

From: "Jones, T. R." <tjones2@entergy.com>
To: "Cox, Mark R" <mcox90@entergy.com>
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From: "Jones, T. R." <tjones2@entergy.com>

Created By: tjones2@entergy.com

Recipients

entergy.com
mcox90 (Mark R Cox)

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11/2 AM

Briefing on Spent Fuel Pool

Indian Point Energy Center

November 3, 2005



Entergy



AGENDA

Welcome
Fred Dacimo, Vice President, Indian Point Energy Center

Spent Fuel Pool Investigation
*Don Leach, Project Management
Entergy Nuclear Northeast*

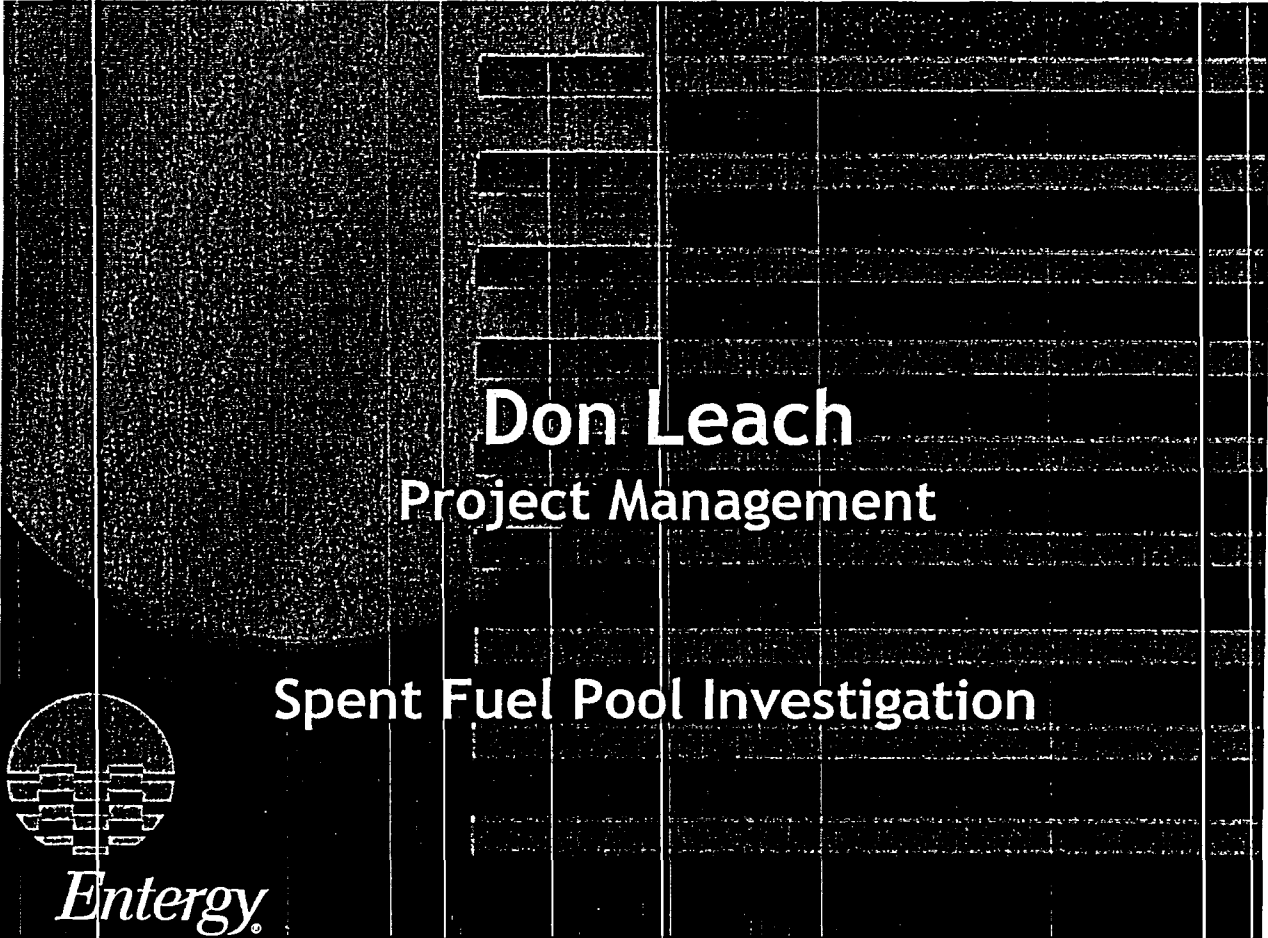
Radiological Impacts & Unit 1 Spent Fuel Pool
Don Mayer, Director, Special Projects

