ComEd
Zion Generating Station
101 Shiloh Blvd.
Zion, Illinois 60099
Telephone 708 / 746-2084

May 3, 1995

U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attn: Document Control Desk

Subject: Zion Nuclear Power Station Units 1 and 2;
NRC Docket Numbers 50-295 and 50-304;
NRC Inspection Report Number 50-295/304-95007

Reference: R. J. Caniano letter to R. P. Tuetken dated April 3, 1995 transmitting Notice of Violation

Enclosed is the Commonwealth Edison (ComEd) response to the Notice of Violation (NOV) transmitted by the referenced letter and discussed in the subject inspection report. The NOV cites one Severity Level IV violation. The violation involves a failure to adequately implement the requirements of Zion Radiation Protection Procedure (ZRP) 5720-02, Revision 0, " Identification and Control of Individual Radioactive Particles".

If you have any questions or require additional information, please contact Ken Dickerson, Regulatory Compliance Engineer, at (708) 746-2084, extension 2371.

Sincerely,

G. K. Schwartz for

R. P. Tuetken
Zion Site Vice President

cc: J. B. Martin, Regional Administrator, Region III
C. Y. Shiraki, Zion Project Manager, NRR
J. R. Roton, Senior Resident Inspector, Zion Station

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RESPONSE TO NOTICE OF VIOLATION
INSPECTION REPORT 50-295(304)/95007

VIOLATION: 295(304)/95007

During an inspection conducted on March 14-16, 1995, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR part 2, Appendix C, the violation is listed below:

Technical Specification 6.2.2.A. states, in part, that radiation protection control procedures shall be prepared, implemented, and maintained.

Procedure ZRP 5720-02, Revision 0, "Identification and Control of Individual Radioactive Particles" step G.5.a.2.d. states, in part, that if fuel fragment particles (FFP) are identified at greater than 50 mR/hr, then contact a Radiation Protection (RP) supervisor. Also, step G.6.c.1. states, in part, that if a FFP is found and removed from an individual's protective clothing and the FFP is greater than 25 mR/hr, then save the FFP for isotopic analysis.

Contrary to the above, the licensee failed to implement Procedure ZRP 5720-02, Revision 0. Specifically:

On January 24, 1995, an employee working in the reactor cavity was contaminated, on two occasions, with FFPs exceeding 50 mR/hr and the RP supervisor was not contacted and the FFPs were not saved for isotopic analysis.

This is a Severity Level IV violation (Supplement IV).

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REASON FOR THE VIOLATION

ComEd acknowledges the violation. The root cause of this violation was management deficiency. The station was deficient in maintaining the fundamental knowledge level needed to recognize plant conditions required to effectively implement ZRP 5720-02, "Identification and Control of Individual Radioactive Particles".

Contributing causes included procedural deficiencies and poor communications. The ComEd Corporate Failed Fuel Action Plan (NOD-TS.15) does not require adequate notification nor provide guidance to the site Radiation Protection Department in response to an Action Level 1 failed fuel condition. Additionally, the Radiation Protection Department does not have its own failed fuel response procedure. Absent a procedural requirement, the interdepartmental communications between site Nuclear Engineering, Chemistry, and Radiation Protection were not adequate to ensure proper Radiation Protection personnel awareness of the potential magnitude of individual radioactive particle conditions.

In September of 1993, prior to Zion Station's Dual Unit Outage (DUO), site Nuclear Engineering (SNE) estimated Unit 2 had one to two leaking fuel rods and an INPO Fuel Reliability Indicator (FRI) of 4.6 E-5 uCi/g. Station action is not required until the Failed Fuel Action Plan (NOD-TS.15) is initiated with an FRI of 8.0 E-4 uCi/g.

From October 1993 to the Spring of 1994 Unit 2 was shutdown for the DUO. No exceptional radiological conditions were encountered during the DUO.

