    - Action plan to resolve issue is being developed to ensure the milestone date is not impacted
- Scheduled Activities
  - Unit 2 (Fall 2013) Testing Work Scope
    - Continuity verification of 4160V Switchgear B6T-4 Control Circuit
    - Rotational checks 2A and 2B HPI pumps from PSW and Normal power
    - Functional verification of valves using PSW and Normal power
  - Units 1 and 3 Overlap Testing Work Scope
    - Rotational checks A and B HPI pumps from PSW power for each unit
    - Phase rotation checks on 600VAC MCCs on PSW power for each unit

Milestone 4 – Align PSW Pump to Steam Generators – June 3, 2015

- Completed Items
  - Installation of pre-outage piping and pipe supports
- Scheduled Activities
  - Completion of 48 Auxiliary Building / Reactor Building Engineering Change Packages (ECPs) to support Phase I cooling
  - Pre-outage Station ASW system demolition and installation of PSW system
  - Integrated PSW System testing

Milestone 4 – PSW Pump Room



Milestone 4 – 2000 HP Pump/Motor

Milestone 5 – PSW System Complete – February 4, 2016

Remaining PSW Project Work Scope

- Units 1, 2, and 3 Pressurizer Heater and Vital I&C Battery Charger Repowering from PSW
  - Six 600VAC Automatic Transfer Switches (Two per unit)
  - Eight 600VAC Manual Transfer Switches (Two for Unit 1 and Three each for Units 2 and 3)
  - 18 cables left to pull from PSW Building to Auxiliary Building through TSB Cable Vault and Manhole 7
  - Cable infrastructure installation in the Auxiliary Building
- Units 1, 2, and 3 Vital I&C Cable Re-routes
  - Installation and termination of twenty-four 1000MCM single conductor cables
    - 16 cables have been pulled, 8 remain
  - Installation of cable infrastructure
  - Tie-ins to new Automatic Transfer Switches
- Phase II of Auxiliary Building and Reactor Building Cooling Project

Milestone 6 – Satisfy the Requirements of NFPA 805 – November 25, 2016

Transition License Conditions

- The Transition License Conditions will be discussed by Ed Burchfield in the NFPA 805 presentation

Dave Baxter

VP, Regulatory Project Completion

Overall Approach: PSW TS and UFSAR revision, HELB Mitigation Strategy, then Tornado Mitigation Strategy

- PSW TS and UFSAR revision completion plan
  - PSW Design Basis – Define design basis for initial installation – Complete
  - Thermal-Hydraulic Analysis – Perform analysis for NFPA 805 case – Complete
  - RB/AB Cooling – RAI response addressing Alternate Cooling System design criteria – Complete
  - PSW TS and UFSAR – Finalize TS, TS bases, and UFSAR – Complete
- Expect NRC SER 90 to 180 days after submittal

Ed Burchfield

Engineering Manager

Reactor Protective System/Engineered Safeguards

- Unit 1 RPS/ES Installation Complete (Spring 2011)
- Unit 3 RPS/ES Installation Complete (Spring 2012)
- Unit 2 RPS/ES Installation Scheduled for Fall 2013

Project Status

- NRC Safety Evaluation issued December 29, 2010
- Program Implemented January 1, 2013
- All items not related to PSW are complete or on schedule
- Turbine Building / Auxiliary Building wall penetrations modifications completed
- Triennial fire inspection performed in August

Remaining Items to Complete:

- PSW modifications
- Once the PSW modifications are complete
  - Incorporate the PSW modifications into site documents
  - Confirm that the risk decrease from installation of PSW bounds the transition risk
  - Complete the analysis of non-power operation fire impacts
- Complete remaining modifications
  - Fire detection modifications
  - Purge Room wall modifications

Ongoing actions until modifications are complete:

- Appendix R required fire watches continue to be performed
- New NFPA 805 fire watch program has been established
- Additional compensatory actions remain in place until PSW is completed

Oconee's fire safety has benefited from the implementation of NFPA 805, and will continue to improve upon PSW completion