Tour of Facility
Spent Fuel Pool Wall
IP2 Transformer Yard (MW-1111)
Discharge Canal

Lunch

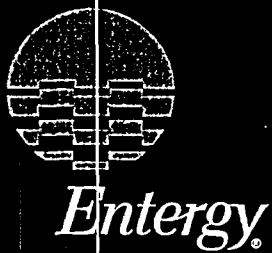
Questions & Answers

2



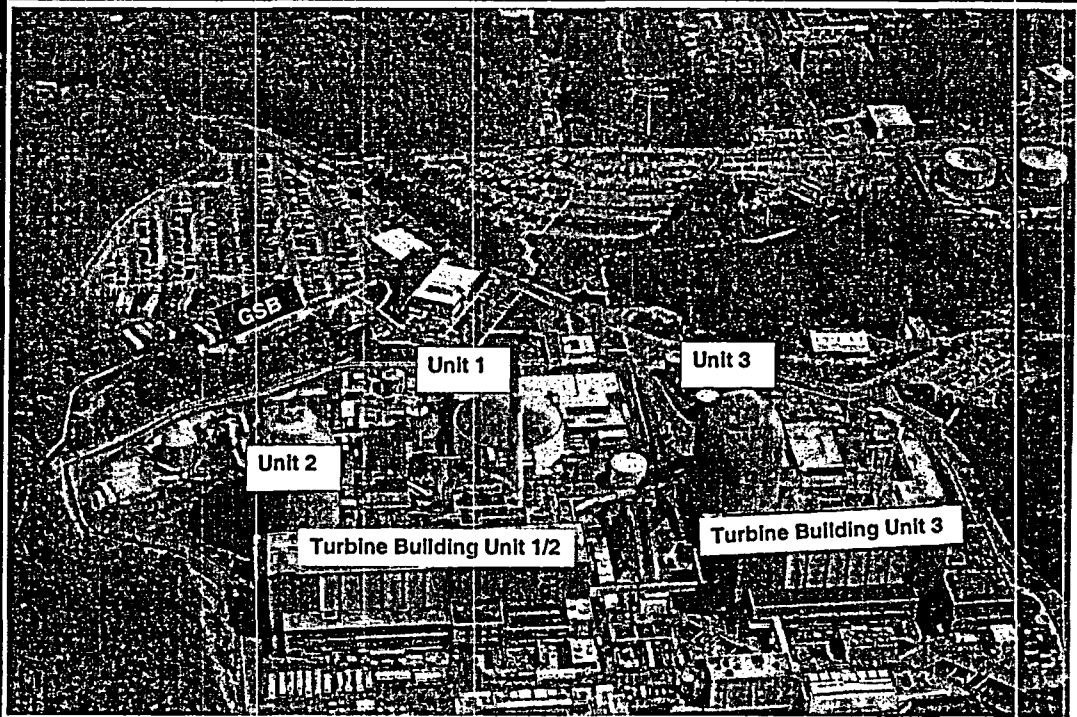
Don Leach
Project Management

Spent Fuel Pool Investigation



Entergy

Site Layout



Overview of Spent Fuel Pool Issue

Two hairline shrinkage cracks discovered on south wall of spent fuel pool during excavation for new crane

