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MFN 070-83
JNF 025-83

April 15, 1983

U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555

Attention: Mr. D.G. Eisenhut
Division of Licensing

Gentlemen:

SUBJECT: IN THE MATTER OF 238 NUCLEAR ISLAND
GENERAL ELECTRIC STANDARD SAFETY ANALYSIS REPORT
(GESSAR II) DOCKET NO. STN 50-447

RESOLUTION OF OUTSTANDING ISSUES

Attached please find proposed resolutions to selected outstanding issues. This information is provided in the following attachments:

Attachment Number	Branch
1	Chemical Engineering
2	Containment Systems
3	Materials Engineering
4	Structural & Geotechnical Engineering

Sincerely,

Willa for

Glenn G. Sherwood, Manager
Nuclear Safety & Licensing Operation

Attachment

cc: F.J. Miraglia (w/o attachments)
D.C. Scaletti
C.O. Thomas (w/o attachments)
L.S. Gifford (w/o attachments)

E003

ATTACHMENT NO. 1

PROPOSED RESOLUTION OF
CHEMICAL ENGINEERING BRANCH
OUTSTANDING ISSUE 15

Discussion Item 9

Smoke detectors will be added to the air intakes for the control building. This will resolve discussion item 9.

Discussion Item 6

Discussion item 6 is an NRC staff action item concerning the shutdown capability. Since the GESSAR II design will have redundant remote shutdown capability, which meets the requirements for fire separation, no future concerns are expected.

Discussion Items 4 and 7

~~These two items concern~~ This outstanding issue concerns fire dampers in ventilation ducts used for smoke venting. Some of these ventilation ducts are shared systems in that they also provide normal ventilation. Other ducts are for smoke venting only. Based on the discussion below the present GESSAR II design should be adequate and should be acceptable to the NRC, so that ~~items 4 and 7~~ this issue should be resolved.

The auxiliary building smoke removal system is shown on Figure 9.4-4 and described in Section 9.4.3.2.1.11. Each set of duct work serves and traverses only fire areas of one safety division. There is a smoke vent intake in each fire area with a remote manually operated fire damper which is normally closed. There is a fusible link from the air operator to the vanes so that the damper will close on high temperature. The fire rating of the dampers is 1½ hours. The duct is heavy gage, welded construction which exceeds the requirements for 3 hour fire rated construction. Hence, the design is considered completely adequate for the service.

One of the design objectives of GESSAR II is to avoid fire dampers in smoke vents, as their automatic closure would render the smoke vent inoperative at the very time it was needed. With two exceptions, smoke vents pass through safety areas only of the same division as the vented area. The two exceptions are the Division 2 cable tunnel vent and the primary containment vent.

Duct will be designed to withstand a 3 hour fire. Sprinkler head will be deleted

The Division 2 cable tunnel located in the corridor of (-)6'-~~3~~ 10 elevation of the auxiliary building has a dedicated smoke removal system, which passes through the division 1 area. The inlet to the duct is fitted with a standard sprinkler head. Any heat or smoke that exceeds 165° F will fuse the link allowing fire water to flow through the head. The duct opening is 2.5 sq ft. This deluge spray will be sufficient to cool inlet gases from either direction below a temperature that could cause duct failure which could allow migration of heat to other fire resistence areas. This is consistent with NFPA 13 using sprinklers to protect openings in fire resistence walls where dampers cannot be fitted for other overriding criteria. The calculated flow rate from the cable tunnel during smoke venting is 3000 cfm, a relatively low flow rate. The sprinkler is designed to flow .15 gpm per 100 square foot of floor area or a minimum of 15 gpm, therefore, 3000 cfm will be cooled by a minimum of 15 gpm water. This is sufficient flow to cool gases or smoke below the temperature that would weaken or collapse even a duct of standard gage construction. The duct has a thick wall and is all welded construction, which adds a redundant degree of protection.

