Agenda

• Decommissioning Project Update  Patrick Daly
• Radiation Protection Overview  Chris Baker
• Environmental Program Overview  Darlene Murphy

Rail work
Safety Status

- 2 OSHA Recordable Injuries since last ZCAP meeting
  - Left shoulder pain, it was upgraded from a First Aid injury after the individual’s personal physician recommended physical therapy.
  - Left ankle sprain after falling from a step ladder.

- RADIATION PROTECTION

  Year to date 4.75 man Rem total
• QA Vendor inspections for all 3 canister fabricators and the fuel building crane vendor. (PA, UT, Japan, WI)
RVI Segmentation Project Update

Upper and lower Internals removed
D&D Activities

Unit 2 Rx Head

GTTC liner Unit 2

Unit 1

Unit 1 Prep work
Construction

Rail construction

Unit 1 HLS

34kv electrical work

Asbestos Abatement
## Waste Management

<table>
<thead>
<tr>
<th>Disposition</th>
<th>Number of shipments</th>
<th>Net weight (lbs.)</th>
<th>Volume (ft³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLW</td>
<td>24</td>
<td>678,311</td>
<td>27,179</td>
</tr>
<tr>
<td>Asbestos Insulation</td>
<td>158</td>
<td>947,480</td>
<td>127,980</td>
</tr>
<tr>
<td>Recycled Asphalt</td>
<td>122</td>
<td>2,350,000</td>
<td>59,076</td>
</tr>
<tr>
<td>Demolition Debris</td>
<td>171</td>
<td>1,236,784</td>
<td>148,029</td>
</tr>
</tbody>
</table>
Spent Fuel Management

- Fuel modifications complete except for one element
- Fuel visual inspections complete
- Fuel sipping in progress (about 30% complete)
- Data to be used in a fuel loading plan
Major work scheduled for the next 6 months

- Complete the rail construction
- Construct the VCC pad
- Construct the ISFSI pad and building
- Construct Heavy haul road
- Upgrade the fuel building crane
- U-2 reactor vessel internals segmentation
- U-1 reactor cavity prep work
- Asbestos abatement
- Electrical system modifications
## ZionSolutions
### Nuclear Decommissioning Balance Roll Forward
#### As of December 31, 2011

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount ($ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning Balance</td>
<td>$ 801.4</td>
</tr>
<tr>
<td>Earnings - Net of Taxes &amp; Fees</td>
<td>44.0</td>
</tr>
<tr>
<td>Disbursements</td>
<td>(148.9)</td>
</tr>
<tr>
<td><strong>Ending Balance</strong></td>
<td><strong>$ 696.5</strong></td>
</tr>
</tbody>
</table>
ZionSolutions
Majority of Expense Incurred
As of December 31, 2011

Project Management
Procurement of Casks and Canisters for Dry Fuel Storage
Planning & Preparation for Spent Fuel Storage
Unit 1 & 2 Containment Preparation & Support
Asbestos Remediation
Plant Maintenance & Security
ZionSolutions
Majority of Expense Incurred
As of December 31, 2011

Unit 1 & 2 Reactor Vessel
Unit 2 Containment Large Components
Unit 2 Reactor Internals Segmentation Preparation
Waste Disposal
Establish Temporary Utilities
ISFSI Pad Design
Rail Improvements
Radiation Protection

Chris Baker

February 27, 2012
Purpose

• Protect the health and safety of the Zion Solutions workers, the public and the environment by maintaining radiation exposure ALARA and maintaining strict control of radioactive materials.

• This is accomplished by:
  - Maintaining a qualified and experienced Rad Pro staff
  - Training & retraining the workforce (NGET)
  - ALARA Program
  - Radiation Work Permits (RWP)
  - Rad Pro surveys and postings
  - Air sampling and monitoring
10 CFR 20 - states that no licensee shall allow any individual to receive a total occupational dose in excess of the following values:

- **5 Rem/yr.** – Total Effective Dose Equivalent (TEDE) - the sum of the internal dose and external dose.
- **15 Rem/yr.** – Lens Dose Equivalent (LDE) - dose to the lens of the eye.
- **50 Rem/yr.** – Shallow Dose Equivalent (SDE) - external exposure of the skin or extremities (elbows, lower arms, wrists, hands, knees, lower legs, ankles, and feet).
- **50 Rem/yr.** – Total Organ Dose Equivalent (TODE) - the sum of the external exposure and internal exposure to the organ receiving the highest dose.
The following Zion administrative dose guidelines are in effect:

- 2 Rem/yr (2000 mrem/year) – Total Effective Dose Equivalent (TEDE)
- 12 Rem/yr. – Lens Dose Equivalent (LDE)
- 40 Rem/yr. – Shallow Dose Equivalent (SDE)
- 40 Rem/yr. – Total Organ Dose Equivalent (TODE)

