GPU NUCLEAR CORPORATION

OYSTER CREEK NUCLEAR GENERATING STATION

Operating License No. DPR-16
Docket No. 50-219
Technical Specification Change Request No. 161

This Technical Specification Change Request is submitted in support of the Licensee's request to change the Appendix A Technical Specifications to Operating License No. DPR-16 for Oyster Creek Nuclear Generating Station. As a part of this request, the proposed replacement pages for Appendix A are also submitted.

GPU Nuclear Corporation

By J J Barton
J. J. Barton
Vice President and Director
Oyster Creek

Sworn and Subscribed to before me this 19th day of February, 1992.

JUDITH M. CROWE
Notary Public of New Jersey
My Commission Expires 11/25/95

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter GPU Nuclear Corporation	))	Docket No. 50-219

CERTIFICATE OF SERVICE

This is to certify that a copy of Technical Specification Change Request No. 161 for Oyster Creek Nuclear Generating Station Technical Specifications, filed with the U.S. Nuclear Regulatory Commission on February 19, 1992, has this day of February 19, 1992, been served on the Mayor of Lacey Township, Ocean County, New Jersey by deposit in the United States mail, addressed as follows:

The Honorable Russell C. Palumbo
Mayor of Lacey Township
818 West Lacey Road
Forked River, NJ 08731

By J J Barton

J. J. Barton
Vice President and Director
Oyster Creek

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1.0 <u>Proposed Technical Specification Change Request</u>

GPU Nuclear Corporation requests the Commission to amend the Appendix A Technical Specifications by replacement of the following pages as indicated below:

<u>Replace Pages:</u> 1.0-3; 3.1-4; 3.1-11, 3.1-14, and 3.1-15 (Table 3.1.1); 3.4-8; 4.1-9 (Table 4.1.2); and, 4.4-2.

2.0 <u>Extent of Changes</u>

This submittal proposes to change the OCNGS Appendix A Technical Specifications Bases Sections: 3.1 - Protective Instrumentation; and, 3.4 - Emergency Cooling. Deletions of references to the Containment Spray System (CSS) in Definition 1.18.B and on Tables 3.1.1 and 4.1.2, as well as, the automatic actuation test in Technical Specification 4.4.C are also proposed. These changes are necessary in order to remove the auto-initiation logic from the CSS control circuits and associated interfaces with the Emergency Service Water system supply and actuation circuitry, and Diesel Generator block loading sequence.

3.0 <u>Discussion</u>

3.1 <u>Design Basis of the CSS Auto-initiation Logic</u>

The containment spray system is equipped with automatic start logic to the pump motors and automatic valve readiness logic to the motor operators of the containment spray valves. This logic automatically actuates on coincident LO^2 (low-low) reactor water level and high drywell pressure signals in a 'one out of two twice' logic. The combination of the parameters used in the starting logic assures that the automatic logic will function for an event which causes a loss of coolant inventory sufficient to reduce reactor water level to the LO^2 setpoint in combination with sufficient blowdown to increase the drywell pressure to the high setpoint value. Further, the logic would not cause a containment spray initiation for an event for which LO^2 level was reached without a high drywell pressure condition such as a normal loss of feedwater. Similarly, the logic would not initiate sprays for a high drywell pressure condition without a concurrent LO^2 water level event.

Even with the automatic start logic, there is a class of events which would still require manual initiation of containment sprays. These events consist of small steam or water breaks such that the availability of the feedwater system can prevent reactor water level from reaching LO^2 level. If water level does not drop below LO^2 level, the automatic start logic will not actuate the containment spray pumps. For this class of events, the operator would be required to manually initiate sprays to decrease drywell pressure and temperature.

The valve readiness logic will align the containment spray valves for drywell injection automatically upon an actuation signal to the system. If the containment spray system is in the test mode (torus recirculation) when an automatic logic actuation occurs, the valves will be repositioned to the drywell injection mode.

3.2 <u>Evaporative Cooling</u>

A further feature of the system is that the control room operator cannot lock out the containment spray pumps and inhibit spraying of the drywell before the logic has sealed in. The operator can manually trip the containment spray pumps from the control room. However, depending on the operator's delay in tripping the pumps, the sprays could cause a rapid depressurization of the drywell which could lead to negative pressure in the drywell and torus with the possibility of excessive torus to drywell differential pressure.

