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FACIL: 50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina 05000400
AUTH. NAME AUTHOR AFFILIATION
GRACE, J. N. Region 2, Office of Director
RECIP. NAME RECIPIENT AFFILIATION
UTLEY, E. E. Carolina Power & Light Co.

SUBJECT: Ack receipt of 870821 ltr denying violations noted in Insp Rept 50-400/87-22. Corrective steps which will be taken requested within 30 days of ltr date.

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NOTES: Application for permit renewal filed. 05000400

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Official

SEP 22 1987

Carolina Power and Light Company
ATTN: Mr. E. E. Utley
Senior Executive Vice President
Power Supply and Engineering
and Construction
P. O. Box 1551
Raleigh, NC 27602

USNRC-DS
1987 SEP 28 A 9:52

Gentlemen:

SUBJECT: NRC INSPECTION REPORT NO. 50-400/87-22

Thank you for your response of August 21, 1987, to our Notice of Violation, issued on July 8, 1987, concerning activities conducted at your Shearon Harris facility. We have evaluated your response and found that it meets the requirements of 10 CFR 2.201.

After careful consideration of the bases of your denial of the Violation, we have determined, for the reasons presented in the enclosure to the letter, that the violation occurred as stated in the Notice of Violation. Therefore, in accordance with 10 CFR 2.201(a), please submit to this office within 30 days of the date of this letter, a written statement describing steps which have been taken to correct the violation and the results achieved, corrective steps which will be utilized to avoid further violations, and the date when full compliance will be achieved.

The responses directed by this letter are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

We appreciate your cooperation in this matter.

Sincerely,

ORIGINAL SIGNED BY:
J. NELSON GRACE

J. Nelson Grace
Regional Administrator

Enclosure:
Staff Assessment of Licensee Response

cc w/encl:
R. A. Watson, Vice President
Harris Nuclear Project
D. L. Tibbitts, Director of Regulatory
Compliance
J. L. Willis, Plant General Manager

IE01

bcc w/encl:
C. Barth, OGC
NRC Resident Inspector
A. Upchurch, Chairman, Triangle J
Council of Governments
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ENCLOSURE

Staff Assessment of Licensee Response

Restatement of Violation

10 CFR 20.201(b) requires that each licensee make or cause to be made such surveys as may be necessary for the licensee to comply with the regulations in 10 CFR 20, and are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present. A survey is defined in 10 CFR 20.201(a) as an evaluation of the radiation hazards incident to the production, use, release, disposal, or presence of radioactive materials or other sources of radiation under a specific set of conditions.

10 CFR 20.101(a) specifies the quarterly occupational radiation dose limits to the lens of the eyes and the skin of the whole body.

Contrary to the above, the licensee failed to perform adequate evaluations of individual exposures to noble gas in that algorithms used to covert thermoluminescent dosimeter (TLD) readings to skin and lenses of the eye dose for personnel who made containment entries on June 17, 1987, and before were inappropriate for the noble gases present in containment. The licensee used no other dose assessment technique to assess doses due to noble gases.

Licensee Comment

The violation as stated was denied. The licensee stated that adequate dose evaluations were being performed in accordance with 10 CFR 20, and that the dose evaluations were reasonable under the circumstances to evaluate the extent of radiation hazards that may have been present. This position is based on the following: (1) the TLD dose algorithm was adequate considering concentrations of noble gas found in containment, and (2) it was reasonable for radiation protection personnel to assume, based on the low concentrations of noble gases measured during routine monitoring and the expected MPC-hours of exposure, that personnel dose from the noble gas would be insignificant and that further dose evaluations were not necessary.

