



## Addressing Public Concerns

As a large nuclear plant near New York City, Indian Point has been a controversial facility for nearly its entire lifetime. Numerous operational upsets, equipment failures and other visible deficiencies over the years have contributed to a lack of confidence in Indian Point among some in the public, and public concerns about the plant were clearly exacerbated by the events of 9/11.

The ISE Panel assigned very high importance to identification and evaluation of issues of public concern – and its effort in that respect sets this evaluation apart from the many other reviews of the station by regulatory, industry, and internal organizations. From input received at the public meeting it sponsored in April, from reviews of media reports, and from personal, telephone and email communications, the Panel identified and evaluated 39 distinct issues of expressed importance to the public. These are tabulated and addressed in Appendix 3 of the ISE Report.

From these 39 issues of public interest, the following stand out as having particularly high visibility in the public eye and accordingly were very thoroughly evaluated by the Panel.

### Leakage of Spent Fuel Pools and Underground Piping

**Leakage from spent fuel pools has been controlled, but Entergy must be vigilant.** Because the fuel pools store fuel that has been operated in-reactor for years, it is not uncommon for the pool water to contain some entrained radioactivity. Groundwater at many locations on the site is sampled on an ongoing basis, via wells installed for that purpose, to detect even small amounts of leakage. Leakage from the Unit 1 spent fuel pool was first detected in the mid-1990s, and in 2005 leakage from the Unit 2 spent fuel pool was also detected.

The company was unsuccessful in finding and isolating the small leak in the Unit 1 pool, but it has installed an ion exchange system to remove the radioactive material – primarily Strontium-90 ( $\text{Sr}^{90}$ ) - from the water in the pool water. The permanent and complete solution to the problem will be the transfer later this year of the spent fuel from the Unit 1 pool to dry storage, followed by draining and cleaning the Unit 1 pool, to be completed next year.

*“The leakage is not a threat to off-site people or environment. But clearly there is public anxiety on this issue – Entergy’s plan to address it is sound, but it merits fast action.”*

The predominant radioactive isotope in the Unit 2 pool is Tritium, present in low concentration. The source of leakage from the Unit 2 pool was determined to be a pinhole leak in the transfer canal. This has been repaired but it is possible that there is another source of leakage, so continuing surveillance is needed.



The radiological consequences of these leaks are negligible – amounting to less than one-thousandth of NRC permissible dose levels even with extremely conservative and unrealistic assumptions. Nevertheless, the Panel encourages Indian Point vigilance with respect to the Unit 2 spent fuel pool. If the leak is not being fully captured, additional steps should be taken to locate and terminate the leak source, even if the level of tritium in the leak poses no threat to public health.

### Inspection of underground piping should continue, and potential leaks should be addressed.

Like most industrial facilities, buried piping systems at IPEC are used to transfer fluids between systems and buildings. A section of piping (225 linear feet) was replaced in spring 2007 to repair a leak that evidently had been caused by incomplete application of the protective coating. While the amount of radioactivity deposited in the surrounding soils from this leak was too slight to detect, the affected piping system contained dilute levels of tritium, and leakage from such systems could release tritium to the groundwater or the atmosphere at the site. The ISE Panel confirmed that other buried piping is vulnerable to future tritiated water leaks due to same kind of piping degradation that caused the previous leak.

*“IPEC should explore options for reducing the vulnerability of the piping to unanticipated leakage in the future ... at least one of these options should be completed no later than calendar year 2008.”*

The Panel notes that IPEC’s inspection of this piping is consistent with industry practice for underground piping, and the next scheduled examination is two years in the future. While the risk to public health from such a leak would be insignificant due to the very low amounts of tritium involved, this vulnerability is an undesirable impediment to public confidence in IPEC operations.

The Panel recommends that IPEC explore options for examining this piping on a more accelerated basis. Two options are available:

- Excavating a few selected locations to observe the protective coating on the piping, and to ensure the wall thickness is adequate, and/or
- Performing a pressure test to confirm wall thickness is sufficient to preclude tritiated water leakage.

The Panel recommends that at least one of these options be completed in calendar year 2008.

### The Siren Upgrade Project

Indian Point has been working to install a new siren system for several years. The installation project has been fraught with technical problems and delays, resulting in NRC fines and a great deal of adverse public attention. As part of the its extensive Emergency Preparedness



evaluation, the ISE Panel paid particular attention to Entergy's performance in this siren system upgrade project and its implications.

