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Docket Nos. 50-443/444

JUL 13 1983

MEMORANDUM FOR Thomas M. Novak Assistant Director
for Licensing DL

FROM Daniel R. Muller Assistant Director
for Radiation Protection DSI

SUBJECT METR INPUT FOR SUPPLEMENT TO SEABROOK SER

Attached is input from the Effluent Treatment Systems Section METB which covers the monitoring requirements for the service water and RCNS for Seabrook. This input should be included in Sections 11.5 and 11.3 of the next supplement to the Seabrook SER. If there are any questions contact J. Hayes (x27649) who is the cognizant reviewer for Seabrook.

Original signed by
Daniel R. Muller

Daniel R. Muller Assistant Director
for Radiation Protection
Division of Systems Integration

Attachment
As stated

cc R. Mattson
W. Gammill
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DATE	07/08/83	07/11/83	07/12/83	07/13/83			

SUPPLEMENT TO SEABROOK SER

11.3 Gaseous Waste Management System

The staff expressed concern in the SER as to the manner in which the applicant would handle concentrations greater than 4% H_2 in cubicles containing components of the radioactive gaseous waste system (RGWS). The applicant in response to a staff question, stated that some cubicles of the RGWS would be monitored for H_2 and if concentrations approached 4%,

(a) the affected components of the process stream will be isolated and/or the affected component purged with N_2;

(b) the affected cubicle will be ventilated to reduce the H_2 concentration; and

(c) unnecessary personnel will be evacuated from the area.

The staff's concern was that the affected cubicle was not ventilated on a routine basis and that, with a H_2 concentration greater than 4%, to begin ventilation would present an O_2 source and potentially an explosive mixture. The staff's position was that the cubicle should not be ventilated unless the cubicle's concentration of H_2 is reduced. This could be done by purging the affected component with N_2.

The applicant has revised it's response to the staff's original question on the H_2 concentrations in cubicles of the RGWS components. This revised response stated that potential leakage from the RGWS components is vented along with normal building exhaust air to Unit 1 plant vent and that this ventilation flow is maintained in the event of abnormal levels of H_2

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within the cubicles of the RGWS. For abnormal levels of H_2 within the H_2 surge tank cubicle, an additional 20,000 scfm purge system will automatically activate on high H_2 concentrations. The normal and supplemental ventilation flows will dilute and reduce the H_2 concentration in the affected compartments.

The staff considers this revised response to have satisfied its concerns on the adequacy of diluting H_2 concentrations in various cubicles housing RGWS components. With the resolution of this item, the staff concludes that the design of the gaseous waste management systems is acceptable and meets the requirements of 10 CFR Part 20 and 20.106, 10 CFR Part 50 and 50.34a, General Design Criteria 3, 60 and 61, and 10 CFR Part 50 Appendix I. This conclusion is based on the following:

1. The applicant has met the requirements of GDC 60 and 61 with respect to controlling releases of radioactive material to the environment by assuring that the design of the gaseous waste management systems include the equipment and instruments necessary to detect and to control the release of radioactive materials in gaseous effluents.
2. The applicant has met the requirements of Appendix I of 10 CFR Part 50 by meeting "as low as is reasonably achievable" criterion as follows:
   (a) Regarding Sections II.B and II.C of Appendix I, the staff has considered releases of radioactive material (noble gases, radioiodine and particulates) in gaseous effluents for normal

operation including anticipated operational occurrences based on expected radwaste inputs over the life of the plant for each reactor on the Seabrook site. The staff has determined that the proposed gaseous waste management systems are capable of maintaining releases of radioactive materials in gaseous effluents such that the calculated individual doses in an unrestricted area from all pathways of exposure are less than 5 mrem to the total body or 15 mrem to the skin and less than 15 mrem to any organ from releases of radioiodine and radioactive material in particulate form.

(b) Regarding Section II.D of Appendix I, the staff has considered the potential effectiveness of augmenting the proposed gaseous waste management systems using items of reasonably demonstrated technology and has determined that further effluent treatment will not effect reductions in the cumulative population dose within a 50-mile radius of the reactor at a cost of less than $1,000 per man-rem or $1,000 per man-thyroid-rem.

3. The applicant has met the requirements of 10 CFR Part 20 since the staff considered the potential consequences resulting from reactor operation with "1% of the operating fission product inventory in the core being released to the primary coolant" for a PWR, and determined that under these conditions the concentrations of radioactive

materials in gaseous effluents in unrestricted areas will be a small fraction of the limits specified in 10 CFR Part 20, Appendix B, Table II, Column 1.

4. The staff has considered the capability of the proposed gaseous waste management systems to meet the anticipated demands of the plant due to anticipated operational occurrences and has concluded that the system capacity and design flexibility are adequate to meet the anticipated needs of the plant.

5. The staff has reviewed the applicant's quality assurance provisions for the gaseous waste management systems, the quality group classifications used for systems components, the seismic design applied to the design of the systems, and of structures housing the radwaste systems. The design of the system and structures housing these systems meet the criteria as set forth in Regulatory Guide 1.143.