NRC Response

The licensee's response implies that an informed judgement had been made by onsite radiation protection personnel that the TLD was adequate to monitor exposures from inconsequential noble gas concentrations. The onsite personnel actually were unaware of the capabilities of the TLD in this regard. The noble gas concentrations in the vicinity of the work were not known since noble gas air samples in the work area were not taken. The installed Radiation Monitoring System (RMS) indicated noble gas concentrations in containment were approximately at Maximum Permissible Concentration (MPC) levels, although the licensee had not yet concluded tests to demonstrate how representative the RMS readings were for various areas in containment. Offsite personnel were aware of the TLD's capabilities, but had not communicated this to onsite personnel

and were not involved routinely in the daily personnel protection decision process at the plant. Thus the onsite health physics staff who controlled exposures to workers, did not have in place a system to provide sufficient information on total dose. Lacking information on the dose to workers from the noble gas, the dose evaluations were not reasonable or adequate. They were based on the erroneous assumption that the TLD measured the noble gas exposure. In order for an evaluation to be considered acceptable, the licensee must include an assessment of the potential source and the capability of the TLD to measure exposures from that source. In this case, the licensee did neither, but rather assumed there was no problem in the absence of data.

Licensee Comment

The TLD dose algorithm utilizes beta correction factors which are based on the range of beta energies most responsible for personnel exposure. Although some noble gases emit beta particles with energies outside of this range, the resultant dose which may go unassigned is very small. Conservative calculations based on air sampling results at SHNPP show that the maximum potential unassigned dose to any individual during the first two quarters of 1987 were less than 7 mrem to the skin and 1 mrem to the lens of the eye. Such low doses are considered insignificant. Therefore the assumption by radiation protection personnel that the TLD would adequately monitor the exposure of personnel entering containment was correct.

NRC Response

Prior to the NRC calling the situation to the attention of station personnel, they were not aware that the dose from certain noble gases were not measured by the TLD. Although the station personnel's subsequent evaluation has shown the dose from unmeasured exposure to noble gas was low, there was a failure to perform an adequate evaluation prior to exposing workers to the noble gas. The onsite radiation personnel stated to the inspector that they thought that the TLD was measuring the noble gas exposure, which it wasn't. They did not assume that the noble gas hazard was insignificant and therefore did not warrant monitoring. Had there been a significant noble gas concentration in containment, the control systems in place would not have called for changes as workers accumulated dose from noble gas since station staff believed that their TLD was monitoring the noble gas exposure.

Licensee Comment

The maximum unassigned doses to the skin and lens of the eye correspond to less than 0.1% of the applicable quarterly dose limits in 10 CFR 20. NRC regulations do not require monitoring when exposure is not expected to exceed 25% of the quarterly limit.

NRC Response

The licensee's position would be relevant if workers only received exposures during the quarter from a small number of noble gas exposures. But many plant workers receive exposures from other sources during the quarter which are in

excess of the record keeping criteria. Measurable noble gas exposure then becomes part of the worker's cumulative quarterly exposure. It should also be noted that the licensee would not have known whether or not minor or significant exposures were being received because their TLDs were not capable of monitoring this dose, and they did not assess the potential exposure by any other means.

Licensee Comment

In conclusion, the dose assessment techniques used for SHNPP were adequate to evaluate the exposure to noble gases. However, CP&L recognizes that with continued plant operation, the potential for higher noble gas levels exists. If this occurs, it will be noted during routine monitoring and appropriate actions will be taken to ensure that dose evaluations are reasonable to evaluate the extent of any radiation hazard present.

NRC Response

The staff does not agree with the licensee's conclusion. The station personnel charged with controlling dose to workers did not assess the dose from noble gas exposure, therefore the dose assessment technique could not have been adequate. The TLD algorithms were not capable of measuring the dose from noble gas, and no other dose assessment technique was used. The onsite personnel incorrectly assumed the TLD could measure dose from noble gas exposure. The licensee's evaluation showed that resultant errors in total dose were low, however, the adequacy of the dosimetry to measure noble gas, the concentration of noble gas and the likely doses to be encountered had not been evaluated prior to assigning dosimetry and establishing work controls. The licensee had not established a system to establish controls to ensure that, if noble gas levels become higher, they will be appropriately identified and evaluated.

NRC Conclusion

For the above reasons, the NRC staff concludes that the violation occurred as stated.