Moisture in the cracks is along a 3' and 9' long section

Immediate actions included an analysis of structural integrity of the spent fuel pool, collection of leakage and radiological sampling of moisture in crack and surrounding earth (inside fuel building)

In-depth Investigation – *Bounding the Problem*

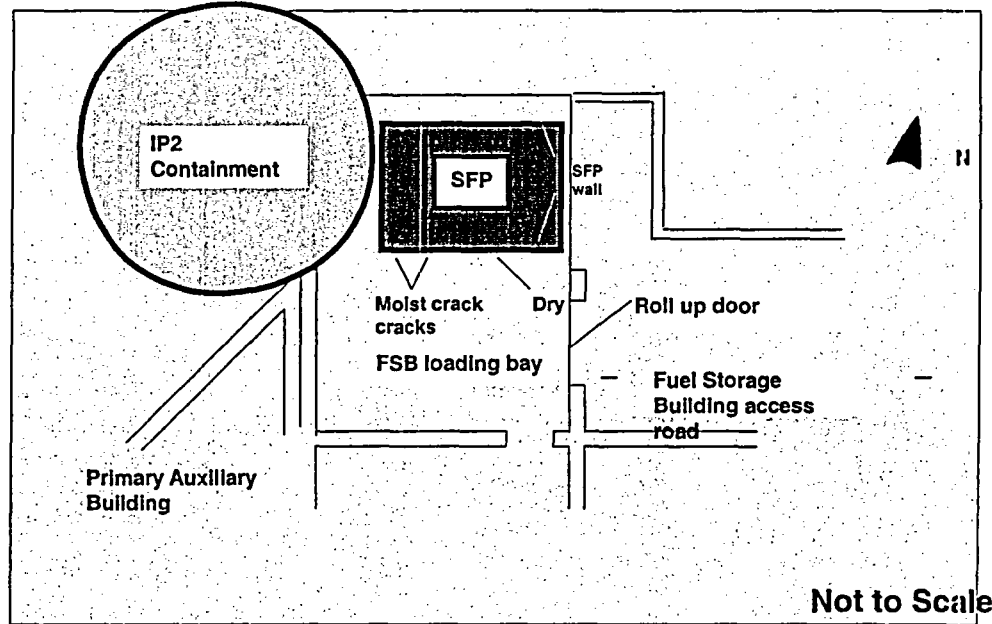
- **Conducting root cause analysis - a *structured, methodical investigation***
 - **What is the source of the moisture?**
 - **Is it coming from the spent fuel pool or on-going excavation or is it from previous operations?**
 - **How much water is leaking?**
 - **Where is the water going?**
 - **How can we capture the water?**
 - **Does the water contain radioactivity?**
 - **What is the extent of the leakage?**
 - **What actions are need to confirm the condition of the spent fuel pool and liner?**

