

March 28, 2000

Mr. David Lochbaum
Nuclear Safety Engineer
Union of Concerned Scientists
1616 P Street NW, Suite 310
Washington DC 20036-1495

SUBJECT: UNION OF CONCERNED SCIENTISTS LETTER, DATED MARCH 9, 2000

Dear Mr. Lochbaum:

Your letter of March 9, 2000, provided comments on a recent NRC inspection report (NRC Integrated Inspection 50-286/99-08 dated December 8, 1999) for an inspection conducted at the New York Power Authority's Indian Point Unit 3 reactor facility. The inspection period encompassed the reactor's tenth refueling outage and included onsite inspection by region-based specialists. The inspection noted apparent excessive instances of skin contamination during work in the containment. Your letter specifically noted this assessment and contended that our staff overlooked the plant owner's obligation to keep radiation doses to workers as low as is reasonably achievable (ALARA), did not cite an apparent violation of NRC regulation 10 CFR 20.1101(b) regarding ALARA, and did not enforce regulations intended to protect plant workers from excessive radiation exposure. In addition, you questioned if: 1) managers at Indian Point 3 were financially rewarded for achieving a 40-day refueling outage and, 2) have any managers at Indian Point 3 been reprimanded or otherwise disciplined for not meeting the company's goals for contaminations. You further opined that the NRC was implicitly endorsing unacceptable business practices that resulted in unnecessary exposure.

We reviewed the inspection report in light of your questions. We confirmed that the inspector properly interpreted the federal regulations; that the findings of the inspection did not support a violation of 10 CFR 20.1101(b); and that the utility's rationale and performance were consistent with the concept and specifications of ALARA as described in the federal regulations. While not included in the inspection report, the following information and safety context may clarify this matter.

Title 10, Code of Federal Regulations, Part 20, Section 1101, "Radiation protection programs," (10 CFR 20.1101) became effective on January 1, 1994, and required licensees to use, to the extent practicable, procedures and engineering controls based on sound engineering practices to achieve occupational doses and dose to the public that are as low as is reasonably achievable (ALARA). Prior to this revision, 10 CFR 20.1, only recommended that licensees make every reasonable effort to maintain radiation exposures as low as is reasonably achievable taking into account the state of technology and the economics of improvements in relation to benefits to the public health and safety and other societal and socioeconomic considerations in relation to the utilization of atomic energy in the public interest.

Given this significant change in regulatory specification of ALARA application, the Commission provided additional clarification in response to public comments on the rule change.

Federal Register Vol. 56, No.98, dated May 21, 1991, pertains. In particular, the NRC stated that the ALARA rule was designed to emphasize ALARA as an operating principle rather than an absolute minimization of exposure; and that compliance with this requirement would be judged on whether the licensee incorporated measures to track and, if necessary, to reduce exposures, and not whether exposures and doses represent absolute minimum or whether the licensee used all possible methods to reduce exposure. The NRC's responses also indicated that while the agency encouraged licensees to employ quantified analyses to establish cost versus benefit relative to ALARA, such analysis was not mandated. Notwithstanding, quantitative optimization analysis was expected to be used primarily in situations where the resultant benefits were not only quantifiable, but also appreciable compared to the cost of performing the analysis.

More recently, Federal Register Vol. 64, No. 194, dated October 7, 1999, announced a final rule that addressed situations in which industrial safety concerns were a factor (i.e., conditions in which worker health and safety may be jeopardized by ALARA measures that could magnify industrial safety hazards present). The rule stated that safety factors, other than radiological factors, may be considered in conducting an ALARA analysis. Such safety considerations include heat related illnesses associated with excessive protective clothing. This rule became effective on February 4, 2000. This position is discussed in the revision of Regulatory Guide 8.15, Acceptable Programs for Respiratory Protection, dated October 1999.

In this specific case, the reactor containment atmosphere at Indian Point 3 experienced higher than expected ambient temperatures during the refueling outage. The higher temperatures resulted from the need to perform emergent inspection work on service water piping fan coolers, which are normally used to cool the air in containment, and unusually high outside temperatures. The piping inspection took place concurrent with ongoing safety-related reactor critical path work activities (i.e., reactor core exit thermocouple work and steam generator work). Consistent with their procedures, the licensee tracked and monitored personnel contamination occurrences, and identified that the elevated temperature was a primary causal factor for many of the occurrences. Corrective actions included the construction of a cooling room for workers.