The phenomenon which leads to this condition is evaporative cooling. In this process, containment spray water is injected into a hot, low humidity drywell atmosphere. The spray water being much colder than the atmospheric temperature evaporates and becomes water vapor. In this process, the spray water absorbs energy equivalent to the heat of vaporization from the atmosphere and results in decreasing the energy of the atmosphere as well as increasing its humidity. The decrease in atmospheric energy causes a rapid reduction in drywell temperature and pressure. Evaporative cooling continues until sufficient spray water has been evaporated to bring the drywell atmosphere to a 100% humidity environment. This cooling process can result in extremely rapid depressurization rates in the drywell and could lead to challenging containment negative design pressure capability.

Removing the automatic start logic for the containment spray system will prevent the consequences of an inadvertent automatic containment spray actuation.

3.3 Emergency Operating Procedures

The symptom based Emergency Operating Procedures (EOPs) contain bases for the manual initiation of containment spray upon the status of drywell pressure and temperature relative to the containment spray initiation limit. This limit is utilized to preclude exceeding the torus to drywell differential pressure capability and to minimize the possibility of primary containment de-inertion in the event that torus pressure drops below secondary containment pressure after the initiation of containment sprays. The EOPs make use of manual initiation of containment sprays to reduce drywell temperature and drywell pressure in order to preserve containment integrity and to promote mixing of the containment atmosphere to reduce localized hydrogen accumulation should hydrogen be present.

In order to enhance the implementation of the EOPs, the automatic start logic for the containment spray system should be removed.

3.4 Safety Evaluation

The justification to eliminate the automatic start logic for the containment spray system was based on a series of analyses using the CONTEMPT computer code with case specific input. The cases that were considered for analysis were the following:

- Large break LOCA
- Small break (0.1 ft^2) LOCA
- Main steam line break
- Stuck open relief valve

The large break LOCA was chosen since this break maximizes the blowdown energy input into the containment. The small break LOCA deposits energy to the containment in the form of the break blowdown to the drywell plus the Automatic Depressurization System (ADS) blowdown directly to the torus. The steam line break case was chosen since it defines the temperature profile for environmental qualification of electrical equipment inside the drywell. However, it was assumed that containment sprays were manually initiated for the most limiting main steam line break which was considered because LO^2 level would not be reached if main feedwater was available.

Thus, the proposed elimination of the automatic start logic for the containment spray system will not have any effect on the results for the main steam line break, associated with the OC EQ profile in the drywell. The stuck open relief valve deposits energy directly to the torus pool and does not result in a significant increase in drywell pressure which could cause an automatic start of the containment spray system. Thus, it is concluded that the last two cases are unaffected by the elimination of the automatic start logic for the containment spray system and will not be discussed further. Each of the two LOCA cases will be addressed separately below.

The general approach taken for evaluating the effect of the automatic start logic on containment response was to compare the containment parameter profiles under automatic spray actuation to those when the sprays are manually started at 10 minutes after the break. The time delay of 10 minutes for operator action is consistent with the assumptions made for manual spray actuation. Moreover, credit was taken for the operator placing one loop of the containment spray system (one containment spray pump, one emergency service water pump and two heat exchangers) in the dynamic test (torus cooling) mode to provide heat removal from the torus pool after drywell pressure has been reduced by manual spray actuation.

Large Break LOCA

The large break LOCA which was considered was the design basis double ended guillotine break of a recirculation loop. The break results in a massive blowdown into the drywell for approximately 30 seconds. After this time, the pressure in the reactor is essentially the same as the containment pressure. Further, the core spray injection into the reactor will overwhelm the core decay heat production after the end of the blowdown. The core spray injection which is required to boil in order to remove decay heat 30 seconds after a scram is roughly 500 gpm. The actual rate of injection is far in excess of the amount required to remove decay heat by boiling. Thus, the core spray water will not be heated to boiling while flowing through the core and out of the break and will flow to the torus through the drywell vents. Therefore, after the end of the blowdown, there will not be any additional steam input to the drywell and thus, drywell temperature and pressure will decay due to containment sprays.

Two different models were used to evaluate the containment response to the DBA LOCA. The first model contained assumptions which were intended to maximize the pressure profile in the containment. This model was used to calculate drywell and torus pressures as well as drywell atmospheric temperature.

The second model contained assumptions to maximize the heatup of the torus water pool to evaluate the effects on core spray and containment spray NPSH limits.

