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Braidwood Station Groundwater Tritium Investigation

December 20, 2005

Agenda



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- Introduction – Scott Humbard
- Braidwood Site Overview - John Moser
- Safety of the Public - John Moser
- Status of Investigation – Scott Sklenar
- Long Term Plan – John Moser
- Summary – John Moser

Braidwood Site Overview



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- Approximately 4500 acre site with 2500 acre cooling lake
- Tritium generated in reactor coolant from reactor operation
- Circulating water system transfers heat to cooling lake
 - Continuous make-up and blowdown between cooling lake and Kankakee River
 - Vacuum breakers used in blowdown line to prevent damage due to water surges in pipe when flow changes

Braidwood Site Overview



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- Liquid effluent management
- No tritium (or other liquid radioactive effluents) being released into blowdown line flow until pipe confirmed to be leaktight
 - liquid effluent storage capacity being supplemented with temporary storage tanks

Safety of the Public



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- Groundwater sampling identified elevated concentrations of tritium in the shallow groundwater
- Drilled over 100 monitoring wells onsite and offsite to determine extent of tritium migration
- Tested 14 private wells of residents north (downgradient) of the site
 - Thirteen private wells measured less than 142 picocuries per liter (pCi/L)
 - Three readings from one private well were 1151, 1524, 1367 pCi/L
- Calculated radiation associated with highest private well reading is 0.3 millirem per year
- Results of private well sample analysis have been communicated to residents

Status of Investigation



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Regional Geology

- Fine grained uniform sand – ranges in thickness from 15 to 35 feet
- Regional clayey till – averages 20 feet thick
- Bedrock formations comprising shales, coal, silt stones, limestone, and sandstones
- Uppermost aquifers – uniform sand and bedrock sandstone

Man-made Features

- Coal mining operations
- Borrow pits

Hydrology

- Shallow groundwater flows toward the north
- Geologic barriers exist to vertical downward migration
- Deep bedrock groundwater also flows to the north
- Interaction of groundwater with surface water bodies

Extent of Tritium Plume

- Shallow water-bearing sand
- Surface water bodies
- Deeper water-bearing sand
- Bedrock aquifer

Potential Sources, Transport of Tritium

- Existing evidence indicates the source of the tritium is the blowdown line
- Further investigations focused to confirm whether source is current leak(s), historic spills, or a combination
- Potential transport mechanisms
 - Influence of pond on tritium transport

Regional Investigation

- Historical review of coal mines and local quarries
- Review of historical aerial photographs
- Survey of public and private drinking water systems north of site
- Development of regional hydrogeologic cross-sections

Status of Investigation



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Field Investigation

- Two onsite shallow sand wells
- 21 onsite deeper sand wells
- 10 offsite shallow wells
- 12 offsite deep wells
- Synoptic round of water level measurements
- Comprehensive round of groundwater samples
- Will sample selected wells weekly
- Installing staff gauges in surface water bodies

Blowdown Line Integrity

- Periodic surveillance of blowdown line vacuum breaker valves to verify no leakage
 - December 9, 2005 surveillance confirmed no leakage
- Special acoustic monitoring test being performed on blowdown pipe to determine if pipe has underground leak
 - Sensor (“microphone”) attached to umbilical cable inserted in pipe; water flow pulls sensor through pipe to identify location of leak
 - Test scheduled to be completed December 30, 2005

- Data evaluation and reporting
 - Evaluate data from field investigations and pipeline integrity test in order to:
 - Determine source or sources
 - Define lateral and vertical extent of plume
 - Evaluate risk to human health and environment
 - Develop appropriate future actions including monitoring
- Prepare summary documents of evaluations for regulatory review
- Establish periodic informational update meetings

- Project underway to significantly reduce overall liquid tritium discharge from Braidwood
 - Reduce tritium production through enhanced reactor core design
 - Optimize management of tritium inventory in reactor operations
 - Enhance gaseous release capability
 - Research tritium separation technology

Summary



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- Investigation and actions in progress to minimize the risk to human health and the environment
- Long term approaches to minimize liquid tritium effluent are being pursued
- We remain committed to open communication with stakeholders