Project Status

- MSIV schedule re-prioritized based on higher safety significance projects
  - PSW
  - NFPA 805
  - Fukushima Modifications

FLEX Modifications

- Based on use of SSF for Phase 1 Coping
- Duke Project Approval Process complete; Kickoff meeting conducted
- Implementation Schedule: U2 (Fall 2015), U3 (Spring 2016), U1 (Fall 2016)
  - S/G Make-up Capability
  - RC Make-up Capability
  - CCW Embedded Water Transfer Capability
  - Primary Repower
  - Alternate Repower
  - SFP Makeup
  - FLEX Equipment Storage Building

Spent Fuel Pool Level Instrumentation (SFPLI) Modifications

- Duke Project Approval Process complete; Kickoff meeting conducted
- Implementation Schedule: U1 & U2 (Fall 2015), U3 (Spring 2016)
- Primary and backup channel for each spent fuel pool
- Both channels will use wave guided radar technology

Flood Modifications (50.54(f) Request Letter)

- Fukushima Response includes External Flood for Oconee
- Flood Modifications will be discussed in more detail later in the presentation

Dean Hubbard

Licensing Manager, Oconee Nuclear Station

Fukushima Flooding Response - Overview

- Oconee's flooding evaluation has been updated to meet Fukushima response requirements
- All extreme external flooding events have been evaluated
- Interim actions have been put in place for postulated flooding events
- The interim actions for the postulated dam failure have been inspected by the NRC
- Permanent integrated flooding responses are in development
- Flooding modifications for a postulated dam failure are being designed to support 2016 implementation

- **Hazard Reevaluation Report (HRR) – Completed March 12, 2013**
  - Includes all external flooding events per NUREG 7046
  - Dam failure analysis using Xu & Zhang 2009 (with alternate breach sensitivity reviews)
  - Dam seismic fragility gap analysis using 2007 fragility analysis with 1989 Electric Power Research Institute (EPRI) Uniform Hazard Spectrum (UHS) inputs
  - Probable Maximum Precipitation (PMP) analysis using HMR-51, 52 with no change based on review of updated U.S. Bureau of Reclamation (USBR), December 2011 PMP Study for the Southeast
- **Breach methodology question response (parallel paths):**
  - Alternate Breach Method Development – Targeted November 2013
    - Von Thun and Gillette
    - McDonald & Langridge-Monopolis
    - Froehlich
  - Xu & Zhang Independent Review for Jocassee – Targeted November 2013

- **Integrated Assessment (IA) started January 2013**
  - Conducted in parallel with Hazard Reevaluation Report (HRR completed)
  - Targeted to complete by December 2013 using current HRR (due March 12, 2015)
  - Contractor involved with NEI flooding taskforce on IA development
- **Modification design firm mobilized and working on detailed design**
  - Dam failure protection & mitigation modifications
  - Local Intense Precipitation updated hazard design study
  - Objective to maintain a free flowing site