In-depth Investigation — *Bounding the Problem cont'd*

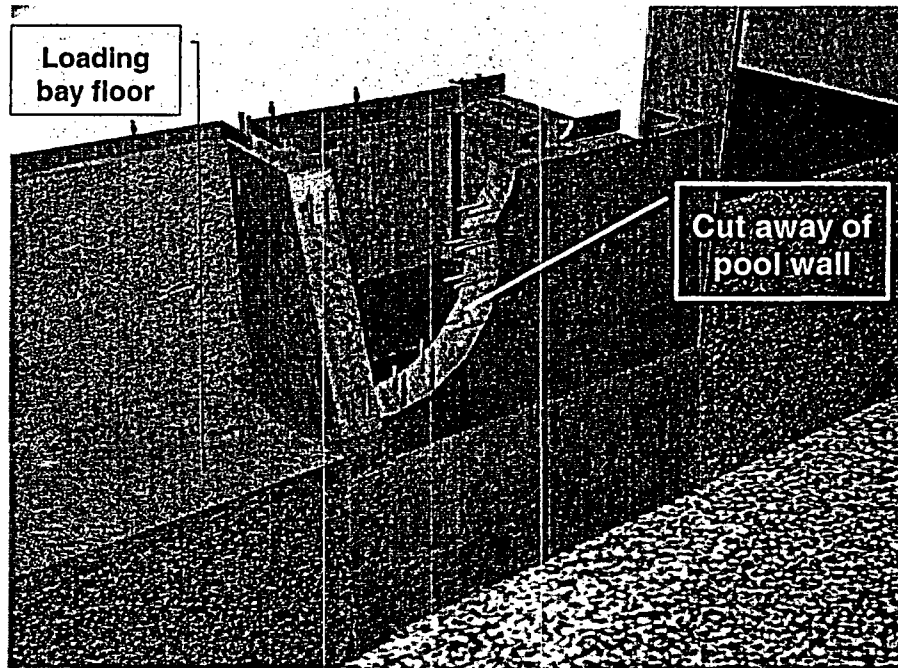
- **Key Actions Taken**

- Performed structural analysis of spent fuel pool
- Sampled water from cracks for radioactivity
- Took soil samples nearby to analyze for radioactivity
- Installed collection system to capture water
- Brought in experts in hydrology and structural engineering
- Sampled existing site monitoring wells

IP2 Spent Fuel Pool Area



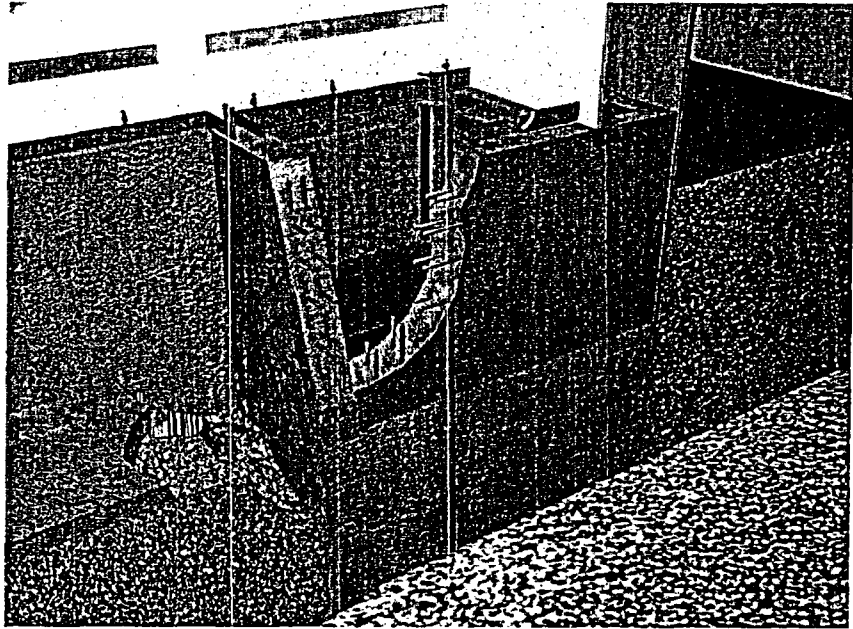
IP2 Spent Fuel Pool Area Before Excavation



Artist rendering of spent fuel pool wall

For illustration only

Loading Bay During Excavation



Artist rendering of spent fuel pool wall

For illustration only

Investigation Key Dates

Excavation in Spent Fuel Building Floor



Shrinkage crack noted in SFB south wall structural integrity of SFP verified

Aug. 22 Samples taken for radiological analysis. No radioactivity detected

Begin monitoring and sampling program



Large area surface samples show trace amounts of radioactivity

Sept. 1



Installed cover and drain collection system to capture water

Sept. 6-9 Made core bores at crack location; Collected liquid and soil samples for tritium analysis

SFB :: Spent fuel building

Current Status

- **Spent Fuel Pool liner inspection about 1/3 complete**
 - A couple of anomalies identified
 - Evaluating repair options
- **Permanent leak collection modification fabrication begun**
- **Drill new monitoring wells near Fuel Storage Building and Unit 2 turbine**
 - See map for proposed locations
 - Drilling scheduled to begin Nov. 8
- **Update ground water model for site**

Solution Strategy

- Complete pool liner inspection; repair as appropriate
- Install permanent collection modification
- Update hydrology study
- Design monitoring and mitigation system for groundwater

What is Tritium?

