

NRC / Korean NSSC

Presentation

June 1, 2016

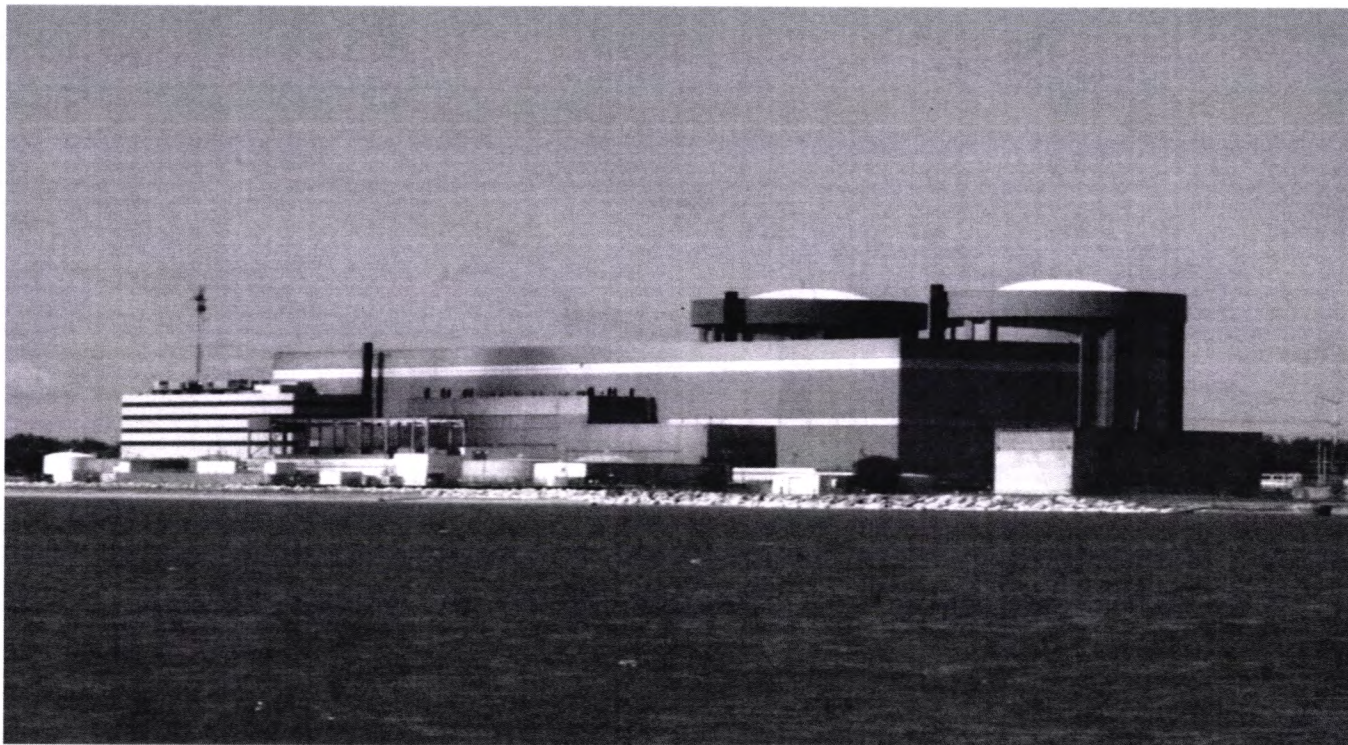


Zion Restoration project

Zion Decommissioning – Bob Quinn



Largest Single Fuel Movement Campaign in US Currently the largest Nuclear Decommissioning project in the US



2015 Key Accomplishments



- Fuel Transfer to ISFSI Completed
- All Class GTCC Waste Removed
- All Class B & C Waste Removed
- NRC Approved Defueled Station Emergency Plan (DSEP)
- License Termination Plan Submitted to NRC and Accepted for Review
- Control Room Shut Down Completed
- Demolition and Backfill of Cribhouse Completed
- VCC Pad, Old Sewer Lift Station, VBS, Met Tower and South Guardhouse Demolitions Completed
- Phase 1 Turbine Building Interior Demolition Completed