A summary of the maximum values for the containment parameters is given in Table 1. This table shows that there is virtually no effect on the maximum containment parameter values when the automatic containment spray logic is eliminated since the energy removal capacity of the containment spray system is much lower than the energy addition rate to the containment due to the break blowdown. The automatic spray case assumed that the sprays were initiated at the start of the LOCA. In fact, due to the loss of offsite power assumption for this accident, containment spray would not actuate for about 85 seconds which allows for the pumps to be loaded on the diesel generator. This delay has no effect on the peak parameter values.

The drywell pressure profiles for the two cases were considered. The profile with automatic spray actuation shows that the pressure drops to essentially atmospheric within approximately 300 seconds. With manual sprays, the pressure decays much more slowly up to 10 minutes, then decreases rapidly and is nearly the same as Case 1 after 0.5 hours. There is no safety concern with respect to containment integrity due to this slow pressure decay. The slower pressure decay will increase containment leakage to the reactor building. However, the standby gas treatment system will filter this leakage and prevent any increase in the offsite dose. A similar trend was found in the torus pressure profiles. Again, at the end of 0.5 hours and for the duration of the transient, the profile for Case 2 is essentially the same as that for the automatic spray case (Case 1).

In reviewing the difference in drywell vapor temperature profiles for the two cases, the peak temperature value is virtually unchanged when the automatic spray actuation is removed. The temperature profile for Case 2 decreases slower in the first 10 minutes than Case 1 and then shows a prompt drop at 10 minutes.

The torus pool temperature profiles show that there is little difference between the two cases. It should be noted that neither of the torus temperature profiles result in a condition which would violate the NPSH limits for the core spray or containment spray pumps for the maximum flow as required for the Appendix K LOCA analysis (See General Electric Report LB672-87162), even if the torus overpressure which would be present is conservatively ignored. The NPSH requirements for the core spray pumps are more limiting compared to that of the containment spray pumps. Even without the torus overpressure which would be present at the time of peak torus pool temperature, adequate pump NPSH is assured since the peak torus pool temperature is 18°F below the NPSH limit for the core spray pumps.

Small Break LOCA

A 0.1 ft^2 recirculation line break was chosen as a representative small break LOCA. The blowdown from the break reduces to essentially zero within 500 seconds since reactor pressure is rapidly reduced by the combination of the break and the ADS actuation. Once the reactor is depressurized, the core spray injection is much greater than the decay heat production of the core and thus no further steam is added to the drywell after the end of blowdown. The summary of the maximum containment parameter values for the small break LOCA is given in Table 2. As was the case for the large break LOCA, the maximum values are only slightly affected by the elimination of the containment spray automatic start logic.

The profiles for drywell and torus pressure respectively for the two cases were analyzed. Case 4 shows slightly higher peak pressures since the containment spray system will have an effect more quickly due to the smaller mass and energy addition rates to the containment for this size break. The peak values for this case are still well below the design pressures for both the drywell and torus and thus are not a concern. The drywell vapor temperature profile shows that the peak temperature for Case 4 is less than 1°F higher than for Case 3 and is still well below the design temperature for the drywell. The torus pool temperature profile for the two cases shows that the torus temperature will assure that NPSH requirements for the core spray and containment spray pumps will be satisfied. The peak torus pool temperature is well below that of the DBA LOCA so that adequate pump NPSH is assured.

Emergency Diesel Generator Interface

Deletion of the auto-start logic for the CSS/ESW pumps will result in removal of the diesel generator load sequence timers. The relay timers provided a time delay in the loading of the pumps onto diesel generators to prevent an unnecessary loading from occurring during the initiation of emergency power.

The same relays will now be used to prevent the starting of the Containment Spray and ESW pumps until the diesel generator block loading sequence is completed. This change is conservative in that an additional margin of safety is afforded by re-allocation of the protective relays previously used for time delays required when the pumps were started automatically.

Conclusions

As a result of the analyses performed on the large and small break LOCAs assuming a manual initiation of sprays at 10 minutes, the following conclusions are drawn:

° For the large break, the elimination of the automatic start logic for the containment spray system has no effect on the peak drywell or torus pressure as well as the peak drywell temperature.

° While the peak torus pool temperature does increase for the large break when the automatic logic is eliminated, the increase is small and does not challenge the NPSH requirements for the core spray or containment spray pumps.

° For the small break, there are slight increases in the peak values for drywell and torus pressure and drywell temperature as a result of the elimination of the containment spray automatic start logic. However, these increases are very small and are well below the design values for these parameters.