External Flooding
High Level Timeline

2013

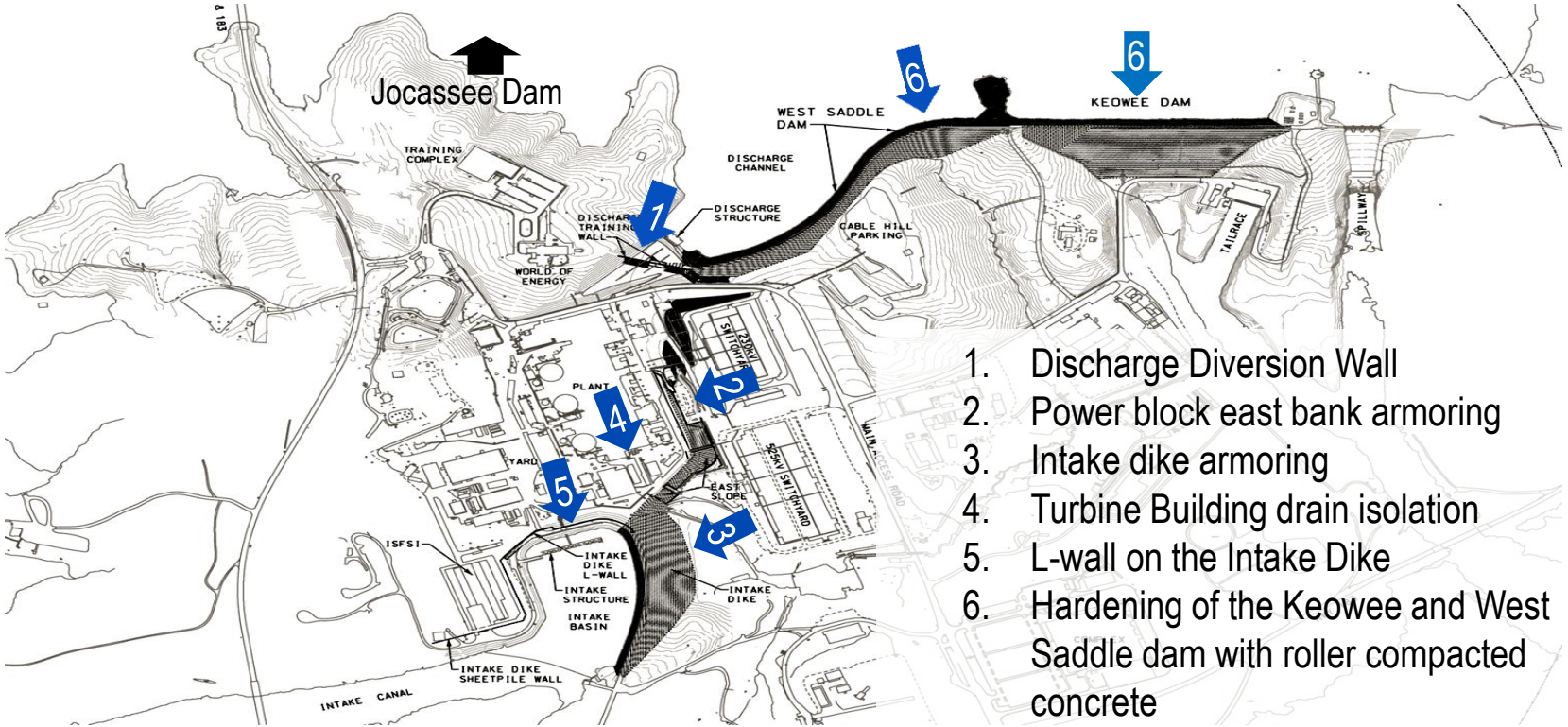
- ✓ January – Integrated Assessment Team kickoff
- ✓ February – Peer Review team lead in place
- ✓ March – Hazard Reevaluation completed & controlling flood parameters identified
- ✓ May – Completed Integrated Assessment (IA) evaluation of existing flood protection
- ○ **June – Target date for NRC approval of HRR (moved based on Xu & Zhang review)**
- ✓ July – Completed IA evaluation of protection/mitigation
- ○ **September – Determine IA protection/mitigation strategy & mod scope**
- ○ **October – Complete first draft of IA**
- ○ **December – Target for submittal of the IA to the NRC**

2014

- ○ **Target date for NRC approval of the IA**

- **Major modifications will be required regardless of the breach method applied**
- **Modification options (depending on the final dam failure assumptions)**
  1. Discharge Diversion Wall
  2. Power block east bank armoring
  3. Intake dike armoring
  4. Turbine Building drain isolation
  5. L-wall on the Intake Dike
  6. Hardening of the Keowee and West Saddle dam with roller compacted concrete