2015 Key Accomplishments

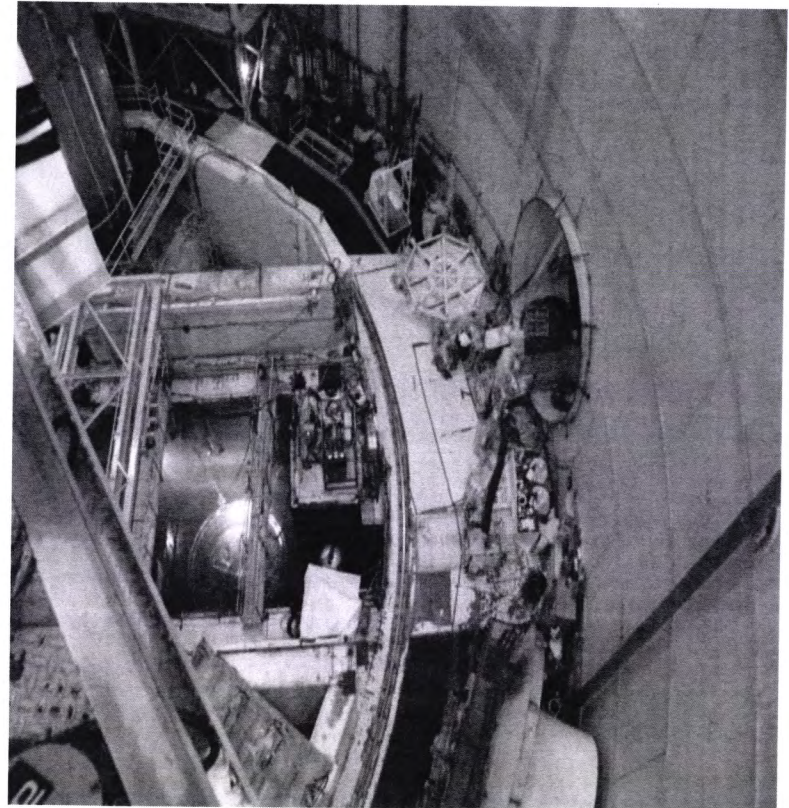


- Turbine Building Unconditional Release Surveys Completed
- Aux Building Pre-Open Air Demolition and Decontamination Commenced
- Fuel Rack Removal Completed
- Containment Buildings Tendon Removal
- Unit 2 Steam Generator Removal
- Water Processing Continued



2015 Key Accomplishments: Reactor Vessel Segmentation

- Units 1 & 2 Lower Internals Complete
- Units 1 & 2 Cavities have been drained and decontaminated.
- Units 1 & 2 reactor vessel segmentation completed

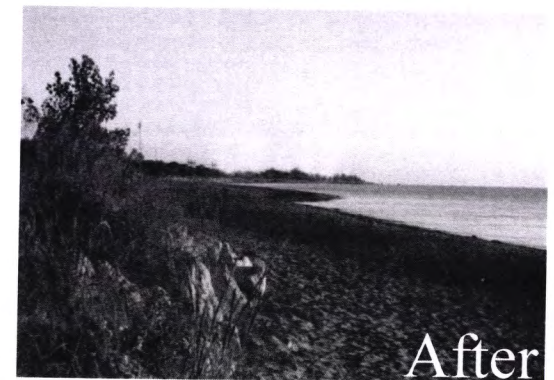


Cutting on Lower internals
Unit 1

Site Conditions – End State- John Brandes



- Above grade buildings demolished and removed (to a minimum 3' below grade)
- Basement areas backfilled and land areas returned to natural contours
- Roadways and rail lines will remain
- Intake and discharge piping from and into Lake Michigan will remain
- Some buried piping will remain
- Adjacent facilities/structures to remain:
 - ComEd Switchyard (to the West)
 - ISFSI Complex (to the Southwest)
 - ISFSI Warehouse (to the Southwest)
 - Microwave Tower (to the South)
 - Sewage Lift Station



Challenges – John Brandes



- First time evolution of decommissioning work activities
- Rendering station “Cold, Dark & Dry”
- Schedule and planning
- Safety

Regulatory Requirements - Jerry Houff



A. Regulatory Related Activities

1. Interface with Regulators
2. Revise Updated Final Safety Analysis Report (UFSAR) which became Defueled Safety Analysis Report (DSAR)
3. Revise Technical Specifications, Emergency Plan and Security Plan to reflect *ZionSolutions* Quality Assurance Project Plan
4. Develop D&D Plan – Post-Shutdown Decommissioning Activities Report (PSDAR)
(10 CFR 50.82 (a)(4)(i))
5. Develop and Submit License Termination Plan (LTP)

Regulatory Requirements (con't)