On September 8, 1994, site Nuclear Engineering initiated Action Level 1 of the station Failed Fuel Action Plan for Unit-2 based on an FRI of 1.2 E-3 uCi/g. Site Nuclear Engineering notified the Site Vice President and Corporate Nuclear Fuel Services and developed a sampling plan for reduced power or shutdown conditions to more accurately determine fuel burn-up and the associated number of leaking fuel rods (this was performed during shutdown for Z2R13). Corporate Nuclear Fuel Services (NFS) and Westinghouse Fuel Reliability personnel were consulted via conference call to discuss the number of leaking fuel rods, RCS activity, and the presence of transuranics for Z2R13. Just prior to shutdown for Z2R13 the INPO FRI was 4.2 E-3 uCi/g for December of 1994.

Unit 2 containment particulate, iodine, and noble gas air sample data collected prior to the DUO and then between the DUO and Z2R13 showed no increase in activity. These data led Radiation Protection (RP) personnel to conclude that conditions entering Z2R13 were similar to those entering the DUO. At the onset of Z2R13 standardized dose rate surveys, surveys in support of steam generator work, and alpha surveys revealed no abnormal trends compared to past outages. During the early stages of Z2R13 Radiation Protection was unaware of the extent of the failed fuel degradation.

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On January 24 1995, in preparation for mid-loop work, the cavity was drained and the reactor head was set. A post drain down survey was completed in the reactor cavity. The cavity floor was still very wet and gross contamination in the 100 mrem/hr beta range was present. A hot spot reading 34.5 R/hr with an ion chamber (closed window) was also identified on the outer edge of an excore detector cover in the northeast quadrant of the cavity. These results were not unusual based on past outage experience. Hot spots, especially around the head and excore detector covers, have been common immediately following drain down.

The cavity was to be decontaminated to facilitate conoseal, NIS modification, and Inservice Inspection (ISI) work. A pre-job briefing was held January 24, 1995 for the cavity decontamination effort. The meeting was led by the decon supervisor, a health physicist, and a field radiation protection supervisor.

The deconners began by washing the walls of the cavity from the 617' level. Once this was finished, the deconners donned class 4 dress (canvas coveralls, outer plastics, double rubbers, double gloves, and double hood) and a face shield and went down into the cavity to spray and squeegee the floor of the cavity into the lower internals laydown area. Their dosimetry was located on their knees.

Radiation protection monitored the decontamination efforts, worker dose rates, and worker accumulated dose from the Wireless Remote Monitor (WRM) and video monitor station just inside the containment hatch 617' elevation. The RP field supervisor monitored the WRM unit and video station while in direct communication (using headsets) with RPT #1 overseeing the decon of the cavity from around the edge of the cavity 617' level. The radiation protection technicians (RPT) did not accompany the deconners in the cavity due to spraying water and to maintain dose ALARA. During the decontamination effort the RP field supervisor monitoring the WRM noticed an area of elevated dose rates when workers approached an excore detector cover in the south quadrant of the cavity. The deconners completed the initial decontamination and exited containment with no problems encountered.

RPT #1 entered the cavity to perform the post decon survey. A survey of the cavity floor showed that all smears had a very high level of contamination (42-900 mrem/hr beta) and identified a new hot spot of 30 R/hr (knee high reading, window closed) on the outer edge of an excore detector cover in the south quadrant of the cavity. The previous hot spot of 34.5 R/hr on the excore detector cover in the northeast quadrant of the cavity was gone.

The decon and RP field supervisors decided that the hot spot should be removed to facilitate the planned work evolutions in the cavity. RPT #2 and a new deconner were briefed in the field by the RP and decon supervisors regarding removal of the 30 R/hr hot spot on the excore detector cover. The deconner and RPT #2 suited up and went down into the cavity to remove the hot spot. Both workers dressed in class 4 protective clothing with their primary and secondary dosimetry on the left knee taped in the pocket of the outer protective coverall.

RPT #2 entered the cavity first to find and survey the targeted hot spot located on the outer edge of an excore detector cover in the south quadrant of the cavity. RPT #2 found the hot spot and determined that a telescanner/teletector was required (has an extension pole that allows for the survey to be performed at a greater distance from the source and has a greater dose rate range). With a telescanner the initial reading was 60 R/hr. The dose field appeared to be very directional (vertical) with much lower readings off to the side of the spot on a horizontal plane.
The RPT went up the ladder and discussed the reading with the decon and RP supervisors. The group decided to proceed with the decon.