- Tritium is a radioactive form of Hydrogen
- Reacts in the environment just like stable hydrogen to form water
- Used in commercial products such as watch dials and exit lights because it can interact with a phosphor to emit light continuously
- Tritium emits a low energy Beta particle
- It is produced in the atmosphere from cosmic rays and in power and production reactors

Tritium Sample Results

Description	Tritium Concentration (microcuries per milliliter)	Comments
Monitoring Well in Transformer yard	(0.00021) 210,000 pCi/ml	The highest activity detected in any onsite well 10 X drinking water standard
Monitoring Wells (2) located south and adjacent to the IP2 turbine building	No Detectable Activity above background	
EPA Drinking Water Standard	(0.00002) 20,000 pCi/ml	Permissible level in drinking water
Maximum level detected in the 5 additional sample points near Unit-3	0.0000016 1600 pCi/ml	10x less than drinking water standard
Background tritium levels in U.S. drinking water	(0.0000001 to 0.0000004) 100 -400 pCi/ml	From USEPA Report 42, 1985.

What do the Numbers Mean?

- NRC regulations allow small amount of radioactivity to be discharged from nuclear power plants
- Discharges are monitored and reported monthly and summarized in annual reports
- Indian Point has been consistently < .1% of our allowable limits

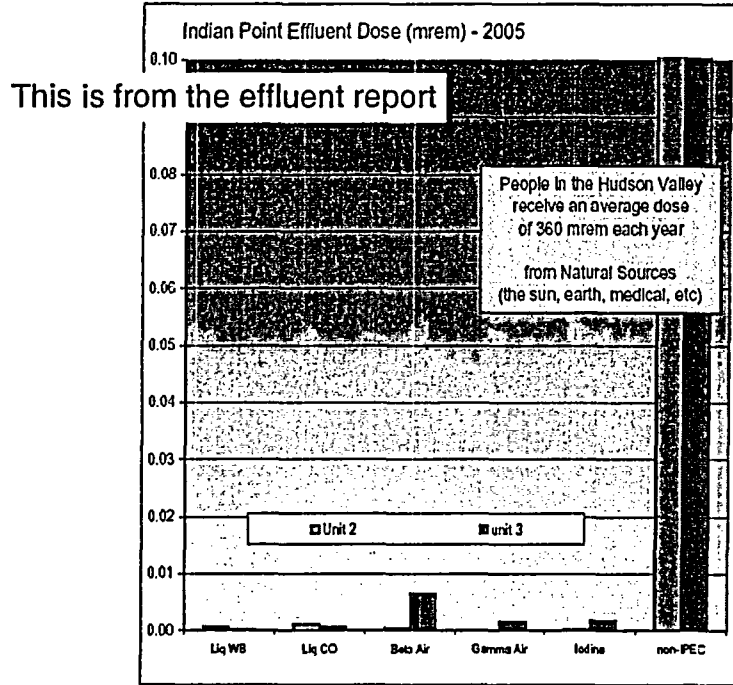
Dose Limits from Discharges

	Federal Limits	IPEC 2005 YTD
Liquid Effluents	3.0 mrem/yr	< .1%
Airborne Effluents	10 mrem/yr	< .1%
Total from all sources	25 mrem/yr	< .1%
Background radiation	360 mrem/yr	Need 2004 results

Preliminary Dose Estimate

- Using the highest level of tritium activity and assuming 10 liters/day water consumption yields a conservative estimate of $< .01$ mr/yr
- Note: there are no drinking water wells on site and the estimate is a bounding calculation only

