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Reply to Notice of Violation
Inspection Report No. 50-83/89-01

United States Nuclear Regulatory Commission
Washington, D.C. 20555

Attn: Document Control Desk

Dear Sir:

This report is divided into two parts to address the two violations cited in Inspection Report No. 50-83/89-01.

A. Inspection Report No. 50-83/89-01 cites the UFTR facility with a Severity Level IV violation of 10 CFR 20.201(b) for failure to make or cause to be made such surveys as (1) may be necessary to comply with regulations and (2) are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present. The UFTR facility is cited in two cases as follows:

1. Routine quarterly radiation exposure surveys conducted in the reactor cell restricted area failed to adequately evaluate the elevated dose rates and radiation fields associated with the center and west vertical reactor beam ports. For each quarterly survey, records indicated measurements were made only for a single location approximately one meter above the reactor shield surface over the center vertical beam port.

2. Routine quarterly radiation exposure surveys conducted within and outside of the reactor cell restricted area failed to identify a collimated radiation beam resulting in radiation dose rates exceeding allowable limits of two millirem per hour (mR/hr) outside the west wall of the reactor cell restricted area.

1a. Admission or Denial of the Violation

1) For the failure to adequately evaluate the elevated dose rates associated with the vertical reactor ports during the quarterly radiation exposure surveys conducted in the reactor cell, the statement of violation repeated above is admitted; however, although measurements were only recorded for a single location and height over the outer vertical port, the existence of the elevated levels over the ports at significant power levels was

known and protection measures were in place to assure ALARA conditions were met.

2) For the failure to identify a collimated radiation beam resulting in radiation dose rates above two mR/hr outside the west wall of the reactor cell during quarterly radiation exposure surveys conducted within and outside the reactor cell restricted area, the statement of violation is also admitted. However, it should be noted that this beam was discovered by the licensee in followup to an NRC Inspection.

1b. Reasons for the Violation

1) The reason for the violation for failure to adequately evaluate the elevated dose rates associated with the vertical ports is considered to be due to the inadequacy of Radiation Control Technique #31 (Instructions for Performing UFTR Environmental Radiation Surveys) used to control and document performance of the quarterly environmental radiation survey conducted in the reactor cell. The existence of these elevated levels was known to the operations staff and efforts were underway to reduce the levels. In the interim, extra portable shielding had been administratively required over the center vertical port since about April 1988 and one new vertical port plug redesign had been tested but found not to give optimal dose rate reduction when tested in July, 1988. Further redesign and manufacturing efforts were in progress at the time of the latest NRC inspection in late February, 1989. Basically, the reason for the violation is due to the inadequacy of the radiation survey requirements and associated documentation for the quarterly environmental radiation surveys conducted in the reactor cell restricted area which includes the area around the vertical ports. As a result, the recommended caution signs at the vertical port location were not called out in the Radiation Control Technique (RCT) controlling the surveys so they were not implemented though conditions at the ports were known to the operations staff and resulted in avoidance of the area at power for visitors and with no one allowed to stand over the ports. In addition, the RCT #31 did not provide for documentation of administrative steps taken to assure ALARA requirements were met for these ports.

2) The reasons for the failure to identify the collimated beam were twofold. First, analysis indicates the root cause of this occurrence is an inadequate survey performed on the new rabbit system shield when implemented on January 20, 1987. This

inadequacy was probably abetted by the expectation that a single-piece monolithic shield should be better than a multipiece pile of shield pieces as had been used previously. What was not accounted for was the reduction in effective shielding thickness along the direct path of the rabbit exit line from the west side of the UFTR.

In addition, due to the apparent inadequacy of RCT #31, it is felt that subsequent quarterly radiation surveys of the restricted areas were not designed to locate such collimated beams. Those quarterly surveys performed under RCT #31 (Q-4 surveillance in unrestricted areas and Q-5 surveillance in restricted areas) have been used more to assure unchanging reactor conditions versus finding hot spots which are expected to be taken care of by surveys performed at the time when shielding is changed as required by UFTR SOP-E.1 "Alterations to Reactor Shielding and Graphite Configurations."

1c. Corrective Steps Taken/Results Achieved

1) For the failure to adequately evaluate the elevated dose rates associated with the vertical ports, the area of the vertical ports was posted on March 2, 1989 and designated as a potential high radiation area when the reactor is running. In addition, detailed radiation surveys of the entire area of the UFTR vertical ports were taken and documented on March 2, 1989 to complete required corrective action to address this violation. In addition, the final redesigned plugs for the center and east vertical ports as well as an additional bottom plug for the west vertical port were installed and tested on March 2, 1989 to demonstrate over a factor of about two reduction in the dose rates associated with the leakage beams from these ports. These plugs were installed for all future operations beginning March 17, 1989 following completion of all documentation.