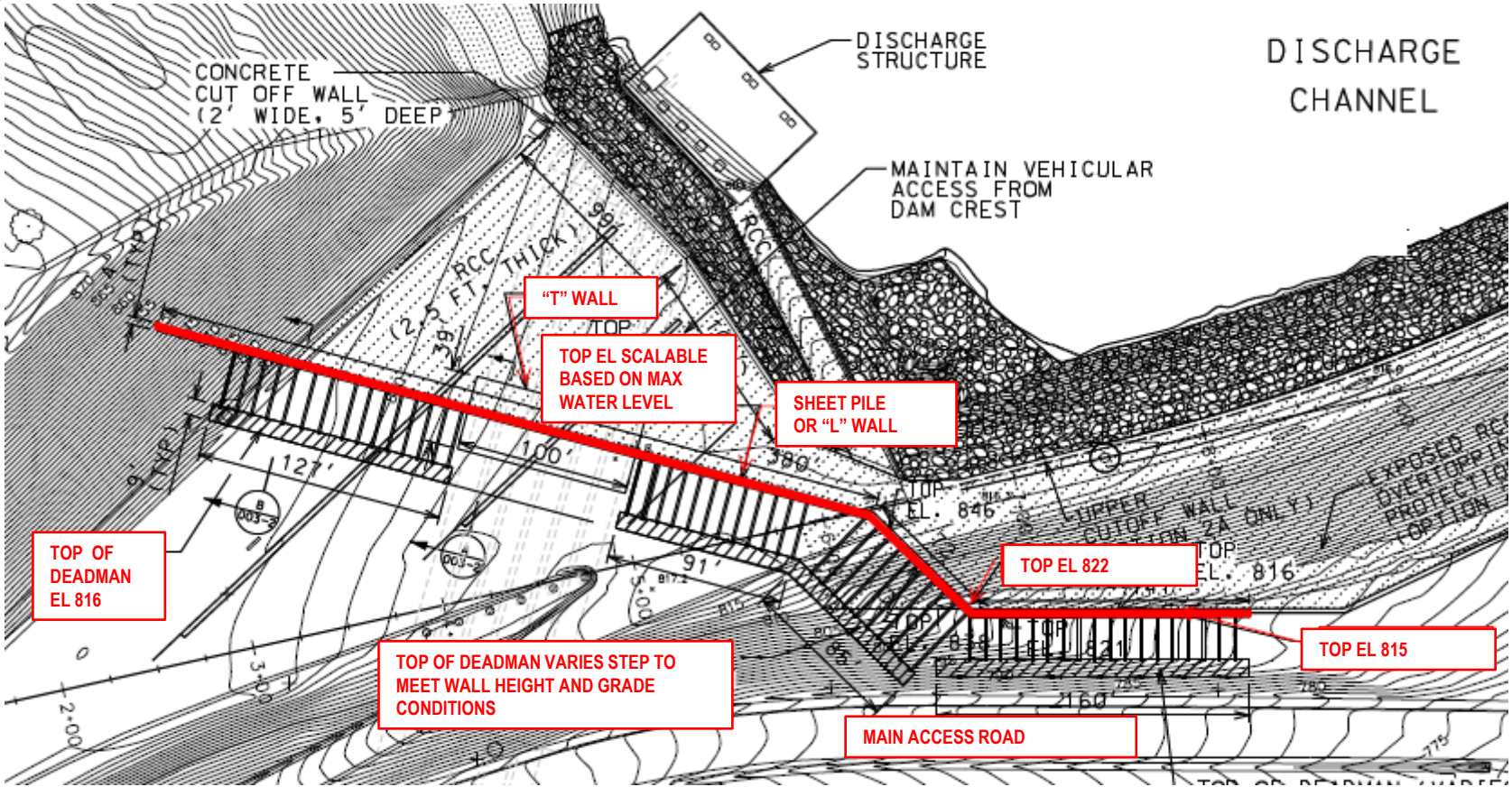
Dam Failure Modifications Options



1. Discharge Diversion Wall
2. Power block east bank armoring
3. Intake dike armoring
4. Turbine Building drain isolation
5. L-wall on the Intake Dike
6. Hardening of the Keowee and West Saddle dam with roller compacted concrete

