



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 126

TO PROVISIONAL OPERATING LICENSE NO. DPR-16

GPU NUCLEAR CORPORATION AND
JERSEY CENTRAL POWER & LIGHT COMPANY

OYSTER CREEK NUCLEAR GENERATING STATION

DOCKET NO. 50-219

1.0 INTRODUCTION

By letter dated October 23, 1986, and supplemented on April 5, 1988, General Public Utilities (GPU) Nuclear Corporation (the licensee) requested an amendment to Provisional Operating License No. DPR-16 for the Oyster Creek Nuclear Generation Station (Oyster Creek). This amendment request responded to the Nuclear Regulatory Commission (NRC) staff's request in a letter dated October 6, 1986 and was designated Technical Specification Changes Request (TSCR) No. 148 by the licensee. The purpose of the NRC staff's request was to incorporate updated requirements for monitoring fission product radioactivity levels in the reactor coolant system as discussed in NUREG-0822, Oyster Creek Integrated Plant Safety Assessment Report (IPSAR). In the IPSAR the staff concluded that reactor coolant activity at Oyster Creek should be maintained within the same limits imposed on newly licensed boiling water reactors to minimize the offsite radiological consequences of a small line failure which could release coolant to the atmosphere outside of containment. The staff also suggested using recent guidance to all licensees provided in NRC Generic Letter 85-19, dated September 27, 1985, insofar as action statements and reporting requirements. This evaluation documents the staff's review of GPU's TSCR No. 148 and the staff's position regarding a change to the Oyster Creek Technical Specifications (TS).

2.0 EVALUATION

The current Oyster Creek TS contain various limits and reporting requirements for radioactivity in the plant's radioactive fluid treatment and effluent systems. However, the TS requirement for the reactor coolant system, the primary source of radioactive effluents, is far less restrictive than for plants licensed during the past decade. The only limit is a total radioiodine (radioactive isotopes of iodine) activity of 8.0 microcuries per gram ($\mu\text{Ci/gm}$). If this limit were to be reached in the reactor coolant system, the TS requires the reactor to be placed in the cold shutdown condition and NRC regulations require prompt notification to the NRC and a written Licensee Event Report. More recently licensed nuclear power plants have TS which require actions such as more frequent sampling at a

much lower threshold (0.2 $\mu\text{Ci/gm}$), require reporting sample results as dose equivalent iodine-131 (D.E. I-131) and provide for certain annual reporting requirements. As a result of the staff's IPSAR evaluation of Oyster Creek (NUREG-0822), the licensee was requested to upgrade the Oyster Creek TS to be consistent with the Standard TS for General Electric boiling water reactor (BWR's) issued in 1978 as NUREG-0123 and with Generic Letter 85-19. The TS upgrade would (a) add a definition for D.E. I-131, (b) reduce the reactor coolant action limit to 0.2 $\mu\text{Ci/gm}$ based upon D.E. I-131, (c) add a Limiting Condition for Operation to be followed when the action limit is exceeded, (d) add annual reporting requirements when the action limits are exceeded and (e) require gaseous effluent sampling following power level increases and air ejector activity increases. The licensee submitted TS changes for this upgrade on October 23, 1986. After a detailed review of the proposed changes, the staff met with licensee representatives on June 30, 1987 to request revisions to the proposed TS changes. The licensee submitted the requested changes on April 5, 1988.

Reactor coolant activity is monitored primarily by measuring the radioactivity of several isotopes of iodine, which are products of the fission process, and mathematically converting those measurements to a D.E. I-131 value. This value is an indicator of how much leakage exists between the reactor fuel and the reactor coolant system as the result of fuel cladding failures. The historical fuel failure rate for nuclear reactors is typically very low (approx. 0.02%) resulting in D.E. I-131 equilibrium activity levels in the range of 0.0001 to 0.1 microcuries per gram ($\mu\text{Ci/gm}$). The equilibrium value of radioiodine activity is reached only after several days of operation at a given reactor power level. Each power level has a unique value of D.E. I-131. At Oyster Creek, the equilibrium iodine activity is typically about 0.0003 $\mu\text{Ci/gm}$. Approximately 25% of the operating reactors have experienced a transient increase in coolant iodine levels called "iodine spiking." These spikes are normally the result of a significant change in plant operating conditions, such as a reactor trip or large changes in power level, and subside after several hours allowing D.E. I-131 activity to return to pre-spike concentrations. The temporary iodine concentrations can be as high as 1000 times the normal equilibrium concentrations. In order to discern between these temporary iodine spikes and gross fuel element failures, the Standard TS require more frequent monitoring of coolant activity (every 4 hours) once D.E. I-131 values reach a predetermined value. This value is 0.2 $\mu\text{Ci/gm}$ for BWR's and 1.0 $\mu\text{Ci/gm}$ for PWR's. If the D.E. I-131 levels remain above 0.2 $\mu\text{Ci/gm}$ in a BWR for more than 48 hours or reach 4.0 $\mu\text{Ci/gm}$ at any time, major fuel degradation is indicated and the reactor must be shutdown within 12 hours. These limits have been established by the NRC in the Standard TS and are based upon assuring compliance with the offsite exposure guidelines of 10 CFR Part 100. In establishing the D.E. I-131 limits, the NRC assumed that a small loss of coolant accident (or failure of a small reactor coolant line) occurs simultaneous with a very large iodine spike or degraded fuel condition and that radioiodines would account for a small fraction (10%) of the off-site dose. The Standard TS assumptions are therefore very conservative since the existence of high D.E. I-131 and a small break are virtually coincidental (i.e. one would not normally cause the other) and are very unlikely.