Dose Comparison to Background



Unit 1 Spent Fuel Pools

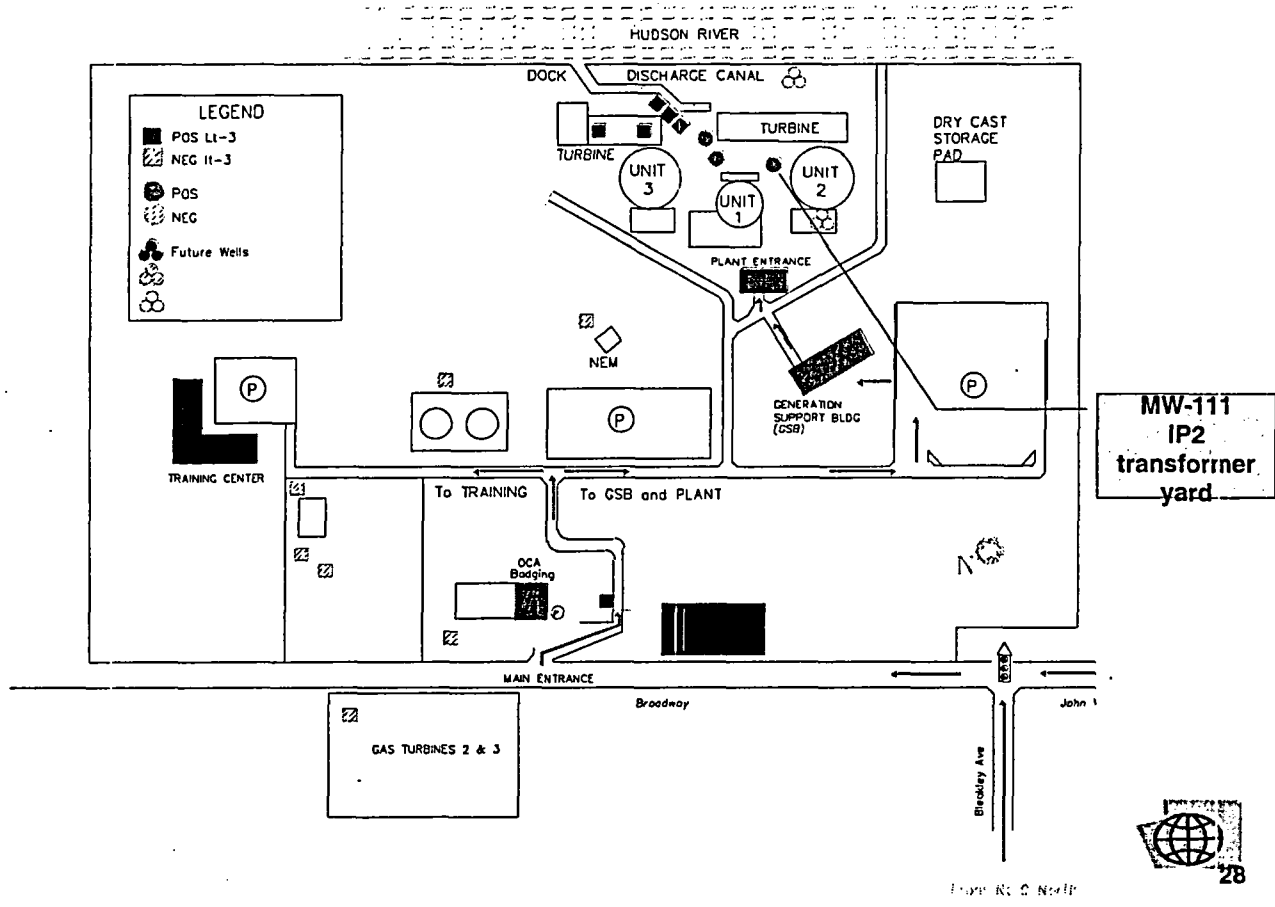
- Interconnecting set of pools
- 160 spent fuel assemblies stored in the “West” pool
- Know leaks in the pool system dating back to early 1990’s
 - Average of 25 gals/day which is collected, monitored, processed and released as permitted by our license.
- Project underway to transfer Unit 1 fuel to dry casks in order to stop pool leakage
- Foundation drain system collects water from pools