The containment exhaust

~~The other exception is the vent for primary containment~~. ~~It~~ has two inboard (1 manual) isolation valves and one outboard isolation valve. If a fire occurs, either the inboard valves or the outboard valve would be located out of the fire area and could be closed. The valve within the fuel building is located in a room with 2 hour rated walls. The room is directly accessible from the fuel building or the stair tower between the fuel and auxiliary building. All return registers except for the pool sweep are located high in the containment so that bulk mixing, aided by the dome mixing system, would occur before any combustion gases enter the ventilation duct. The containment is more sensitive to bulk air temperature than the ventilation duct. If a fire raised the bulk temperature excessively, containment spray would be initiated to protect the containment at a temperature well below the threshold of damage to the ventilation duct. For these reasons, the current GESSAR II design for the containment ventilation is considered proper and adequate. The exhaust ducting which is Schedule 80 welded pipe will be designed with a 3 hour fire rating.

The remaining smoke vents which do not have fire dampers are the two in the control building. Each one of these smoke vents serves and traverses one division. Since it is impossible for these smoke vents to allow the fire in the area of one division to spread to another division, the current GESSAR II design is considered to be adequate and proper.

There is a containment vent and a containment supply. The supply takes air from the auxiliary building roof top intake. The fans ~~which~~ are located in a room on the top floor of the auxilary building. The boundaries of the room have a ~~thre~~ 3 hour fire rating. The supply duct goes directly into the reactor building from the room. A fire in the room cannot prevent safe or alternate shutdown. There is an inboard and a outboard isolation valve for the duct.

ATTACHMENT NO. 2

PROPOSED RESOLUTION TO
CONTAINMENT SYSTEMS BRANCH
OUTSTANDING ISSUES 7,8 AND 9

(7) Secondary Containment Bypass Leakage

<u>NRC concern</u> Bypass leakage may occur prior to PLCS actuation and should be accounted for in the dose calculation.

<u>GE response</u> GE will calculate the transport delay time to the environment on each containment penetration line with the PLCS installed. If the transport delay time from any line is less than the PLCS actuation time, GE will re-do the dose calculation to account that particular bypass leakage.

(8) Containment Repressurization

<u>NRC concern</u> Post-LOCA containment repressurization by the PLCS should be limited to 50% design containment pressure at 30 days.

<u>GE response</u> GE will comply. GE will re-do the containment repressurization calculation to a less conservative method and will consider reducing the allocated leakages of the isolation valves.

(9) Type C tests (gang vs. individual valve test)

<u>NRC concern</u> Gang testing of valves may not able to detect for potential single valve failure.

<u>GE response</u> GE will first gang test the valves with the PLCS. The acceptance criteria for this test will be the threshold leakage of a single valve (allocated leakage of the smallest single valve of the group). If this gang test exceeds the test criteria, a partial gang test will be performed with the same acceptance criteria as the first gang test. Individual valve test will be performed until the valve with excess leakage is located and corrected.

The responses to the corresponding NRC questions will be revised accordingly. GESSAR II will be revised via amendment upon completion of the effort described above.

ATTACHMENT NO. 3

SUPPLEMENT TO PROPOSED RESOLUTION OF MATERIALS ENGINEERING BRANCH OUTSTANDING ISSUE 5

5.2.3.3.4 Moisture Control for Low Hydrogen, Covered Arc Welding Electrodes (Continued)

Electrodes are distributed from sealed containers or ovens as required. At the end of each work shift, unused electrodes are returned to the storage ovens. Electrodes which are damaged, wet, or contaminated are discarded. If any electrodes are inadvertently left out of the ovens for more than one shift, they are discarded or reconditioned in accordance with manufacturer instructions.

5.2.3.4 Fabrication and Processing of Austenitic Stainless Steels

5.2.3.4.1 Avoidance of Stress/Corrosion Cracking

5.2.3.4.1.1 Avoidance of Significant Sensitization

¶ The GESSAR II design complies with Regulatory Guide 1.44 Rev. 0 and with the guidelines of NUREG-0313 Rev. 1.

Regulatory Guide 1.44 addresses 10CFR50, Appendix A, GDCs 1 and 4, and Appendix B, requirements to control the application and processing of stainless steel to avoid severe sensitization that could lead to stress/corrosion cracking.