RPT #2 and the deconner went down into the cavity to decon the hot spot with an abrasive pad on a wooden pole. After they attempted this, a survey of the hot spot revealed a 90 R/hr reading and 1 R/hr on the abrasive pad. RPT #2 and the deconner discussed the new survey results and strategies on how to remove the spot with the RP and decon supervisors. Another attempt to remove the spot was made using a mop and cleaner. The worker then knelt down on both knees and scrubbed with a wire brush.

A survey of the spot by RPT #2 revealed the spot had increased to 150 R/hr and then with closer scrutiny to 250 R/hr contact. RPT #2 stated that the spot was very small and any slight deviation from the center of the telescanner probe greatly reduced the magnitude of the reading. RPT #2 again reiterated that the radiation appeared very directional, straight up, with much lower readings off to the side. The RP supervisor called the workers out of the cavity to discuss the increasing hot spot dose rate. RPT #2 and the deconner left the cavity. RPT #3 monitoring the WRM noticed that the deconner's electronic dosimetry (ED) did not decrease to reflect the ambient dose rates. RPT #3 contacted RPT #1 with this information.

RPT #1 surveyed the deconner and identified a 3 R/hr (window open) particle in the area of the dosimetry on the worker's knee. The ED and TLD were taken out of the pouch by RPT #1 and verified to be free from contamination. The deconner was taken out of his outer protective clothing. The deconner donned a new set of plastics and the dosimetry was placed in the same left knee pouch. The deconner was surveyed to verify he was free from particles.

Believing the excore detector cover gasket to be the source of the contamination, RPT #2 and the deconner went down into the cavity and tried to cut off a corner of the excore detector cover gasket. The work was performed while kneeling on the cavity floor.

RPT #2 surveyed the deconner throughout all the work in the cavity and found no readings above background, approximately 40 mR/hr. RPT #2 was in close proximity to the deconner during all work in the cavity. After the deconner made a number of final attempts to cut and scrub the hot spot from the excore detector cover gasket, a survey revealed that the spot had broken up into several 10-15 R/hr spots on the cavity floor.

RPT #3 monitoring the WRM from the 617' level informed RPT #1 that the electronic dosimeter (ED) read higher than the area background. RPT #1 surveyed the deconner and identified a 1.5 R/hr (window open) particle on the front of the deconner's knee near his dosimetry (approximately the same location as the first hot particle).

Upon exiting containment, the deconner surveyed his dosimetry, his hands, and his feet at the containment exit. An elevated response from the frisker was detected when the top of his ED was surveyed. At this time, the TLD was attached to the metal clip on the back of his ED. The IPM-8 personnel contamination monitor alarmed and indicated contamination in the area of his right hand.

RPT #4 in the decon room surveyed the deconner's hand and found 12K dpm. The deconner's hand was decontaminated with soap and water. RPT #4 also surveyed the ED and found approximately 150K dpm on top of the ED near the display. This was decontaminated down to 20K dpm. RPT #4 surveyed the TLD and determined that it had a much higher contamination level than the ED. However, the level of contamination was not quantified. RPT #4 stated that as he brought the contamination probe over the TLD the probe responded immediately. The TLD badge was immediately taken out of the contaminated holder, surveyed for contamination (it was clean), and placed in a new holder. The contaminated TLD holder was discarded.

The ED was contaminated so RPT #5 at the RP window recorded the ED reading (57 mrem) and credited the deconner with this accumulated dose using an access control administrative computer.

On February 7, 1995, the TLD coordinator notified the Health Physics Services Supervisor of a TLD discrepancy. A deconner's TLD was found to have an unusually high beta reading and an investigation was initiated. A PIF (295-200-95-CAT3-027) was written documenting the event. Corporate Health Physics was notified. The NRC Region III Radiation Protection inspector was notified. The individual was restricted from the Radiologically Posted Area (RPA) pending investigation.

A corporate health physicist was brought onsite to assist the investigation and dose assessment. On February 24, 1995 Corporate Health Physics support completed a dose investigation for the abnormal TLD response.

