



Prairie Island Nuclear Generating Plant

**NRC Region III
Regulatory Conference**

**Radioactive Material Transportation
Event**

March 17, 2009

Agenda

- Opening Remarks – Mike Wadley
- Sequence of Events – Scott Northard
- Causes and Corrective Actions – Scott Northard
- Public Radiation Safety Significance – Scott Nelson
- Conclusion – Mike Wadley
- Closing Remarks – Dennis Koehl

Opening Remarks

- Prairie Island takes its obligation to protect the health and safety of the public very seriously
 - We agree with the performance deficiency, and the two violations associated with the radioactive material shipment
 - Causes and corrective actions
 - Public radiation safety significance

Sequence of Events

Scott Northard, Plant Manager

Sequence of Events

- October 23, 2008 - Fuel sipping equipment removed from the spent fuel pool, deconned, surveyed, and wrapped (Lid was 120 mR/hr)
- October 24, 2008 - Fuel sipping equipment was loaded into shipping container, surveyed and placed on the trailer (Highest dose rate 170 mR/hr on the middle bottom of container)
- October 25, 2008 - Shipping personnel performed characterization of fuel sipping container

Sequence of Events

- October 29, 2008 - RWSC performed confirmatory survey of container dose rates to verify contact dose rates were within DOT limits
- October 29, 2008 - Shipment left Prairie Island
- October 30, 2008 - Shipment arrived at the receiving facility in Pennsylvania
- October 30, 2008 - Receiving facility personnel performed initial receipt survey of the vehicle and confirmed dose rates were within DOT limits

Sequence of Events

- October 31, 2008 - Shipping container survey was performed by the Receiving Facility
 - Package survey indicated DOT limits exceeded on a small spot on the middle bottom of container:
 - 2,000 mR/hr Teletector Geiger-Mueller (GM) detector
 - 800 mR/hr RO-2 Ion Chamber (IC) detector
 - State of Pennsylvania and Prairie Island notified
 - Region III RP Inspector notified
 - Suspended all radioactive shipments pending investigation and corrective actions

Sequence of Events

- November 3, 2008 – NSPM Fleet Radiation Protection Manager and an RP Technician arrived at facility – confirmed readings and located a discrete particle on a cable
 - Maximum dose rate 1630 mR/hr Telepole GM
 - Shipping container placed back on trailer
 - Verified vehicle limits were not exceeded
 - Readings matched initial transport vehicle survey at Prairie Island



DRAFT

Summary of Radiation Measurements

Activity	Measurements at Prairie Island			Measurements at Waltz Mill			Prairie Island Calculation
	10/23/2008	10/24/2008	10/29/2008	10/30/2008	10/31/2008	11/3/2008	
Equipment Survey Performed	120 mR/hr on lid (RO-2 IC)						1/2/2009
Package loaded with equipment, surveyed, placed on flatbed.		170 mR/hr on box (Telepole GM)					
RWSC performed confirmatory package survey as well as vehicle survey.			150 mR/hr on box (Telepole GM)				
Performed vehicle receipt survey. Package removed from trailer, set in RMA (no package survey).				All results in compliance with DOT vehicle limits			
Performed shipping package survey in storage area					2000 mR/hr (Teletector GM) 800 mR/hr (RO-2 IC)		
Prairie Island confirmatory survey						1630 mR/hr (Telepole GM)	
Generated Effective Dose Equivalent (EDE) rate calculation (RIS 2003-04)							97 mR/hr EDE rate

Missed Opportunities

- Job Planning missed key methods/HU tools
- Discrete Radioactive Particle not detected
- 49 CFR Subpart H qualifications not verified
- Packaging did not fix particles in place
- RWSC did not inspect packaging inside box
- Differences in content vs. surface readings not questioned by RWSC, and readings close to DOT limit did not require additional oversight

Causes and Corrective Actions

- Prairie Island Radiation Protection personnel did not apply human performance fundamentals in job planning and allowed an unacceptable level of tolerance for risk
 - PreJob Briefs now require identification of critical steps and application of HU tools for error reduction
 - Risk Matrix developed to guide RP related activity decision-making
 - Site wide focus on Human Performance Improvement Plans
 - Diagnostic Assessment used in supervisor coaching to address behaviors

Causes and Corrective Actions

- Prairie Island Radiation Protection methods were inadequate to detect the presence of discrete particle contamination on materials
 - Procedures now require the use of radiation survey instruments that provide faster response with an audible indication of discrete particles
 - All Prairie Island RP Technicians have received additional training in the use of the correct survey instruments and related procedures

Causes and Corrective Actions

- Prairie Island Radiation Protection methods were inadequate to successfully package radioactive materials
 - Prairie Island now requires contents to be tightly wrapped to prevent them from shifting in transit
 - All RP Technicians have received additional training in these new packing methods
 - RWSC must directly oversee the packaging of all materials for high risk shipments
 - All personnel involved with packaging and shipping must have 49 CFR Subpart H qualifications verified
 - High Risk shipments require closed transport trailer

Causes and Corrective Actions

- Prairie Island management engagement in shipping radioactive materials was inadequate
 - Radiation Protection Supervisor now required to approve shipments exceed 40% of DOT limits
 - Packages potentially containing discrete radioactive particles require RP Manager approval
 - Shipments exceeding 80% of DOT limits require Plant Manager approval

Public Radiation Safety Significance

Scott Nelson, Fleet Radiation Protection Manager

Public Radiation Safety Significance

Radiation Measurements taken at receiver facility

- October 31, 2008
 - Readings reported to the State of Pennsylvania:
 - 2,000 mR/hr Teletector GM detector
 - 800 mR/hr RO-2 Ion Chamber detector

G-M and Ion Chamber Technology Fundamental Differences

Geiger-Mueller

- High sensitivity
- Rugged, light, and has audible output
- Best to determine the presence of a radiation field

Does not measure true dose rate

Ion Chamber

- Slower response
- Most accurate
- Used for confirmatory measurements

Measures true dose rate

Additional References

- NRC Regulatory Guide 7.3, “Procedures for Picking Up and Receiving Radioactive Material”
- CRCPD E-5, “Generic Procedures for the Inspection of Low-level Radioactive Waste Conveyance, Packaging and Form”

Both documents direct resurvey with more accurate instruments when limits are exceeded

Safety Significance

- We concluded:
 - Ion chamber measurement was the most accurate assessment of dose rate on the package
 - Dose rates were less than five times the limit, which meets the criteria for a White finding

Conclusion

Mike Wadley, Site Vice President

Conclusion

- Our performance leading up to this shipment did not meet expectations and represents an erosion of public confidence
- We agree with the performance deficiency and the associated violations
- Immediate aggressive actions were taken to prevent any further violations
- Thorough evaluation and comprehensive corrective actions were implemented
- Ion Chamber is the most accurate instrument for assessing significance and results in a White finding

Closing Remarks

Dennis Koehl, Chief Nuclear Officer