All austenitic stainless steel is purchased in the solution-heat-treated condition in accordance with applicable ASME and ASTM specifications.

Cooling rates from solution heat treating temperatures are required to be rapid enough to prevent sensitization. Non-sensitization is verified using ASTM A262, Practice A methods.

Material changes have been made to minimize the possibility of intergranular stress/corrosion cracking (IGSCC). All welded wrought austenitic stainless steel in the reactor coolant pressure boundary which could be susceptible to stress/corrosion cracking is low carbon nuclear grade Type 304 or Type 316 L or LN with

5.2.3.4.1.1 Avoidance of Significant Sensitization (Continued)

0.02% maximum carbon content and nitrogen control. There is no piping which is service sensitive or nonconforming as defined in NUREG-0313, Revision 1.

For machine, automatic, and manual welding interpass temperature is restricted to 350°F for all stainless steel welds. High heat welding processes such as block welding and electroslag welding were not permitted. All weld filler metal and castings are required by specification to have a minimum of 5% ferrite.

These controls were used to avoid severe sensitization and to comply with Regulatory Guide 1.44, Control of the Use of Sensitized Stainless Steel.

For commitment and revision, see Section 1.8.

5.2.3.4.1.2 Process Controls to Minimize Exposure to Contaminants

Exposure to contaminants capable of causing stress/corrosion cracking of austenitic stainless steel components was avoided by

ATTACHMENT NO. 4

SUPPLEMENT TO PROPOSED RESOLUTION OF
OUTSTANDING ISSUE 1
(QUESTION 220.11)

Question 220.11

220.11 (3.7.2) At the time of this review, Appendix 3H which decribes the effect of the concrete between the containment and the shield building on the seismic analysis, is not available. Indicate when this appendix will be provided. This information should be made available prior to the forthcoming structural audit in December 1982.

Response

In the Suppression Pool region of the containment vessel the shell has been stiffened by filling the annulus between the Containment and the Shield Building with reinforced concrete. A seismic dynamic analysis was performed to determine the effects of this added concrete on the seismic responses of various structures in the Reactor Building. These structures include the Shield Building, Containment vessel, Drywell, Shield wall and the RPV pedestal.

Specifically, the objective of this analysis was to ~~establish~~ verify that the original seismic envelope curves used in the plant design . envelope the seismic response of the Reactor Building structures with the added concrete. If this is not the case new envelope curves as required will be provided. (delete)

Soil Cases

Four soil cases were used in the seismic dynamic analysis for the horizontal ground motion. They are the following:

CASE NUMBER	DESIGNATION
2	GE-75-A-H2
4	GE-75-VP3
6	GE-75-HR-H2
7	GE-FB-H2 (Fixed Base)

Two soil cases were used in the analysis for the vertical motion. They are the following:

CASE NUMBER	DESIGNATION
11	GE-75-A-V
12	GE-FB-V (Fixed Base)

The case numbers above refer to those listed in GESSAR Table 3A-1.

Mathematical Model

The mathematical model originally used for the analysis to develop the design loads and building responses did not include the concrete added to the region between the containment and the Shield Building below elevation (-) 5 ft 3 in.

For this analysis, solid elements were added to represent the annular concrete. (See figure attached) The rest of the model is similar to that used previously, (See Figure -1). The computer program for axisymmetric structures (AXIS) was used in the analysis.

Dynamic Analysis

The horizontal and vertical analyses were performed separately. Shell forces, shell moments and element stresses were obtained for individual soil cases. These results were then enveloped to arrive at a set of final responses for horizontal and vertical motions respectively. Tables 1 through 18 depict the final results. These tabulated values were then compared with those in Section 3.7.

Response spectra were generated for the soil cases studied. They were enveloped to arrive at a final set of curves.

Conclusions

A review of the seismic forces indicated that in a few locations they are slightly higher than the envelope (in the range of 3%) However the resulting stresses are within the allowables.

Add: — The seismic response spectra for the various structures resulting from this analysis were generally within the envelopes previously generated.

Since the containment structure was stiffened by the additional concrete and the shield building participation increases in the load distribution. Some minor shifting in frequency was observed