- **Modifications selected based on the Fukushima Hazard Reevaluation Report to respond to a postulated upstream dam failure:**
  1. Discharge Diversion Wall
  2. Power block east bank armoring
  3. Intake dike armoring
  4. Turbine Building drain isolation

Discharge Diversion Wall



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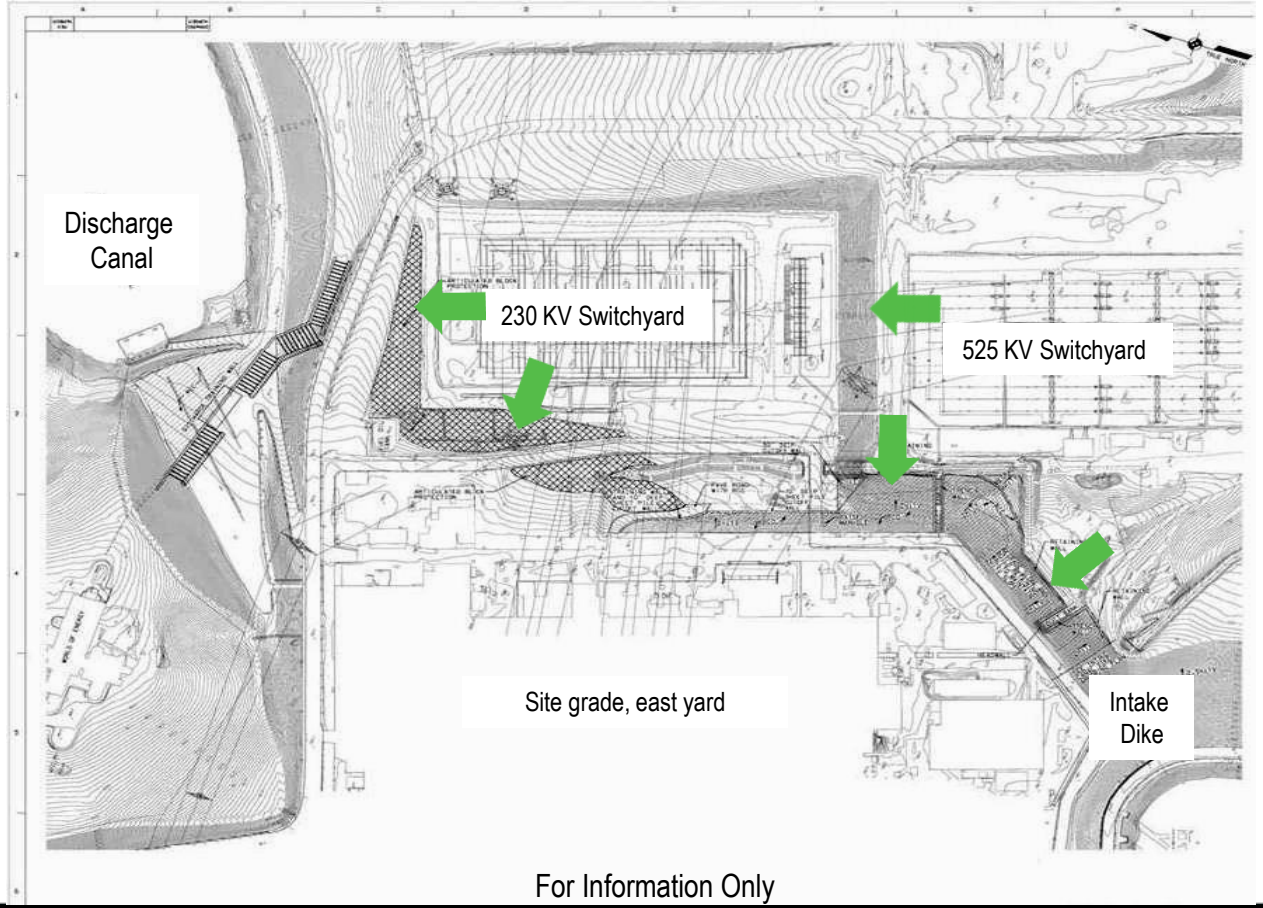
East Bank Armoring