B. Decommissioning Licensing Activities

- DOT (Department of Transportation) permits for large components and radwaste shipments
- Construction Permit for Rail Spur
- Demolition Permits
- Hazardous Paint Removal
- Air Quality Permit for Dust Control
- Underground Storage Tank Removal
- Air Emissions Source Removal
- FAA (Federal Aviation Administration) & FCC (Federal Communications Commission) Notifications
- Coast Guard buoy permits
- NPDES (National Pollutant Discharge Elimination System) permit modifications/ renewals
- Sanitary/Water treatment permits

Radioactive Waste Operations – Mike Wiskerchen



The project is primarily engaged with shipping two (2)
Campaigns:

Class B and C Waste

- Waste Control Specialists (WCS) is the receiving facility located in Andrews County, TX
- Ships in a cask on a truck
- Recently completed this campaign last week (37 shipments)

Class A Waste

- Receiving facilities in Clive, UT and Erwin, TN
- Ships in a cask on a truck, Intermodal Container or High Sided Gondola on the rail
- These shipments are the most frequent and continually depart from the plant

Containers for Waste Shipments and Methods of Transport:

Casks

Specialty container, shipped on a truck

Intermodals

Commercially available containers shipped on rail (primary) and truck (secondary)

Sea-lands

Commercially available containers shipped on rail (primary) and truck (secondary)

Gondolas

Commercially available containers shipped on rail only

Radioactive Waste Operations – Mike Wiskerchen

ZION SOLUTIONS_{LLC}
An Energy Solutions Company



Dose Summary – Chris Keene



Description	Person Rem	Comments
Preparatory Activities for Decommissioning		
Prep activities for Fuel Transfer Campaign	0.74	Complete
Spent Fuel Dry Casks (loading + storage ISFSI)	11.578	Complete
Routine/ General Maintenance Activities- all work groups		
Mechanical Maintenance/ General Activities	20.615	In progress
Electrical Maintenance General Activities	6.484	In progress
Security General Rounds/Operations Activities/ISFSI Security	1.369	In progress
Radiation Protection General/ Routine Activities	12.5	In progress
Decontamination/Laundry/HEPA Ventilation Setup Activities	1.535	In progress
Engineering / Management/Supervision/QA & QC Walkdowns/Visitors/NRC	5.085	In progress
Radiological characterization/ Final Site Survey Activities	1.334	In progress
Reactor Internals- Siemplekamp		
Preparatory activities		
Unit 2 Containment	3.406	Complete
Unit 1 Containment	2.702	Complete
Removal of internals		
Unit 2 Containment	3.575	Complete
Unit 1 Containment	2.971	Complete
RP Coverage / Characterization of Reactor Internals removal		
Unit 2 Containment	6.507	Complete
Unit 1 Containment	6.341	Complete
Dismantling / segmentation / waste packaging		
Unit 2 Containment	24.635	Complete
Unit 1 Containment	30.425	Complete
GTCC (loading + storage ISFSI)		
Unit 2 Containment GTCC	1.584	Complete
Unit 1 Containment GTCC	1.459	Complete
Unit 1 Containment Cavity clean up	10.035	Complete
Reactor vessel- Siemplekamp		
Preparatory activities		
Unit 2 Containment	12.63	Complete
Unit 1 Containment	9.769	Complete

Dose Summary (Continued)