° The peak torus pool temperature for the small break LOCA does not change due to the elimination of the automatic logic for containment spray. Further, NPSH requirements are also not affected.

° For both breaks analyzed, initiation of torus cooling via the dynamic test mode of the containment spray system after manual spraying of the drywell is important to preserve the heat absorption capability of the torus pool. The operator is clearly directed to take this action in the Emergency Operating Procedures (Ref. 4).

In summary, based on the preceding determinations, it is concluded that the elimination of the automatic start feature does not significantly change the containment parameter profiles, nor does it impact upon the plant's ability to intiate emergency power. Therefore, the automatic start feature is not required and may be removed while retaining the manual actuation feature of the system without degrading the safety of the plant.

TABLE 1
PEAK VALUE SUMMARY FOR LARGE BREAK LOCA

PARAMETER	CASE 1 AUTOMATIC SPRAYS	CASE 2 MANUAL SPRAYS AT 10 MINUTES
Drywell Pressure, psig	38.4 @ 5 sec	38.4 @ 5 sec
Torus Pressure, psig	26.6 @ 99 sec	27.0 @ 612 sec
Drywell Vapor Temperature, °F	282.7 @ 5 sec	282.7 @ 5 sec
Torus Liquid Temperature, °F	158.8 @ 10,890 sec	159.4 @ 10,530 sec

TABLE 2
PEAK VALUE SUMMARY FOR SMALL BREAK LOCA

PARAMETER	CASE 3 AUTOMATIC SPRAYS	CASE 4 MANUAL SPRAYS AT 10 MINUTES
Drywell Pressure, psig	20.6 @ 351 sec	20.8 @ 355 sec
Torus Pressure, psig	19.0 @ 413 sec	19.2 @ 598 sec
Drywell Vapor Temperature, °F	259.8 @ 351 sec	260.1 @ 430 sec
Torus Liquid Temperature, °F	153.2 @ 18,310 sec	153.2 @ 18,270 sec

4.0 <u>No Significant Hazards Determination</u>

Based upon the Discussion above, GPUN has determined that this Technical Specification Change Request poses no significant hazards, as defined by the NRC in 10 CFR 50.92. In summary, the proposed amendment to Appendix A does not involve a significant hazards consideration as evaluated below.

4.1 Operation of Oyster Creek Nuclear Generating Station in accordance with these changes would not involve a significant increase in the probability or consequences of any accident previously evaluated because the proposed TSCR No. 161 does not modify or create any accident initiating conditions. The CSS actuation methodology, i.e., automatic or manual, was never considered as an initiating event; and, therefore, the proposed change to actuation method cannot increase the probability of an accident previously evaluated. Further, the CSS actuation within or at the end of a 10 minute time period allocated for operator action subsequent to a large or small break LOCA does not significantly affect the peak drywell or torus temperature and pressure values; and, therefore, the proposed change to actuation method will not increase the consequences of previously evaluated accidents.

4.2 Operation of Oyster Creek Nuclear Generating Station in accordance with these changes does not create the possibility of a new or different kind of accident from any previously evaluated because the proposed TSCR No. 161 has been analyzed. The analysis demonstrates that no significant differences exist in the containment temperature and pressure profiles docketed for the large and small break LOCAs, within the first 10 minutes of the event. For the most limiting accident, Main Steam Line Break (MSLB), delayed actuation of the CSS is assumed in the environmental qualification of electrical equipment important to safety.

4.3 Operation of Oyster Creek Nuclear Generating Station in accordance with these changes does not involve a significant reduction in the margin of safety because the proposed change to CSS actuation does not diminish the capability of the system to mitigate the consequences of design basis accidents. OCNGS has a dedicated containment spray system, and manual actuation of the CSS is an existing design feature of the system. Thus the operation of the facility in accordance with the proposed TSCR No. 161 will not affect the margin of safety.

4.3 Continued

The Commission has provided guidelines pertaining to the application of the No Significant Hazards standards in the Federal Register (48 FR 14870). This proposed change is considered to be in the same category as examples of "Amendments Not Likely To Involve Significant Hazards Consideration." Therefore, the operation of OCNGS in accordance with the proposed amendment involves no significant hazards considerations.

5.0 Implementation

It is requested that the amendment authorizing this change become effective upon issuance, and that implementation shall occur following turnover of the modifications to plant operations and upon restart from the 14R refueling outage. It is expected that the interim period between issuance and implementation will provide sufficient time to allow for the requisite procedure changes and updated operator training.