2) Immediately upon discovery of the streaming (collimated beam) field emanating from the rabbit system shield on March 17, 1989, an extra piece of portable shielding was placed at the west rabbit shield face to eliminate the collimated beam and reduce radiation levels in the area of the end of the rabbit shield below 5 mR/hr and eliminate levels that would require posting outside the west reactor cell wall. Although temporary, the addition of sufficient shielding to provide permanent corrective action for this collimated beam was expected to be a relatively simple matter. In addition, a sign was posted to prevent anyone from removing the extra shielding.

Although a reactor trip and subsequent maintenance and evaluation for restart delayed evaluation and followup to assure permanent correction of the problem of this collimated beam, a permanent though still portable arrangement of shielding was installed at the west side of the rabbit shield on March 23, 1989. Again an official notice was posted warning that the extra shielding is not to be removed without checking with the Facility Director. Removal of the shielding will also necessitate a new radiation survey of the area involved. A complete detailed survey of the entire west side of the reactor room to include the entire equipment door area was completed on March 23, 1989 following a similar survey around the rabbit system port conducted on March 21, 1989 after discovery of the problem on March 17, 1989. All these surveys were used to provide documented assurance of the resolution of the problem of the radiation dose rates exceeding 2 mR/hr with all levels external to the cell at the door surface below 2mR/hr at full power and dropping rapidly with distance from the wall to below 0.1 mR/hr.

1d. Corrective Steps to be Taken to Avoid Further Violations

1) No further corrective action is needed to adequately evaluate the elevated dose rates associated with the UFTR vertical ports. However, to avoid further violations of this type, as committed in earlier communications to NRC and to the UFTR Reactor Safety Review Subcommittee (RSRS) Executive Committee on March 20 and to the full RSRS at its meeting on March 21, 1989, Radiation Control Technique #31 used to conduct quarterly environmental radiation surveys is undergoing major revision to assure that adequate surveys are conducted, both to assure conditions are not changing and to assure the location, identification, mitigation and/or posting of radiation areas and hazards as necessary to meet the requirements of 20 CFR 20.105(b)(1) as well as ALARA considerations. In addition, all UFTR-associated personnel involved in performing radiation surveys are receiving oral and practical instructions in the proper performance of radiation surveys; a formal class with a practical exercise will be conducted in this area using the revised Radiation Control Technique #31 as a basis prior to performance of the next quarterly environmental radiation surveys due in April, 1989 with a one month delay allowed to May, 1989 per UFTR Technical Specifications. This combined lecture and practical training is expected to be completed by May 12, 1989 so the quarterly environmental radiation surveys

can be conducted and completed well before the May 31, 1989 deadline.

2) As committed in earlier communications to NRC and to the UFTR Reactor Safety Review Subcommittee Executive Committee on March 20 and to the full RSRS at its meeting on March 21, 1989, the Radiation Control Technique #31 used to conduct quarterly environmental radiation surveys is undergoing major revision to assure that adequate surveys are conducted, both to assure conditions are not changing and to assure the location, identification, mitigation and/or posting of radiation areas and hazards as necessary to meet the requirements of 20 CFR 20.105(b)(1) and ALARA considerations. In addition, all UFTR-associated personnel involved in performing radiation surveys are receiving oral and practical instructions in the proper performance of radiation surveys; a formal class with a practical exercise will be conducted in this area using the revised Radiation Control Technique #31 as a basis prior to performance of the next quarterly environmental radiation survey due in April, 1989 with a one month delay allowed to May, 1989 per UFTR Technical Specifications. This special practical training will also address the proper performance of radiation surveys including detector response for shielding placed around ports to further assure that personnel are adequately trained to survey shielding arrangements to assure their adequacy. This combined lecture and practical training is expected to be completed by May 12, 1989 so the quarterly environmental radiation surveys can be conducted and completed well before the May 31, 1989 deadline.

1e. Date When Full Compliance will be Achieved

1) Full compliance has effectively been achieved as of the NRC inspection on March 2, 1989 in that the vertical ports were adequately posted on this date. In addition, detailed surveys were conducted and documented for the ports with existing plugs and with the redesigned more effective plugs in the center and east vertical ports and a second lower end plug in the west vertical port on March 2, 1989. These redesigned plugs were permanently installed as of March 17, 1989 following completion of all documentation. The final corrective step of conducting training on a revised Radiation Control Technique #31 and then implementing the RCT to control and document the quarterly environmental radiation surveys will be completed by May 31, 1989.

2) Date of Full Compliance

Compliance has been achieved via the prompt measures delineated in paragraph (1c)(2) as of March 17, 1989. Full compliance with documented approval and implementation of the revised Radiation Control Technique #31 for controlling performance of the quarterly environmental radiation surveys with one documented performance of the surveys following training will be achieved by May 31, 1989.