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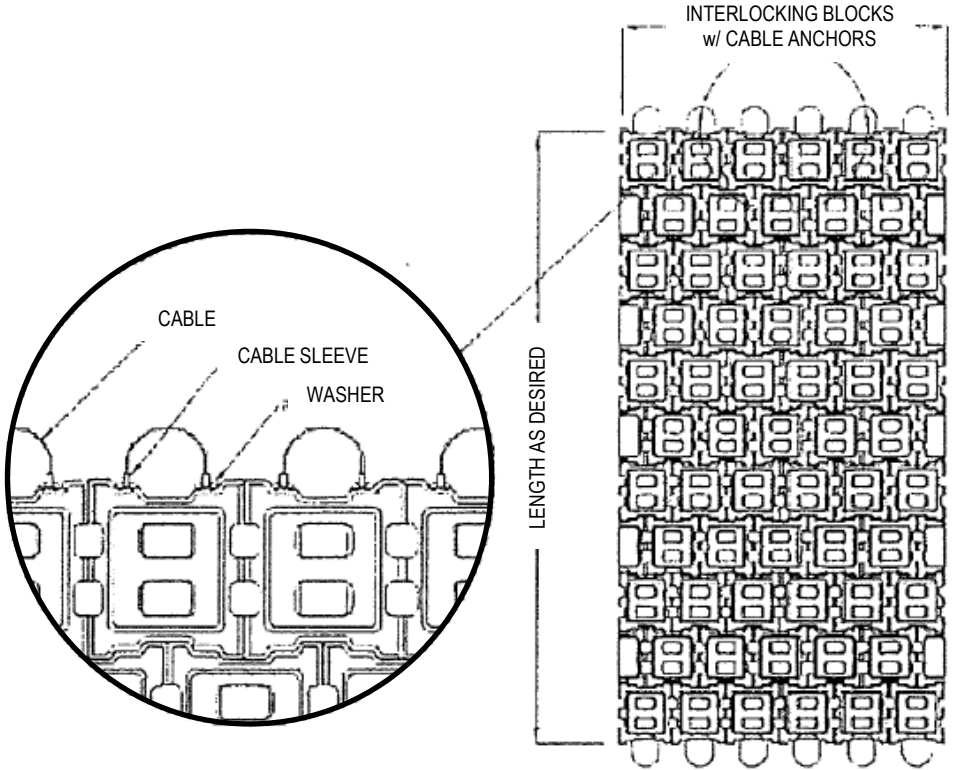
East Bank Armoring