The siren upgrade project was undertaken to address requirements of The Energy Policy Act of 2005. That legislation includes a special provision, applicable only to Indian Point because of the population density in its Emergency Planning Zone, to have full back-up power for its siren system. Along with meeting the mandated requirement, Entergy chose to incorporate other attractive features as well and to install an entirely new state-of-the-art siren system. This initial decision to provide a state-of-art class system that exceeds regulatory requirements, while well intentioned, had substantial bearing on the ultimate project difficulties. As of the Panel's review, the new system still had not been completely installed and tested and it was unclear whether the current committed completion date would be met.

Examining the siren project in detail, the ISE Panel identified a series of errors, including the use of unfamiliar technology, inadequate project management and contractor support, and a lack of clarity around both the NRC's and FEMA's approval requirements. In short, the Panel concluded that IPEC's siren upgrade program was not conducted by Entergy with the requisite rigor demanded of a regulatory-driven nuclear power plant project. The company's inability to meet this regulatory requirement has both undermined NRC's confidence in the licensee and aggravated Entergy's relationship problems with Indian Point stakeholders.

*"Indian Point continues with an action plan targeted to complete the project by August 14. The ISE Panel has observed the activities of the Entergy team currently assigned responsibility for siren project completion and concluded the project is being aggressively managed" but that "likelihood of success by this date is uncertain".*

In the Panel's view, this episode is particularly significant because it reflects poorly on Entergy's performance in managing important projects. In its report, the Panel urges full assessment by IPEC of lessons learned from the siren project and it offers broader recommendations regarding Indian Point project management.

Regarding public protection, the Panel notes that the existing Indian Point siren system remains in place and operable. While not yet including the desirable features of the new siren installation, the existing system meets the requirements that were applicable prior to the 2005 Energy Policy Act, and which still apply to all other U.S. nuclear power plants.

## Terrorist Threats – by Land, Water and Air

With input from stakeholders and federal, state and local law enforcement and regulatory agencies and others, the Panel conducted a thorough evaluation of Indian Point Security. In the wake of 9/11, plant security has been an issue of particularly high public concern.

The Panel's conclusions in two aspects of its review are as follows:



**The site is secure.** The Panel examined the level of training and preparedness of the plant's security force, the extensive support from federal, state and local authorities, as well as the physical attributes of the facility and its surrounding landscape, including the boundary bordered by the Hudson River.

The Panel found the IPEC security force to be well-trained, proficient and professional. Their use of sound defense-in-depth strategies, involving a series of overlapping, redundant security measures along with support from the New York National Guard and local and regional police, enables IPEC Security to deal with a range of possible security threats, including some that are beyond the design basis threat dictated by regulation.

The Panel identified instances of security staffing shortages and outdated equipment, which they recommend Entergy address with high priority. However their overall assessment is that security at the IPEC is strong.

**The possibility of a successful terrorist attack from the air is very low – and even if one occurred, IPEC would withstand an aircraft crash.** In investigating the possibility and consequences of a 9/11-type terrorist attack by aircraft against the IPEC containment structures, fuel storage pools and the dry spent fuel storage cask facility at IPEC, the Panel concluded that the threat is extremely low, particularly because of:

- The security provided by U.S. government agencies and the military to protect against terrorist using a commercial aircraft as a weapon against U.S. infrastructure including nuclear plants.
- The extreme difficulty of an attacking aircraft hitting the IPEC containments, fuel pools or storage casks because of their very small size (compared to the 9/11 targets) and the surrounding hilly terrain and other barriers around the IPEC site.

The Panel also conducted a thorough evaluation of the consequences of an aircraft strike, should one occur, and concluded that:

- The structural design and construction of the containment and fuel storage facilities are such that the striking aircraft could not penetrate and damage equipment essential to safety.
- The mitigating engineered systems, the trained site fire brigade, and the off-site support systems provide excellent protection from the consequences of a large fire or other damage caused by the crashing aircraft.

*"... the Panel concludes that the probability of a large aircraft part striking the buildings with nuclear fuel inside and causing a significant release of radioactivity is extremely low, to the point of being non-credible."*

Based on its extensive evaluations into this topic, the Panel is very confident that Indian Point is safe from an attack from the air. Such an attack is extraordinarily unlikely, and even if one occurred it would not cause significant release of radioactivity to the environment.