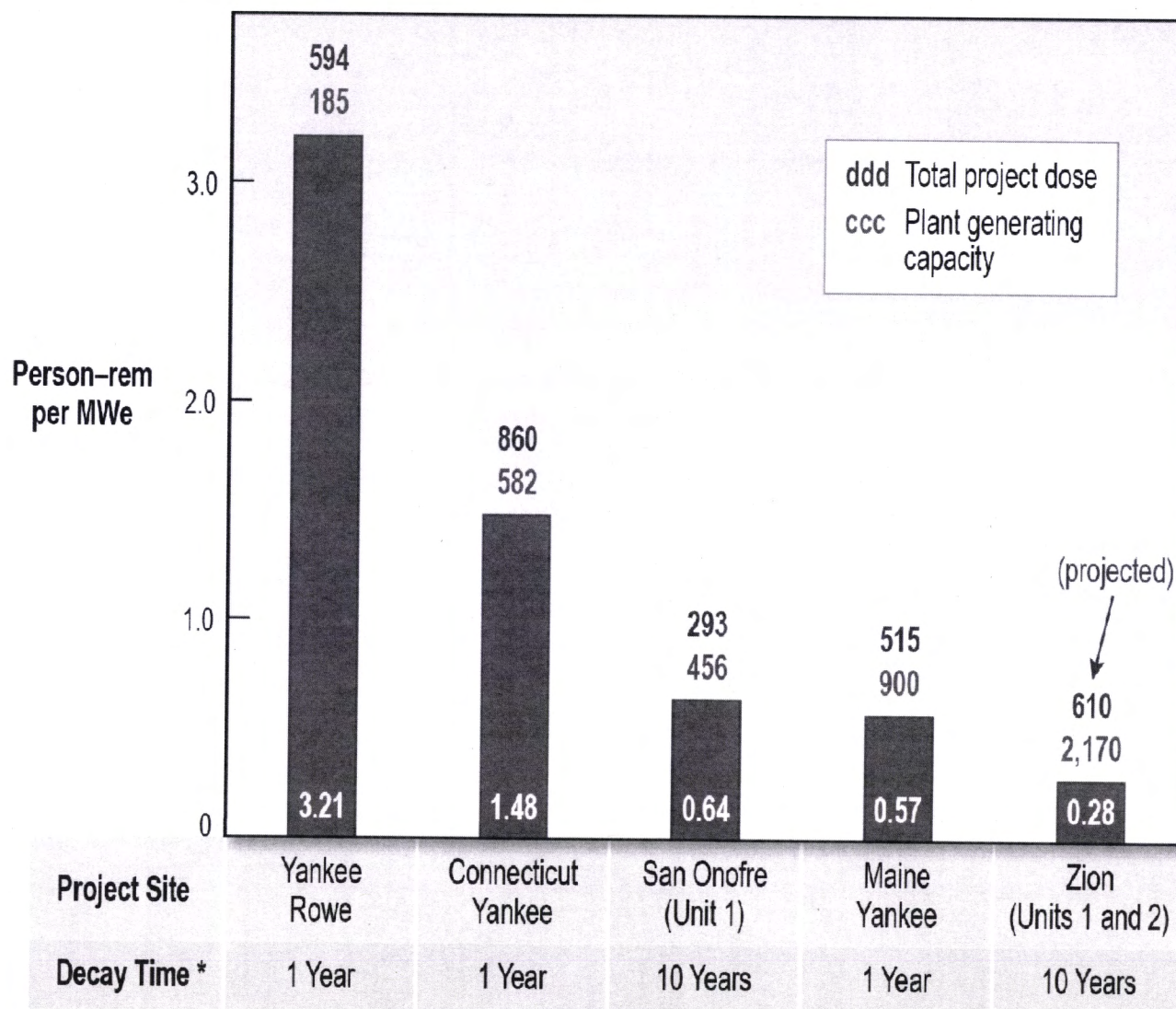
Description	Person Rem	Comments
Reactor Head removal/segmentation (D&D activity)		
Unit 2 Containment	4.11	Complete
Unit 1 Containment	10.854	Complete
Reactor Vessel Segmentation		
Unit 2 Containment	2.693	Complete
Unit 1 Containment	2.276	Complete
RP Coverage for Reactor Vessel Segmentation		
Unit 2 Containment	1.633	Complete
Unit 1 Containment	1.687	Complete
Reactor Cavity Decon/Encapsulation (D&D Activity)		
Unit 2 Containment	3.022	Complete
Unit 1 Containment	4.978	Complete
Steam Generator		
Scaffolding/Insulation removal/MS line & FW line removal/Dome removal		
Unit 2 Containment	1.784	Complete
Unit 1 Containment	5.829	Complete
Support removal/ Primary Side Segmentation/Weld shielding plates		
Unit 2 Containment	13.032	Complete
Unit 1 Containment	28.811	Complete
Lift/Removal from Containment/Prep for shipment on rail cars		
Unit 2 Containment	6.528	Complete
Unit 1 Containment	5.793	In progress
Pressurizer		
Scaffolding/Insulation /Electrical / Mechanical /Segmentation/Package		
Unit 2 Containment	2.084	Complete
Unit 1 Containment	3.205	Complete
Reactor Primary Systems/RCP/LSIV's and associated interferences		
Scaffolding/Insulation		
Unit 2 Containment	5.485	Complete
Unit 1 Containment	22.14	Complete
All items-dismantle/segmentation/ weld shield plates/ encapsulate/package		
Unit 2 Containment	25.602	Complete
Unit 1 Containment	52.479	Complete

