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July 18, 1996

U.S. Nuclear Regulatory Commission
Mail Station P1-37
Washington, D.C. 20555

Attention: Document Control Desk

Subject: Grand Gulf Nuclear Station
Docket No. 50-416
License No. NPF-29
Purge Valve Testing
Questions Concerning Proposed Amendment to the Operating License
(PCOL-96/051)

GNRO-96/00084

Gentlemen:

On July 2, 1996, a conference call was held between the NRC staff and representatives of Entergy Operation, inc., to discuss our proposed amendment to the Grand Gulf Nuclear Station (GGNS) Operating License (see GNRO 96/0051, dated 5-8-96). This change would put containment purge valves with resilient seals on a performance based leakage testing frequency in accordance with our Appendix J testing program. During the call several questions were answered, and clarifications made, to assist in the Staff's evaluation of our request. As a result of this call, we were requested to provide a written response to the questions, including clarifications. Attached is our response to that request. We hope that the attachment provides all the information needed to approve our request and we would like to reiterate our need for approval by August 1, 1996. If you need additional information or have any more questions, please contact Bill Brice at 601-437-6556.

Yours truly,

for

CRH/WBB/ams
attachment: Response to Questions concerning PCOL-96/0051
cc: (See Next Page)

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cc:

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1. What material are the seats made of?

   The resilient material used for the valve seats is Ethylene Propylene Terpolymer (EPT). This material was specified in our original valve specifications.

2. What is the service life of these seats?

   No service life has been calculated for these seats. The shelf life for these seats has been calculated to be sixty years, which is further reduced by our procedures to 40 years for conservatism. The shelf life is, for the most part, based on the material used for the seats. In this case the material used is EPT. The service life was considered in the original specifications used to purchase the valves. These specifications typically include service temperature, flow, type of effluent (water, steam, etc.), pressure, relative humidity and expected radiological conditions.

   Efforts have been made to determine the service lives of seals using similar materials. In March of 1990, the Electric Power Research Institute (EPRI) published a "Guide to Optimized Replacement of Equipment Seals". This study provided new information on replacement intervals for seals based on testing and industry experience. The guide considered the aging of seals used in nuclear plants and the effects of environmental factors such as temperature, radiation and simulated accident conditions. Ethylene propylene (EP)[1] O-ring type seals were included in the study. These seals were calculated to have a service life of >40 years given a radiation level of 2E8 rads and a temperature of 100 degrees Fahrenheit. The original specifications for these valves stipulated temperature conditions of 80 degrees Fahrenheit and radiation dosage of 3.5E2 rads. The specified conditions for these valves are clearly bounded by the conditions of the study.

   Certain components of these valves are qualified as required by 10 CFR 50.49, Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants. The solenoid valves associated with the containment isolation valves included in our submittal, utilize ethylene propylene diene modified (EPDM)[2] elastomers which do have a calculated service life. Since these solenoid valves are normally energized, the valve body is subject to higher temperatures than the ambient temperature. This is the result of heat convection across the solenoid core air gap and conduction down the core assembly of the solenoid. Even considering the elevated temperature conditions inside the valve bodies, all of the EPDM components have a calculated service life of 40 years. These conditions are also bounding for the conditions expected for the resilient seals used in the containment isolation valves.

   Some of our other valves that use resilient seat do have limited service lives. These limitations are typically recommended by the vendor, or are based on operational or environmental considerations. In this particular case, neither the vendor, nor our materials engineers, anticipate any early failures and therefore, the service life is considered to be indefinite.

3. How often is each pair of valves operated (broken down by line)?

   Each of these valves is operated (stroke time tested) quarterly. In addition, the E61F009 & F010 and the E61F056 & F057 are normally operated monthly for a required chemistry isotopic sample (occasionally the samples are taken while operating in the high volume purge

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[1] EP is a type of synthetic rubber compound. EPT is a term that is indicative of the more complex and thermally stable terpolymers.
[2] EPDM is a terpolymer of Ethylene Propylene.

mode that does not require these valves to be opened). The M41F011 and F012 and the M41F034 and F035 are operated occasionally in the high volume purge mode. The F034 and F035 are operated during outages (extended outage vent) and along with the F011 & F012 for drywell purge and for high volume containment purge (these two modes are operated infrequently for various reasons, e.g., chemistry samples, atmospheric control, etc.)

4. Could there be a failure of leak rate test other than the seal and if so would they be reported?

   Any failure of an LLRT would have been included in our submittal. The failure mode would be considered in the assignment of the test frequency in accordance with our Appendix J testing program. The effect on leakage would be considered for any type of valve failure and an LLRT would be performed if appropriate.

5. What type of valves are these?

   All of these valves are butterfly valves.

6. Who is the manufacturer of these valves?

   The valves were manufactured by Henry Pratt.

7. Are the quarterly leakage tests the same as LLRTs?

   Yes

8. Are the quarterly tests done differently?

   No.

9. What maintenance is done and what would be done differently as a result of the change to performance based testing?

   There is no maintenance done to preclude seat leakage and there are no changes anticipated as a result of this change. Maintenance would, of course, be done in response to any performance problems (e.g., problems found during stroke testing).

10. What is the error in the measurement technique?

   The Local Leak Rate Test (LLRT) is performed using rotameter flow gauges. The rotameter ranges, accuracy and tolerances are listed below:

ROTAMETER RANGE	ROTAMETER ACCURACY	ROTAMETER TOLERANCE
0 To 1,100 sccm	1%	11 sccm
0 To 1,100 sccm	2%	22 sccm
0 To 1,200 sccm	1%	12 sccm
0 To 1,200 sccm	2%	24 sccm
0 To 10,000 sccm	1%	100 sccm
0 To 10,000 sccm	2%	200 sccm
0 To 15,000 sccm	1%	150 sccm
0 To 15,000 sccm	2%	300 sccm

In our earlier submittal, some of the early tests indicated recorded leakage rates greater than "0". We believe that these readings may be the result of pressure spikes in the building (caused by the opening of building doors, etc.) and may not be indicative of actual valve leakage. As our experience increased, the LLRT procedure was revised to provide direction for reading rotameters during pressure spikes as follows: "If rotameter is indicating brief (30 seconds or less) flow rate spikes, cause is normally due to infrequently opening doors, or other transient activities that do not affect actual component leakage. In this case, disregard spikes if flow rates return to average stable readings before spikes. If reading comes due during spike, it should be recorded after spike".

The Local Leak Rate Test (LLRT) pressurizes the test volume to P_a (11.5 psig). The test pressure, temperature and flow readings are taken at the start of each test and at 5 minute intervals for the next 15 minutes, to verify that the conditions have stabilized. This additional precaution helps to ensure accurate leakage readings.

These valves are tested by pressurizing between the valves. This results in testing one valve in the accident direction and the other in the opposite direction. As stated in our UFSAR, testing the valve in the opposite direction "is conservative based on tests performed on a specimen valve." This is consistent with ANSI/ANS-56.8-1994, which is relied on by NEI industry guidance on leak rate testing (NEI 94-01) for specific testing requirements. This guidance is in turn endorsed by Regulatory Guide 1.163). It is also consistent with the NRC inspection manual (part 9900: 10 CFR guidance).