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CORRECTIVE ACTIONS TAKEN AND RESULTS ACHIEVED

On February 1, 1995, a memo was provided at the guardhouse to personnel entering the station informing them of failed fuel concerns which were identified on January 26, 1995 during ultrasonic testing of the off-loaded Unit 2 fuel.

On February 7, 1995, the TLD coordinator notified the Health Physics Services Supervisor of the TLD discrepancy in which a deconner's TLD was found to have an unusually high beta reading. The following actions were taken:

- A PIF (tracking #295-200-95-CAT3-027) was written documenting the event.
- Corporate Health Physics was notified.
- The NRC Region III Radiation Protection Inspector assigned to Zion was promptly notified.
- The individual was restricted from the Radiologically Posted Area (RPA) pending investigation.

On February 8, 1995, a corporate health physicist came on-site to assist the investigation and dose assessment.

On February 15, 1995, Corporate Radiation Pro.ection presented information on this event at the Health Physics Radiation Protection Committe· .neeting at which the other five ComEd Health Physics Supervisors were present.

The Radiation Protection Department reviewed the remaining outage work scope and revised applicable outage radiation work permits (RWPs) to include proper controls for hot particles.

Radiation Protection management heightened Radiation Protection personnel awareness for hot particle and failed fuel concerns at numerous Radiation Protection Department shift turnover meetings. Requirements of the hot particle control procedure (ZRP 5720-02), revised RWP controls for specific job evolutions, and areas for heightened job coverage awareness were reviewed with all Radiation Protection personnel.

Procedure ZRP 5720-02, Revision 0, "Identification and Control of Individual Radioactive Particles" was reviewed for content, and found to be satisfactory.

On February 24, 1995, Corporate Health Physics support completed a dose investigation for the abnormal TLD response and the hot particle. An appropriate whole body and shallow dose were credited to the individual's permanent dose record. A hot particle dose was included in the comment section of the individual's Form-5.

CORRECTIVE ACTIONS TO BE TAKEN TO AVOID FURTHER VIOLATIONS

As part of the Radiation Protection Department continuing training the Radiation Protection Training Staff will conduct instruction on the following topics:

-individual radioactive particle characterization, control, and dose assessment;
-pre-job briefing expectations, preparation, and execution. (295-100-95-007-01)

Contract RPTs will be instructed as to the significance of this event during indoctrination prior to each scheduled refueling outage. (295-100-95-007-02)

As part of the 1995 Radiation Protection Department continuing training, site Nuclear Engineering will instruct Radiation Protection personnel on failed fuel indications, action plan response, and radiological ramifications. This training is scheduled for completion prior to the next refueling outage (Z1R14). (295-100-95-007-03)

Zion Administrative Procedure (ZAP) 600-01, "ALARA Program" is being revised to include specific instructions on pre-job meeting content and expectations. This will be completed prior to the next refueling outage (Z1R14). (295-100-95-007-04)

The personnel decontamination procedure ZRP 5720-04 is being revised to include steps to document and assess contamination on personal items (e.g., hardhats, pens, dosimetry, glasses, etc.). This will be completed prior to the next refueling outage (Z1R14). (295-100-95-007-05)

ZRP 5720-02, "Identification and Control of Individual Radioactive Particles," will be enhanced to provide for more definitive response and better application for field use. This will be completed prior to the next refueling outage (Z1R14). (295-100-95-007-06)

ZRP 5200-07, "Radiation Exposure Investigation Report" is being revised to more thoroughly address contaminated dosimetry. This will be completed prior to the next refueling outage (Z1R14). (295-100-95-007-07)

Corporate Nuclear Engineering is revising the Failed Fuel Action Plan (NOD-TS.15) to notify Radiation Protection management to assess the potential radiological conditions when Action Level 1 is entered. Corporate Nuclear Engineering will assure Radiation Protection Department notification until the Failed Fuel Action Plan revision is complete. (295-100-95-007-08)

Corporate Health Physics Support will complete guidance document, "Radiological Effects of Fuel Failures," prior to the next ComEd refueling outage. The Zion Radiation Protection Department, with input from corporate health physics support, will develop a Zion radiation protection response plan for failed fuel. The corporate failed fuel response plan will be proceduralized at Zion prior to Z1R14. (295-100-95-007-09)

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Zion Station is in full compliance.