Note: 1000 mrem = 1 Rem
ALARA

- Station ALARA Committee
- Job Planning
- Procedures
- Pre-Job Briefings
- Rad Pro oversight
- Rad Pro instruments & dosimetry
- Mock Ups
- Source Term Reduction
- Time/Distance/Shielding
- Engineering Controls
- Trained Workforce
Protective Clothing
# Public Dose

## Annual U.S. Estimated Radiation Dose Per Person

<table>
<thead>
<tr>
<th>Source</th>
<th>Average annual effective dose (mrem)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radon and other radionuclides we eat, drink, or breathe</td>
<td>257 mrem</td>
</tr>
<tr>
<td>Radiation from soils, rocks, building materials</td>
<td>21 mrem</td>
</tr>
<tr>
<td>Cosmic/cosmogenic radiation</td>
<td>33 mrem</td>
</tr>
<tr>
<td>Human-made sources</td>
<td>311 mrem</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>622 mrem</strong></td>
</tr>
</tbody>
</table>

Some of the approximate doses when flying at 36,000 feet are:

- New York to Los Angeles round trip = 4 mrem
- New York to Paris round trip = 6 mrem
- Los Angeles to Paris round trip = 10 mrem
- Los Angeles to Chicago round trip = 2 mrem

Most of the radiation dose we receive is from naturally occurring sources—most of this is from radon. The next largest dose is from medical radiation. The smallest dose we receive (<1 percent) is from nuclear power plant emissions and fallout from past atomic bomb detonations.
Consumer Products
Consumer Products
Potassium Iodide (KI) Pills

KI Tablets/Pills/Liquid

- Public concerns after the Fukushima Nuclear Accident
- KI has been erroneously represented as a “magic bullet” of radiation protection
- Taking KI pills will help make sure your thyroid doesn’t take up as much radioactive iodide as it would if you didn’t take the pills.
- The iodide in the (KI) pills fills up the thyroid gland, not leaving room for radioactive iodide that you might breathe in or take in through your mouth.
- The pills do not protect you from other types of radiation that may be released and they will not protect you from the radioiodine if it is only outside your body.
- Plus, to be most effective, the pills need to be taken within a few hours after radioactive iodide was released.
Role of the Environmental Department

ZionSolutions Environmental Department

- Compliance
- Risk Management
- Stewardship
• SPCC
  – To comply with 40 CFR 112 (Oil Pollution Prevention Act)
  – Primary Inputs
    AST Gas/Diesel Tank
    Vehicles/Cranes
    Oil Pad Storage
    Turbine Building
    Transformers
    Construction activities
  – Reduced oil volume stored on site by 87,324 gallons
Risk Management

- Protecting Lake Michigan
  - Outfalls
    - 4 internal
    - 2 external
  - Oil/Water Separators
    - 2 x 42,000 gal liquid capacity
  - NPDES General Permit
  - SWPPP for construction activities related to:
    - Railroad Refurbishment
    - VCC Pad
    - ISFSI Pad
Facility Layout - Challenges

• Surrounded by Floodplain
• Wetlands
  – Encroaching Buffer Wetlands
• Environmental Permits
  Lake County Stormwater Management Commission
  Illinois Environmental Protection Agency
  U.S. Army Corps of Engineers
• Routine Environmental Inspections
  – Internal Management Observations
  – Weekly Designated Erosion Control Inspections
  – Monthly Inspections Performed by LC Enforcement Officer
Floodplain and Wetland Overview

Floodplain

Wetlands
Radiological Groundwater Protection Program (RGPP)

• Samples collected Quarterly from 11 groundwater wells and Lake Michigan surface water
• Over the past year, the site has increased the sampling frequency & analysis as decommissioning commenced
• September 2011 completed the NEI 07-07 5 year review
  – All Tritium sample results consistently below 200 picocuries
  – Conclusion: “There have been no leaks or releases of tritium, other radionuclides, or non-radionuclide contaminants at the Station between September 2006 and June 2011”.
• USEPA Drinking Water Standard is 20,000 pCi/L Tritium-Based on an Annual Dose of 4 mrem/yr
• 1 picocurie (pCi) = 1 E-12 Curie (Ci)
Biodiversity Protection

• Illinois Beach State Park located on the North and South side of the property.
• Examples of Wildlife Protection
  – Deer
  – Peregrine Falcon
  – Piping Plover
  – Blanding’s Turtle
  Inspections and Notifications
  – Snakes
    Fox Snake
    Garter Snakes
    Brown Snakes
Snake Rescue

- A team of ZionSolutions employees and stakeholders rescued approximately 200 hibernating snakes.

- ZionSolutions Environmental coordinated efforts with the Lake Forest Wildlife Discover Center, Illinois Department of Natural Resources, a College of Lake County Biology Professor and a local high school teacher to rescue hibernating snakes from railroad tracks scheduled to be repaired as part of the decommissioning work.

- The success of this project demonstrates the importance that is placed on environmental stewardship and biodiversity protection at Zion Station.
Our Commitment to the Community and Protecting the Environment

Restoring the Zion Station Site Provides Opportunities for Reuse.

The lakefront and wetlands will be protected through rigorous environmental controls and a comprehensive monitoring program.