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May 24, 1991

U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

Attention: Document Control Desk

Subject: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-29
Diesel Generator Fuel Oil Storage
Request for Additional Information on PCOL-90/13

GNRO-91/00073

Gentlemen:

By letter dated March 11, 1991 (GNRI-91/00050), the Staff requested additional information in order to complete its review of our proposed change to the Grand Gulf Nuclear Station (GGNS) Operating License dated February 22, 1991 (GNRO-91/00017).

The proposed change requested that GGNS Technical Specifications (TS) 3.8.1.1 and 3.8.1.2 be revised to provide higher minimum fuel oil storage requirements. These revisions would ensure that seven day fuel oil supply volumes are specified in the GGNS TS.

In response to the Staff request, the attachment to this letter provides our response to the questions transmitted March 11, 1991. The Staff requested a response within 30 days of receipt of their request; however, GGNS requested and received an extension to respond by May 24, 1991 from the NRC GGNS Project Manager.

If you require additional information, please advise.

Yours truly,

W. T. Cottle

WTC/PRE/ams

attachment: Response to Staff RAI on PCOL-90/13

cc: (See Next Page)

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RESPONSE TO STAFF RAI
ON PCOL-90/13

NRC REQUEST No. 1:

Provide the results of the calculated available net positive suction head (NPSH) for the oil transfer pump at the minimum level of oil in the storage tank and compare the available NPSH with the required NPSH. Describe the input and assumptions in the calculation.

GGNS RESPONSE No. 1:

The fuel oil transfer pumps are submersible centrifugal pumps manufactured by Crane Co., Chempump Division. The pumps were originally specified to operate under the following conditions:

a. Liquid Pumped	No. 2 Fuel Oil
b. Viscosity (SSU)	250
c. Vapor Pressure (PSIA)	0.075
d. Max. Temperature (°F)	100
e. Min. Oil Level	Elev. 112'-0"

The minimum oil level at elevation 112'-0" corresponds with the original assumption of two feet of unusable fuel in the storage tank by the tank designer (the bottom of the tank is at elevation 110'-0"). This minimum oil level was used by the manufacturer to select a transfer pump for the storage tanks.

The manufacturer provided the fuel oil transfer pumps to meet the design conditions noted above. The centerline of the suction inlet of the transfer pump is at elevation 110'-8" providing a minimum submergence of 1'-4". No NPSH calculations were performed for the transfer pumps since they are used in a submersible application, and the minimum oil level included in the design specification was used by the manufacturer to ensure adequate suction submergence is available for the pumps at the design conditions.

The manufacturer was contacted by GGNS to determine if the transfer pumps could safely operate with a minimum submergence less than the 1'-4" currently available. This was done to determine the actual minimum oil level required for pump operation. The manufacturer stated that the minimum fluid level for continuous operation is 4" above the center line of the pump's suction flange. The actual minimum oil level for continuous transfer pump operation with the minimum submergence of 4" was determined to be at elevation 111'-0". Consequently, the unusable volume of 2,976 gallons discussed in PCOL-90/13 was chosen to correspond to the minimum fluid level.

It should be noted that there has been no change in the actual minimum fluid level (4") as a result of recalculating the minimum fuel oil storage volume. Therefore, there has been no change in a margin of safety.

NRC REQUEST No. 2:

Describe the methods used to monitor the amount or level of fuel in the storage tank. Include a discussion of measurement accuracy with respect to ensuring the minimum required usable volume is always available.

GCNS RESPONSE No. 2:

Compliance with the Technical Specification minimum required usable volumes is monitored using control room tank level indication. These indicators are fed signals from differential pressure type level transmitters. The transmitters are calibrated to measure tank level in feet. In performing the Technical Specification surveillance for minimum required usable volume, the operator reads the control room indicators. The surveillance procedure identifies a reading in feet which satisfies the minimum required usable volume.