Every BWR nuclear power plant licensed to operate since 1977 has the Standard TS requirements for reactor coolant activity. The 22 BWR's licensed before then have a variety of limits pertaining to iodine activity ranging from 0.2 to 25.0 $\mu\text{Ci/gm}$. The present Oyster Creek TS limit is 8.0 $\mu\text{Ci/gm}$ measured as total iodine, not D.E. I-131. For a number of years, the NRC required utilities experiencing high iodine activities, usually due to iodine spiking as discussed above, to report pertinent activities via a special report on a case basis. This requirement was changed by Generic Letter 85-19 to allow annual reporting of iodine activity levels in excess of the TS limit. In a number of plants, iodine spikes are relatively predictable following certain plant transients and NRC notification each time is not necessary from a regulatory standpoint unless release of significant quantities of fission products may be involved. In cases where an increase in D.E. I-131 activity level is unexpected, the licensee is required by 10 CFR 50.73 to submit a Licensee Event Report (LER) to the NRC. In extreme cases involving potential for releasing significant quantities of fission products or if a reactor shutdown is required by the TS, the licensee would also be required to provide immediate notification to the NRC under the provisions of 10 CFR 50.72. It has been the NRC's experience over the past several years that licensees are very aware of the quality and performance of their fuel long before fuel degradation becomes a regulatory concern. A number of utilities have noted fuel degradation and shut down the affected reactor to resolve the problem even though D.E. I-131 had not even approached the TS value which would have required more frequent sampling (but not necessarily require plant shutdown).

The staff's evaluation in conjunction with the IPSAR concluded that the radiological consequences (offsite) of a small primary coolant line external to the containment cannot be assured to be a small fraction of the guidelines in 10 CFR Part 100 unless the limits of the Standard TS for detecting failed fuel are invoked at Oyster Creek. The IPSAR also assessed external containment main steam line failures and determined that the small line break was more limiting as far as offsite dose consequences. With a combination of lower coolant iodine limits and more frequent sampling and reporting requirements, the staff has a much higher confidence level that the likelihood of a small line rupture concurrent with high coolant activity from failed fuel is very small. This evaluation, therefore, compares the licensee's April 5, 1988 submittal with the Standard TS for General Electric BWRs and Generic Letter 85-19.

Definition of Dose Equivalent I-131 - The proposed definition is identical to the Standard TS definition and is, therefore, acceptable.

Reactor Coolant Activity Limits - The proposed limits of 0.2 $\mu\text{Ci/gm}$ and 4.0 $\mu\text{Ci/gm}$ for D.E. I-131 are identical to the Standard TS limit and are, therefore, acceptable. The Standard TS, in Section 3.4.5.b, also limits to 100/E microcuries per gram where E is a weighted average energy in MeV per disintegration. The licensee's April 5, 1988 submittal stated that current Oyster Creek TS Section 3.6.E.1 limits the release rate of gross activity in noble gases to 0.21E curies per second at the main condenser air ejector. Although the limit, sample point and method of determination are different than the Standard TS, either method will indicate very high levels of non-iodine activity (predominantly from noble gases) which would be indicative of a gross fuel element failure. Because the staff's intent following the IPSAR review was to enhance the ability to monitor for fuel damage, and because such damage would be more detectable in the D.E. I-131 analyses, the staff considers TS Section 3.6.E.1 to be an equivalent level of detection.

Limiting Condition for Operation (LCO) - The LCO proposed is equivalent to that in Generic Letter 85-19 for D.E. I-131 activity. As discussed above, provisions for non-iodine activity are already contained elsewhere in the Oyster Creek TS and are different than the Standard TS LCO. However, the staff considers this deviation acceptable as discussed above.

Sampling Frequency - The Standard TS require sampling primary coolant for D.E. I-131 activity at least once per 31 days. The proposed frequency of at least once every 72 hours is more conservative than the Standard TS and is, therefore, acceptable.

Annual Reporting Requirements - The proposed requirements are equivalent to those in Generic Letter 85-19 and are, therefore, acceptable.

In letters dated November 7, 1986 and December 31, 1986 the Bureau of Engineering, Division of Environmental Quality, Department of Environmental Protection, State of New Jersey raised concerns related to TSCR No. 148. In a letter dated July 20, 1987 the staff responded to the State of New Jersey's concerns.

Therefore, the staff concludes that the proposed TS changes submitted by the licensee on April 5, 1988 as TSCR 148, Revision 1 are responsive to the staff's request to upgrade the TS, generally comply with TS approved for recently licensed BWR's and greatly enhance the licensee's required monitoring of reactor coolant activity and fuel damage. The staff finds the proposed changes acceptable. Based on this, we also consider SEP TOPIC V-16 Reactors Coolant System Radio-activity resolved.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves changes to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration [53 FR 17789] and there has been no public comment on such finding within the period for comment on the finding other than the State of New Jersey's comments as discussed in Section 2.0 above. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of this amendment will not be inimical to the common defense and security nor to the health and safety of the public.

Dated: September 12, 1988

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