To reduce the potential for heat stress of personnel, who were assigned to work on tasks that normally required additional protective clothing layers, the licensee conducted and documented an evaluation of radiological conditions in the work areas to support relaxation of protective clothing requirements. The licensee's evaluation recognized that the relaxed requirements could result in some additional personnel contamination, but determined that such occurrences would not result in any significant personnel skin exposure or make a significant contribution to the individual's total effective dose, given the radiological conditions in the affected work areas. The licensee's evaluation results were consistent with the ALARA principle which provides that factors, other than radiological may be taken into consideration for ALARA analysis. Further, by reducing protective clothing requirements and accepting the potential for some localized personnel skin contamination (a circumstance that was not expected to result in any significant personnel exposure or significant contribution to total effective dose), overall radiation exposure to workers from the ambient general radiation dose rates could be minimized due to increased worker effectiveness and less worker stress. That is, by reducing the protective clothing

requirements, workers may be less encumbered and more comfortable in the warm environment, which could result in less work time in the radiation field, and consequently, less overall total effective dose equivalent to the workers.

Subsequent review of the total number of personnel contaminations, which occurred during the outage, identified that only five personnel contaminations met the licensee's shallow (skin) dose equivalent recording level of 0.1% of the 50 rem annual shallow dose equivalent exposure limit specified in 10 CFR 20.1201. NRC regulations 10 CFR 20.1502 and 10 CFR 20.2106 require monitoring and recording of occupational doses at 10% of the limit. In all of the cases, the skin dose attributable to these contaminations was well within the NRC annual exposure limit. In addition, there were no significant intakes of radioactive material associated with any of the personnel contamination occurrences.

Our inspector's reference to the numbers of contaminations was to focus attention on the minimization of personnel contaminations, and to highlight that the situation challenged the licensee's personnel contamination goal. The inspector did not consider the increased personnel contaminations to have radiological risk significance.

The licensee determined that rescheduling of the piping inspection activities or the critical path safety-related work, considering the planning and logistics involved in these work activities, was not economically justifiable, in consideration of the minor dose consequence, and accordingly, was not commensurate with the ALARA concept relative to cost versus benefit.

Our review of the radiological controls associated with the tenth refueling outage work activities, as detailed in the inspection report, indicated that the licensee implemented effective radiological controls for the outage, including ALARA controls. The inspection report identified that the licensee established aggressive goals for radiation and contamination exposure limits for the outage. The inspection report also identified that total effective dose equivalents to the whole body, dose to lens of the eye, extremity dose equivalent, and shallow dose equivalent to the skin were well below regulatory limits. The maximum committed effective dose equivalent, attributable to internal exposure, was also well within applicable NRC limits. Lastly, the inspection report identified that the licensee maintained personnel occupational radiation exposures, both external and internal, as low as reasonably achievable. Our subsequent review indicated that the total aggregate radiation dose for workers this refueling outage was lower than in previous outages at the plant.

Based on the above discussion, we find that the licensee, although exceeding its personnel contamination goals, acted reasonably, from a risk perspective, considering both worker safety and reactor safety, and that no violation of 10 CFR 20.1101(b) occurred.

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Relative to your question regarding financial rewards for managers for achieving a 40-day refueling outage: the NRC does not review financial rewards for licensee personnel. Relative to your question concerning reprimands or discipline that may have been directed to managers that failed to meet goals for personnel contamination: the utility maintains a process for identifying and correcting problems, and is expected to take corrective measures, if appropriate.

We hope this response sufficiently addresses your concerns and questions. We recognize that our original inspection report did not contain sufficient detail to put our findings into the appropriate context as described above. If you have further questions, please contact Messrs. John White at (610) 337-5114 or Peter Eselgroth (610) 337-5234.

Sincerely,

/RA/

A. Randolph Blough, Director
Division of Reactor Projects

Mr. David Lochbaum

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