B. Inspection Report No. 50-83/89-01 also cites the UFTR facility with a Severity Level IV violation for failure to satisfy 10 CFR 20.105(b)(1) which requires that no licensee shall possess, use, or transfer licensed material in such a manner as to create in any unrestricted area radiation levels which, if an individual were continuously present in the area, could result in receiving a dose in excess of two millirem in any one hour. The UFTR facility is cited as follows:

Contrary to the above, from January 20, 1987 to March 2, 1989, the licensee failed to prevent radiation dose rates during full power operation from exceeding two millirem per hour (mR/hr) in a limited access unrestricted area adjacent to the west wall of the reactor cell.

a. Admission or Denial of the Violation

The violation is admitted.

b. Reason for the Violation

The reasons for the failure to prevent radiation dose rates during full power operation from exceeding 2 mR/hr in a limited access unrestricted area are twofold. First, analysis indicates the root cause of this occurrence is an inadequate survey performed on the new rabbit system shield on January 20, 1987. This inadequacy was probably abetted by the expectation that a single-piece monolithic shield should be better than a multipiece pile of shield pieces as had been used previously. What was not accounted for was the reduction in effective shielding thickness along the direct path of the rabbit exit line from the west face of the UFTR shield structure.

In addition, it is felt that subsequent quarterly environmental radiation surveys of the restricted and unrestricted areas were not designed to locate such collimated beams. This quarterly survey has been used more to assure unchanging conditions versus finding hot spots which are expected to be taken care of by surveys performed at the time

when shielding is changed as required by UFTR SOP-E.1 "Alterations to Reactor Shielding and Graphite Configurations."

c. Corrective Steps Taken/Results Achieved

Immediately upon discovery of the streaming (collimated beam) field emanating from the rabbit system shield on March 17, 1989, an extra piece of portable shielding was placed at the west rabbit shield face to eliminate the collimated beam and reduce radiation levels in the area of the end of the rabbit shield below 5 mR/hr and eliminate levels that would require posting outside the west reactor cell wall. Although temporary, the addition of sufficient shielding to provide permanent corrective action for this collimated beam was expected to be a relatively simple matter. In addition, a sign was posted to prevent anyone from removing the extra shielding.

Although a reactor trip and subsequent maintenance and evaluation for restart delayed evaluation and followup to assure permanent correction of the problem of this collimated beam, a permanent though still portable arrangement of shielding was installed at the west side of the rabbit shield on March 23, 1989. Again an official notice was posted warning that the extra shielding is not to be removed without checking with the Facility Director. Removal of the shielding will also necessitate a new radiation survey of the area involved. A complete detailed survey of the entire west side of the reactor room to include the entire equipment door area was completed on March 23, 1989 following a similar survey around the rabbit system port conducted on March 21, 1989 after discovery of the problem on March 17, 1989. All these surveys were used to provide documented assurance of the resolution of the problem of the radiation dose rates exceeding 2 mR/hr with all levels external to the cell at the door surface below 2mR/hr at full power and dropping rapidly with distance from the wall to below 0.1 mR/hr.

d. Corrective Steps to be Taken to Avoid Further Violations

To avoid further violations, as committed in earlier communications and to the UFTR Reactor Safety Review Subcommittee Executive Committee on March 20 and to the full RSRS at its meeting on March 21, 1989, Radiation Control Technique #31 used to conduct quarterly environmental radiation surveys is undergoing a major revision to assure that adequate surveys are conducted, both to assure conditions are not changing and to assure the location, identification, mitigation and/or posting of radiation areas and hazards as necessary to meet the requirements of 20 CFR 20.105(b)(1) as well as ALARA considerations. In addition, all UFTR-associated personnel involved

in performing radiation surveys are receiving oral and practical instructions in the proper performance of radiation surveys; a formal class with a practical exercise will be conducted in this area using the revised Radiation Control Technique #31 as a basis prior to performance of the next quarterly environmental radiation surveys due in April, 1989 with a one month delay allowed to May, 1989 per UFTR Technical Specifications. This combined lecture and practical training is expected to be completed by May 12, 1989 so the quarterly radiation surveys can be conducted and completed well before the May 31, 1989 deadline.

e. Date of Full Compliance

Compliance has been achieved via the prompt measures delineated in paragraph (c) as of March 17, 1989. Full compliance with documented approval and implementation of the revised Radiation Control Technique #31 as well as documentation of training on the revised RCT #31 for controlling performance of the quarterly environmental radiation surveys with one documented performance of the surveys will be achieved by May 31, 1989.

We trust this response satisfies the requirements delineated in Inspection Report No. 50-83/89-01. If there are further questions, please advise.

Sincerely,

William G. Vernetson
Director of Nuclear Facilities

WGV:lmc
CC: NRC Region II Regional Administrator
P.M. Whaley
J.S. Tulenko
Reactor Safety Review Subcommittee (RSRS)

Notary Public

Notary Public, State of Florida
My Commission Expires May 22, 1990
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