1.14 SECONDARY CONTAINMENT INTEGRITY

Secondary containment integrity means that the reactor building is closed and the following conditions are met:

A. At least one door at each access opening is closed.

B. The standby treatment system is operable.

C. All reactor building ventilation system automatic isolation valves are operable or are secured in the closed position.

1.15 (DELETED)

1.16 RATED FLUX

Rated flux is the neutron flux that corresponds to a steady state power level of 1930 NW(t). Use of the term 100 percent also refers to the 1930 thermal megawatt power level.

1.17 REACTOR THERMAL POWER-TO-WATER

Reactor thermal power-to-water is the sum of (1) the instantaneous integral over the entire fuel clad outer surface of the product of heat transfer area increment and position dependent heat flux and (2) the instantaneous rate of energy deposition by neutron and gamma reactions in all the water and core components except fuel rods in the cylindrical volume defined by the active core height and the inner surface of the core shroud.

1.18 PROTECTIVE INSTRUMENTATION LOGIC DEFINITIONS

A. Instrument Channel

An instrument channel means an arrangement of a sensor and auxiliary equipment required to generate and transmit to a trip system a single trip signal related to the plant parameter monitored by that instrument channel.

B. Trip System

A trip system means an arrangement of instrument channel trip signals and auxiliary equipment required to initiate action to accomplish a protective trip function. A trip system may require one or more instrument channel trip signals related to one or more plant parameters in order to initiate trip system action. Initiation of protective action may require the tripping of a single trip system (e.g., initiation of a core spray loop, automatic depressurization, isolation of an isolation condenser, offgas system isolation, reactor building isolation, standby gas treatment and rod block) or the coincident tripping of two trip systems (e.g., initiation of scram, isolation condenser, reactor isolation, and primary containment isolation).

particular protection instrument is not required; or the plant is placed in the protection or safe condition that the instrument initiates. This is accomplished in a normal manner without subjecting the plant to abnormal operations conditions. The action and out-of-service requirements apply to all instrumentation within a particular function, e.g., if the requirements on any one of the ten scram functions cannot be met then control rods shall be inserted.

The trip level settings not specified in Specification 2.3 have been included in this specification. The bases for these settings are discussed below.

The high drywell pressure trip setting is $\leq$ 3.5 psig. This trip will scram the reactor, initiate core spray, initiate primary containment isolation, initiate automatic depressurization in conjunction with low-low-low-reactor water level, initiate the standby gas treatment system and isolate the reactor building. The scram function shuts the core down during the loss-of-coolant accidents. A steam leak of about 15 gpm and a liquid leak of about 35 gpm from the primary system will cause drywell pressure to reach the scram point; and, therefore, the scram provides protection for breaks greater than the above.

High drywell pressure provides a second means of initiating the core spray to mitigate the consequences of loss-of-coolant accident. Its trip setting of $\leq$3.5 psig initiates the core spray in time to provide adequate core cooling. The break size coverage of high drywell pressure was discussed above. Low-low water level and high drywell pressure in addition to initiating core spray also causes isolation valve closure. These settings are adequate to cause isolation to minimize the offsite dose within required limits.

It is permissible to make the drywell pressure instrument channels inoperable during performance of the integrated primary containment leakage rate test provided the reactor is in the cold shutdown condition. The reason for this is that the Engineered Safety Features, which are effective in case of a LOCA under these conditions, will still be effective because they will be activated (when the Engineered Safety Features system is required as identified in the technical specification of the system) by low-low reactor water level.*

The scram discharge volume has two separate instrument volumes utilized to detect water accumulation. The high water level is based on the design that the water in the SDIV's, as detected by either set of level instruments, shall not be allowed to exceed 29.0 gallons; thereby, permitting 137 control rods to scram. To provide further margin, an accumulation of not more than 14.0 gallons of water, as detected by either instrument volume, will result in a rod block and an alarm. The accumulation of not more than 7.0 gallons of water, as detected in either instrument volume will result in an alarm.

Detailed analyses of transients have shown that sufficient protection is provided by other scrams below 45% power to permit bypassing of the turbine trip and generator load rejection scrams. However, for operational convenience, 40% of rated power has been chosen as the setpoint below which these trips are bypassed. This setpoint is coincident with bypass valve capacity.

A low condenser vacuum scram trip of 20 inches Hg has been provided to protect the main condenser in the event that vacuum is lost. A loss of condenser vacuum would cause the turbine stop valves to close, resulting in a turbine trip transient.