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**HEADLINE:** Cadets told mistakes happen at nuke plant every 2 weeks

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**BODY:**

Class analyzes near-fatal accident at Indian Point 2

**Roger Witherspoon**

The Journal News

BUCHANAN - An accident at the Indian Point 2 plant last year damaged critical generating equipment and nearly killed a plant worker, a visiting class of West Point cadets was told yesterday during a tour of the nuclear site.

The accident was blamed on a malfunctioning hoist that prevented workers from properly replacing steam blades on the 40-foot, 214-ton power generating turbine, the most important equipment in the nuclear power plant.

"We had 100 of the best maintenance engineers in New York working for a week, and they could not fix the hoist," Pat Russel, the plant's corrective action program manager, told the cadets during a class on accident analysis and prevention.

"When you wanted it to go up, you had to hit the down button, and when you wanted it to go down, you had to hit the up," Russel said. "We couldn't fix it, and we couldn't figure out why."

The May 27 accident was reported to the U.S. Nuclear Regulatory Commission at the time. A review of the event showed malfunctioning equipment, lost instructions, pressure from management and bad judgement led to the accident.

The accident and the events leading up to it were analyzed by the 20 West Point cadets for a class on design defects and human error.

"These are things we study at West Point," said Lt. Col. Lawrence Shattuck, director of the school's engineering psychology laboratory, the nation's oldest engineering school. "But we come here to see the effects of design flaws and human factors in real life situations."

Russel said it would have been preferable for plant engineers to wait for a new hoist before attempting to move the turbine, but that would have taken weeks to secure and cost millions of dollars.

"The circuitry was all wrong," Cadet Boyce Buckner said. "They should never have tried to start it. We study a lot of errors, both latent design errors and active human errors. So this type of mistake did not surprise me. But we came here to get field experience and hear from people who have to deal with errors constantly."

Russel agreed the faulty hoist should not have been used. The plant had been shut down since Feb. 15, 2000, when a ruptured tube in one of the four, aging steam generators triggered the spill of 20,000 gallons of radioactive water. The plant began generating electricity again in January.

"They should have waited," Russell said, "but when you are in an outage, and Con Ed is screaming to give us that rotor, time schedules get kind of crunched. Pressure can be good sometimes to keep people focused. But pressure can also be a bad thing. And this time, it was bad.

"They decided to go ahead and use it. Up is down, down is up. We're smart engineers, and we should remember that."

Russel said the hoist rose too fast and the work crew, which didn't know about the partial circuit reversal, could not control it. "They were pushing buttons like crazy, and it kept going up and up," he said.

Workers eventually shut the circuit breaker and the load crashed down, snapping a steel cable that whipped through the cavernous room and hit one man.

"By the grace of God, it didn't kill the employee," Russel said. "But it could have."

Russel said workers in complex areas of the plant make mistakes at a rate of eight to 12 per hour, leading to larger "events" every 12.5 days. Mistakes may seem small, such as putting the wrong date on a report, but that can lead to important documents being misfiled in computerized systems.

It was difficult for engineers to fix the hoist, Russel said, because changes had been made to the equipment's circuitry that was not reflected in the plant's design records. Since engineers did not know what the circuits were supposed to look like, they could not spot the flaws.

Blindly following rules also can cause problems, Shattuck said. The cadets saw a photo taken on the banks of the Hudson River of a beaver lying dead under the trunk of a tree it had apparently gnawed through.

"He obviously chewed according to procedure without checking the wind," Shattuck said to laughter from the cadets, "Sometimes, rigidly following procedures can lead you down the garden path to problems."