Measurement accuracy of this non-safety related instrumentation and instrument uncertainty are not explicitly accounted for in the Control Room fuel oil storage tanks level indication. Based on volume calculations, the minimum storage tank fuel level for diesel generator operability, measured from the bottom of the tank is as follows:

Division 1 Diesel Generator: 9.76 Feet
 Division 2 Diesel Generator: 9.76 Feet
 Division 3 Diesel Generator: 6.86 Feet

The Control Room instrumentation for fuel oil storage tank level minimum level is measured sixteen inches from the bottom of the fuel oil storage tanks. Based on this information, the indicated level for the minimum operability levels listed above are as follows:

Division 1 Diesel Generator: 8.43 Feet
 Division 2 Diesel Generator: 8.43 Feet
 Division 3 Diesel Generator: 5.53 Feet

The surveillance procedures for the diesel generators specify minimum fuel oil storage tank levels for diesel operability as follows:

Division 1 Diesel Generator: 8.70 Feet
 Division 2 Diesel Generator: 8.70 Feet
 Division 3 Diesel Generator: 5.90 Feet

Using this information, the excess fuel margin between minimum indicated level and minimum operability level is as follows:

Division 1 Diesel Generator: 0.27 Feet (2.25% of total depth)
 Division 2 Diesel Generator: 0.27 Feet (2.25% of total depth)
 Division 3 Diesel Generator: 0.37 Feet (3.08% of total depth)

These instruments are presently calibrated on an eighteen month frequency.

NRC REQUEST No. 3:

Provide a discussion of the calculated revised minimum required volume of fuel oil, including reasons for the change and conservatism in the presently calculated values.

GGNS RESPONSE No. 3:

The minimum required volume of fuel oil for each division was calculated in accordance with ANSI N195-1976. In accordance with the ANSI standard, the fuel oil storage requirements were calculated based upon the diesel generators operating at the required loading at the most limiting condition. The time dependence of diesel generator loading was taken into account to ensure that load changes were included in the calculation. In addition, where the design included provisions for an operator to supply power to equipment other than the minimum required for the plant condition, those additional loads were considered. An allowance for fuel consumption during periodic testing was included, and a conservative margin of 10% was added to the calculated minimum fuel oil requirement.

In accordance with the ongoing GGNS calculation review/upgrade program, the calculations for diesel fuel oil storage requirements were reviewed in detail to ensure that all commitments were met. The Division I and II fuel oil storage requirements were revised for the following reasons:

- 1) The previous calculation misinterpreted the requirements of ANSI N195-1976 regarding the inclusions of non-essential loads that an operator can place into service in addition to safe shutdown loads. While non-essential loads were considered, assumptions regarding durations were determined to be nonconservative. The durations were revised where required in the new calculations to provide conservative results.
- 2) Low Pressure Core Spray (LPCS) was assumed to be required to operate for one hour post LOCA in the previous calculation. Currently, GGNS has conservatively interpreted the required duration for long term core cooling to be longer than one hour. In fact, LPCS was assumed to operate for the entire event in the revised fuel oil calculation.
- 3) The loading for control room lighting was found to be slightly low and was revised in the new calculation.

The Division III fuel oil storage requirement was revised because the original calculation referenced startup test data as the basis for the load which the High Pressure Core Spray (HPCS) pump motor placed on the Division III diesel generator, and that information could not be verified during the review. GGNS decided to use loading information that could be readily verified.

As stated previously, the calculations for fuel oil storage requirements were performed in accordance with ANSI N195-1976 which provides a conservative methodology for ensuring adequate storage capacity is maintained. Conservatism in the presently calculated values include:

- 1) A margin of 10% was added to the total calculated fuel oil requirements to ensure that adequate fuel oil volumes are maintained.
- 2) An explicit allowance for fuel consumption for periodic testing was added to the storage requirements.
- 3) No credit is taken for operation of the drip return system on the Division I and II engines for post LOCA operation. An additional 1344 gallons of fuel oil was included in the ANSI N195-1976 storage requirements due to this assumption.
- 4) The following non-essential loads (applicable to Divisions I and II) were added to the electrical load requirements and were assumed to operate for the entire event since the operators can manually place these non-essential loads on the diesel generator following a LOCA:
 - a) Plant lighting
 - b) Fuel pool cooling pump
 - c) Control rod drive pump
 - d) Drywell cooling fan coil units
 - e) Drywell cooling system recirculating fan
- 5) The fuel oil contained in the hemispherical ends of the fuel oil storage tanks was not included in the total storage capacity resulting in a conservative value for overall volume.