6. The staff has reviewed the provisions incorporated in the applicant's design to control releases due to hydrogen explosions in the gaseous waste management systems and concluded that the measures proposed by the applicant are adequate to prevent the occurrence of an explosion or to withstand the effects of an explosion in accordance with General Design Criterion 3 of Appendix A to 10 CFR Part 50.

11.5 Process and Effluent Monitoring

In the Seabrook SER (NUREG-0896) the staff indicated that the applicant had committed to incorporating into plant procedures a requirement to obtain periodic grab samples of the service water whenever a leak between the primary component cooling water (PCCW) system and the service water system is confirmed and the PCCW is radioactively contaminated. In the SER the staff stated that such a proposal did not satisfy the intent of Table 2 of SRP 11.5 and that the staff will require either a radiation monitor or a continuous sampler of the service water.

After a series of meetings and telephone conversations, the applicant and the staff have agreed to an approach which will satisfy the intent of Table 2 of SRP 11.5. The applicant has made commitments which will ensure that the potential releases from the service water system are known. These commitments are summarized below:

1. Weekly sample and analysis of the PCCW and the service water system. Daily sampling and analysis of the PCCW and service water system if the PCCW radiation monitor is inoperable.
2. Daily sample and analysis of the service water discharge when the PCCW concentration is $\geq 10^{-3}$ uCi/cc.
3. Sampling and analysis of the service water once per 12 hours when the activity level in the PCCW is $\geq 10^{-4}$ uCi/cc and leakage is confirmed from the PCCW system to the service water system.

4. Installation of a rate-of-change alarm which will indicate a decreasing liquid level in the PCCW head tank based upon detecting an LLD of 10^{-8} uCi/cc.

The above commitments, which will be incorporated into the technical specifications' sampling analysis requirements for the service water system, extend over various operating ranges with the increased sampling and analysis at times when leakage from the PCCW to the service water is occurring and/or the activity level in the PCCW is high.

The rate-of-change alarm would work in conjunction with the PCCW radiation monitor to alert the operator in the main control room of a leak to the service water system from the PCCW. For the rate-of-change alarm, the applicant will select a set point based upon detecting an activity level of 10^{-8} uCi/cc in the combined discharge of the service water system. This activity level was selected because it is the minimum detectable level of a service water monitor if such a monitor were installed.

Weekly sampling and analysis of the service water system will provide effluent data when confirmed leakage from the PCCW system exists and the PCCW activity level is less than 10^{-4} uCi/cc. It will also provide a check of the operability of rate-of-change monitors function. Weekly sampling and analysis of the PCCW will confirm the operability of the PCCW radiation monitor.

Should the PCCW radiation monitor be inoperable, daily sampling and analysis of the service water and the PCCW will ensure that any release will be determined within 24 hours and that a record of effluents from the service water may be maintained if a leak exists from the PCCW to the service water.

The intent of daily sampling and analysis of the service water when the PCCW activity level is $\geq 10^{-3}$ uCi/cc is to cover those situations where the responsiveness of the rate-of-change alarm may be slow indicating a leak due to equal inleakage and outleakage from the PCCW. With this sampling and analysis requirement, the time period before a leak is determined is minimized (24 hours versus 168 hours) and the potential consequences of such a leak are reduced. The PCCW activity level of 10^{-3} uCi/cc was chosen because release of activity above this level would be unacceptable if allowed to continue for 7 days. The rate-of-change alarm would provide the operator with an alert should a leak develop during this period of time.

For those occasions where confirmed leakage from the PCCW system exists and the radioactivity level in the PCCW is $\geq 10^{-4}$ uCi/cc, samples will be taken and analyzed of the service water once per 12 hours. The requirement to sample and analyze once per 12 hours is the standard action statement for the service water system if its radiation monitor is inoperable. The staff finds the concentration level of 10^{-4} uCi/cc

acceptable for initiating this twice daily sampling because at this concentration the leak rate from the PCCW would have to be at least 1.1 gpm in order for a service water monitor to detect. At concentrations below 10^{-4}, the weekly sample and analysis is sufficient.

The rate-of-change alarm provides a reasonable approach to determine leakage from the PCCW system. It's alarm set point will be established at a concentration of 10^{-8} uCi/cc. This translates to leak rate of approximately 1.1 gpm at a concentration of 10^{-4} uCi/cc. With the incorporation of the PCCW radiation monitor and the rate-of-change in PCCW head level, the fluctuation in the PCCW can be seen in a short period of time. The methodology establishing the set point for this alarm will be included in the applicant's ODCM.

Based upon the staff's review of the proposed technical specifications for the sampling and analysis of the service water system, PCCW, and utilization of the rate-of-change alarm, the applicant's proposed approach for determining effluents from the service water system, in lieu of a service water monitor, is acceptable and meets the intent of Table 2 of SRP 11.5.