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Intake Dike Armoring

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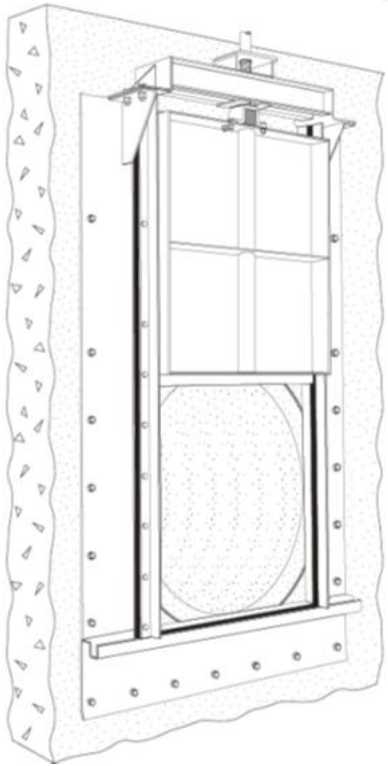
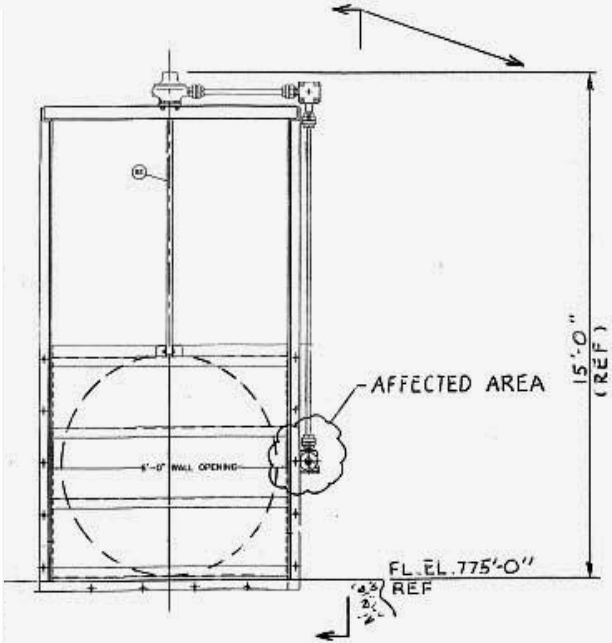
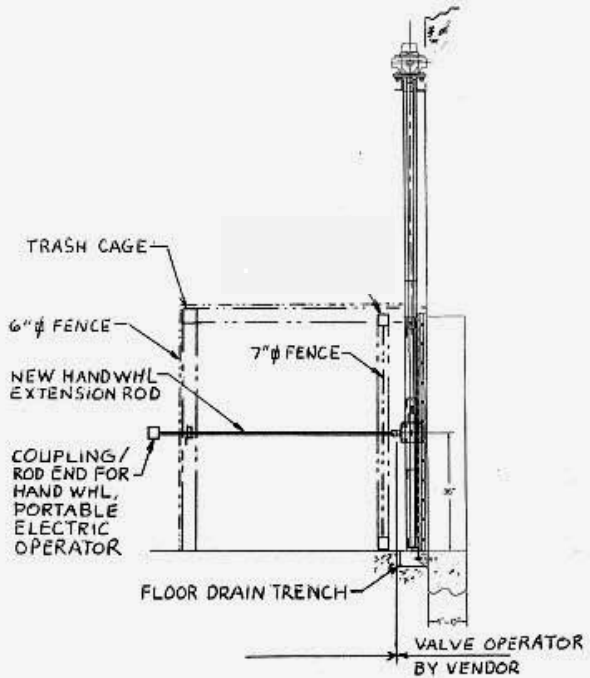
Turbine Building Drain Isolation







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- Hazard Reevaluation Report (HRR) Submitted on March 12, 2013
  - Parallel paths to address breach method questions
    - Alternate Breach Method Development – Targeted November 2013
    - Independent Review of the HRR breach method – Targeted November 2013
- Integrated Assessment (IA) started January 2013
  - Targeted to complete by December 2013 using current HRR (due March 12, 2015)
- Modification design firm mobilized and working on detailed design
  - Major modifications will be required regardless of the breach method applied
  - Dam failure flood mitigation modifications must be completed by June 2016

Preston Gillespie

Senior Vice President, Nuclear Operations

Acronyms

AB - Auxiliary Building
ASW - Auxiliary Service Water
CCW - Condenser Circulating Water
ECP - Engineering Change Package
EOC - End of Cycle
HELB - High Energy Line Break
HPI - High Pressure Injection
HRR - Hazard Reevaluation Report
I&C – Instrumentation and Control
IA - Integrated Assessment
KV – Kilovolt
MCC – Motor Control Center
NEI - Nuclear Energy Institute
NFPA – National Fire Protection Association
PSW - Protected Service Water
RAI - Request for Additional Information
RB - Reactor Building
RC - Reactor Coolant
RPS/ES - Reactor Protective System/Engineered Safeguards
S/G - Steam Generator
SER - Safety Evaluation Report
SLC – Selected Licensee Commitment
SFP – Spent Fuel Pool
SSF - Standby Shutdown Facility
TS - Technical Specifications
UFSAR - Updated Final Safety Analysis Report
VAC - Volts Alternating Current
VDC - Volts Direct Current