Unit 1 Dry Cask Project

- Unit 1 fuel will be transferred to dry casks, starting in 2007
- Fuel assemblies are being inspected as part of the DCS project
 - Inspections began in 2003
 - Water level in “West” pool was raised 8’ to facilitate final inspections in September ‘05
 - When water level was raised, water moved between the pools as expected.
 - No increase in leakage from pools to the foundation drains/environment has been observed

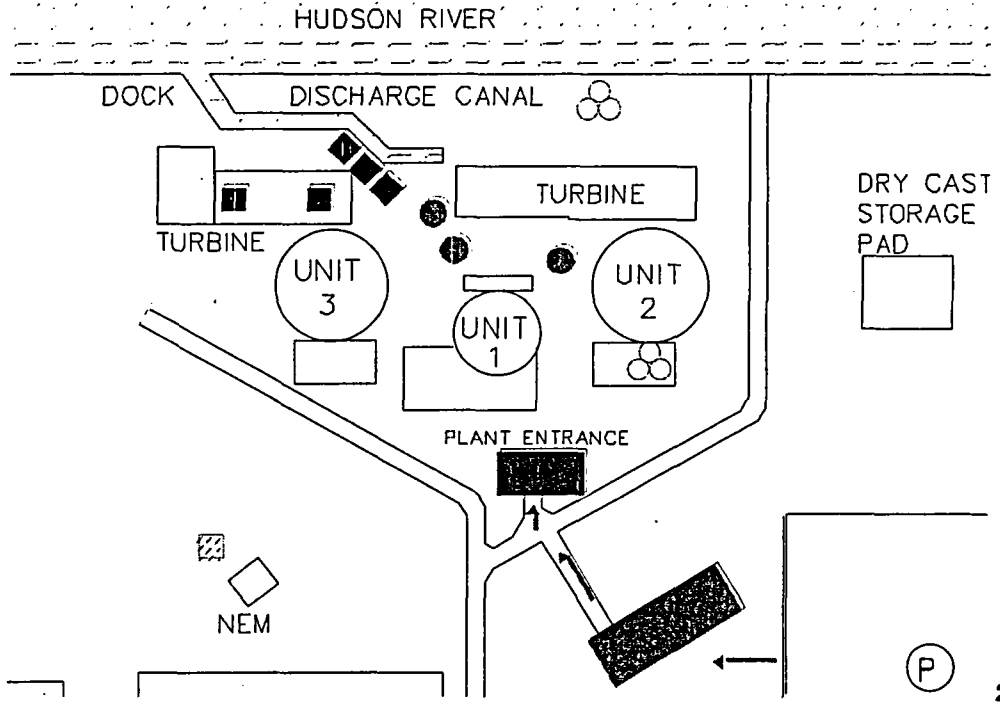
Current Status of Unit 1 Pool

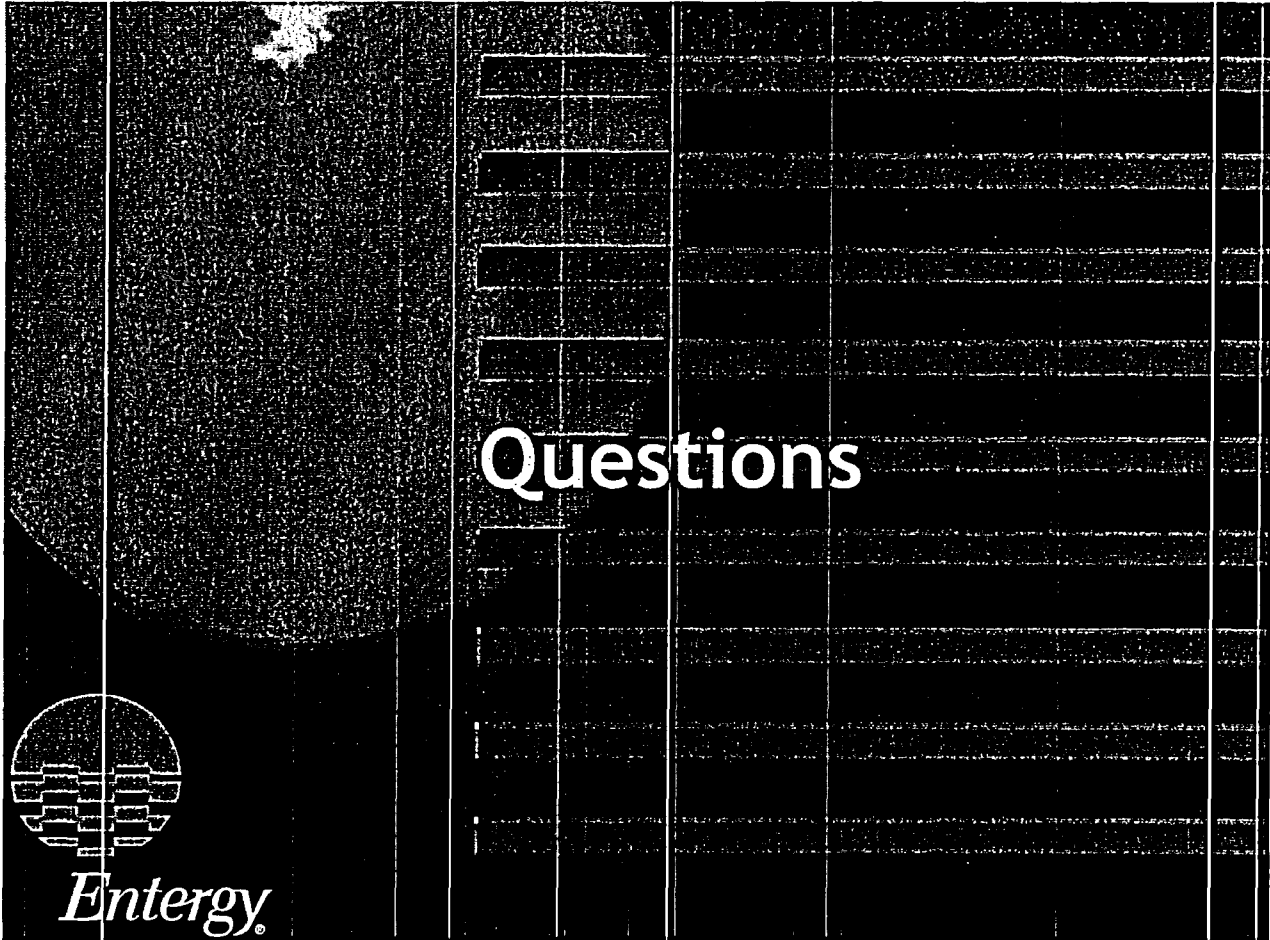
- Where are we now in the process?
 - Inspections needed to complete engineering analysis for final fuel move will be completed in November
- All pools will be drained after fuel is transferred to dry casks thereby stopping the leak



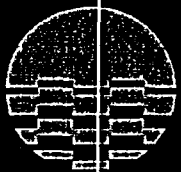
Drawn by: C. Neill

Close in View of Monitoring Wells





Questions



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Investigation Results to Date

Early radiological samples (late August) near crack locations show no detectable activity

Established on-going sampling and monitoring program

Structural analysis confirmed integrity of spent fuel pool

Subsequent samples (Sept. 1) indicated low levels of radioactivity

Tested existing wells on site for radioactivity