Dose Summary (Continued)



Description	Person Rem	Comments
Spent Fuel Pool		
Preparatory activities	1.191	Complete
GTCC Fuel Handling Building	0.963	Complete
Fuel Racks removal/ segmentation/ encapsulate/package for shipment	2.643	Complete
Spent fuel pool and Transfer canal draining/encapsulation	1.522	Complete
Demolition of Fuel Handling Building		In progress
Aux. Building		
Miscellaneous demolition activities	10.392	In progress
Waste management		
Waste handling/packaging	17.561	In progress
Sluicing resin /dewatering/ HIC Activities	4.258	In progress
Liner Activities	16.806	In progress
Totals (as of 3/16/2016)	436.64	

US D&D Dose Comparison



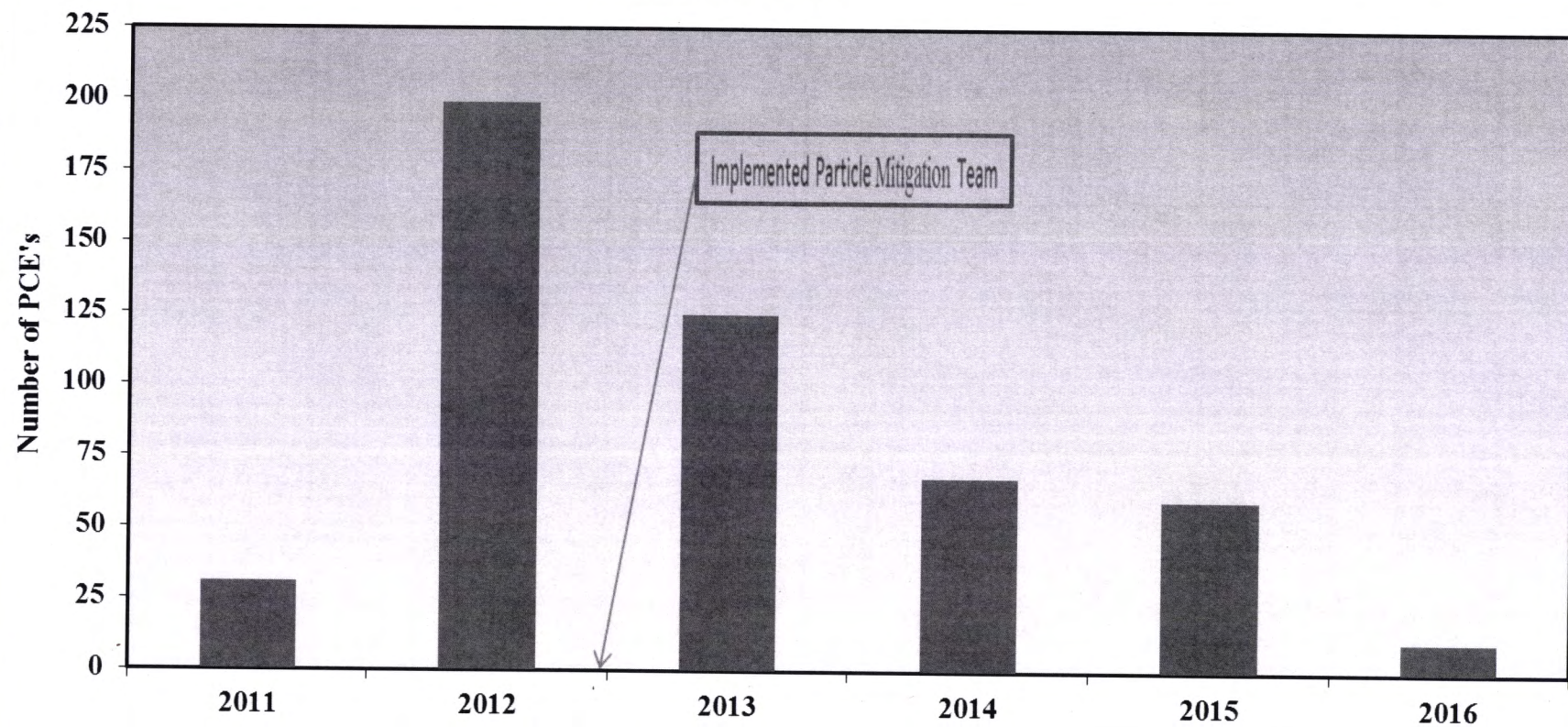
* Elapsed time between plant shut-down and commencement of D&D activities

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YEAR	# of PCEs	# of RCA Hours	RCA Hours/PCE
2011	31	82537	2662
2012	199	158592	797
2013	127	188560	1485
2014	69	270185	3916
2015	58	243374	4196

Zion PCE Trend

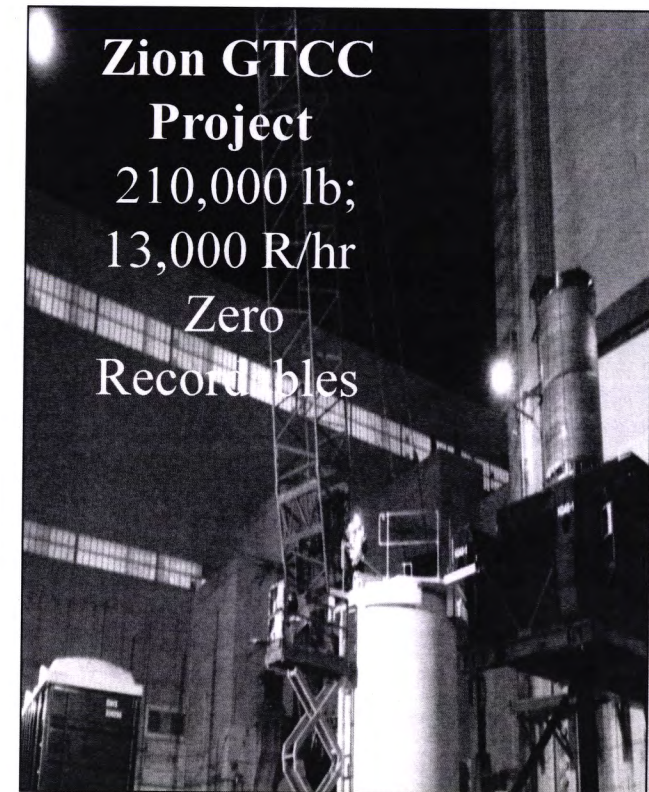
ZionSolutions PCE's



Rad Protection – Planning the Work



- Key – advanced planning
- Extensive demolition/imprecise dismantlement tasks
- Numerous high rad/high contamination moves of large, irregular shaped loads
- Physical and rad conditions changing quickly in some areas

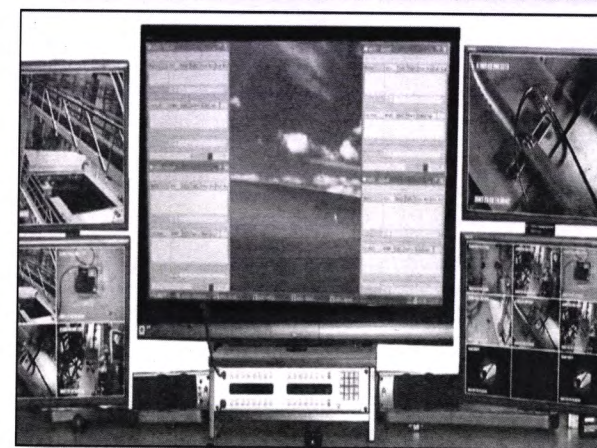


Zion Exposure Goal reduced from 900 to 610 person-rem

Incorporating RP lessons learned into plan



- RP/Rad Engr. early in the planning
- Remote Technology Upgrades
 - Diamond Wire Saws at Zion – 80% dose reduction
 - Advances in wireless-based systems for:
 - Streaming video/Audio communications site wide
 - Exposure telemetry/Equipment and tool location systems



2016 Major Milestones – Bob Quinn



- Completed Liquid Rad Waste Processing – February 2016
- Completed Fuel Rack Removal – February 2016
- Units 1 & 2 Steam Generators & Large Components Removed – March 2016
- Achieve ASA66 Contract Milestone – March 2016
- Complete Containment Tendon Detensioning and Removal – June 2016
- Complete Services Building Demolition and Backfill – June 2016
- Complete Containment Interior Ventilated Demo – Oct 2016

2016 Major Milestones – Bob Quinn



- Complete Turbine Building Basement Demo & Backfill – June 2016
- Complete Fuel & Auxiliary Building Interior Demo – February 2017
- Complete Removal Of Diesel Generators – February 2017
- Complete Turbine Building Demo – February 2017
- Complete Containment Interior Non-Ventilated Demo – April 2017