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CRUTCHFIELD,D. Operating Reactors Branch 5

SUBJECT: Forwards info & rept re SEP Topic III-7.B, "Design Codes, Design Criteria & Load Combinations." As result of review, util has identified two commitments re scupper installation & diesel generator bldg concrete walls.

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May 27, 1983

Director of Nuclear Reactor Regulation
Attention: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: SEP Topic III-7.B, Design Codes, Design Criteria, and Load Combinations
R. E. Ginna Nuclear Power Plant
Docket No. 50-244

Dear Mr. Crutchfield:

Your letter dated January 4, 1983, transmitted the final Franklin Research Center Report TER-C5257-322, relative to the subject SEP Topic. In our April 22, 1983 submittal concerning SEP Topics II-2.A, III-2, III-4.A, and III-7.B, "Structural Reanalysis Program," we addressed all open code change items for steel structural members. The attachments to this letter address all concerns relative to the concrete structures, and the load and load combination portions of III-7.B for steel structures.

Attachment 1 to this letter addresses Design Loads as presented in Table 10.3 of the TER. Information is provided in instances where the TER indicates "No Information Found" and evaluations are provided where required by the TER (as designated by Code Impact Scale Ranking Ax). Attachment 2 to this letter addresses Load Combinations as presented in Table 10.4 of the TER. Evaluations are provided where required by the TER (as designated by Scale Ranking Ax). Attachment 3 to this letter addresses the Code Changes presented in Section 11 of the TER. Evaluations are provided when required by the TER (as designated by Scale Ranking A).

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As a result of the review of the loads, load combinations, and concrete code changes, RG&E has identified two commitments. The first is the installation of scuppers where needed. The second results from our finding that the diesel generator building concrete walls do not meet the current provisions for "in-plane shear" identified as a code change in the Franklin TER. Since RG&E has already committed to make modifications to the diesel generator building to withstand tornado and missile effects, RG&E proposes to perform additional analysis to define necessary modifications for the diesel generator walls as a result of this code change, and implement the modifications concurrently. The schedule for both modifications will be consistent with the schedule for the overall "Structural Upgrade Program," to be defined following review and acceptance by the NRC.

Very truly yours,

John E. Maier

Attachments

Attachment 1: Evaluation of Loads Denoted by "Ax" or "No Information Found" in Table 10.3 "Comparison of Design Basis Loads", Franklin TER-C5257-322

1. Containment Structure (Concrete)

E': NUREG/CR-1821, transmitted to RG&E by letter dated January 29, 1982, found the containment acceptable with respect to SSE loads.

W': The NRC Safety Evaluation Report for SEP Topic III-2, transmitted by letter dated April 12, 1982, determined that the containment was acceptable to withstand tornado loadings. The NRC's SER of April 16, 1982 for SEP Topic III-4.A found the containment acceptable to withstand tornado missiles.

2. Spent Fuel Pool (Concrete)

L: In RG&E's April 22, 1983 submittal concerning SEP Topics II-2.A, III-2, III-4.A, and III-7.B, "Structural Reanalysis Program", the Auxiliary Building was specified to be able to withstand an extreme roof snow load of 100 psf. Any modifications required will be based on this value. SEP Topic II-3.B addressed the issue of increased rain loads on parapet roofs. This applies only to the low roof section of the auxiliary building. The spent fuel pool is under the high roof section of the auxiliary building. Thus, increased rain loading is not applicable.

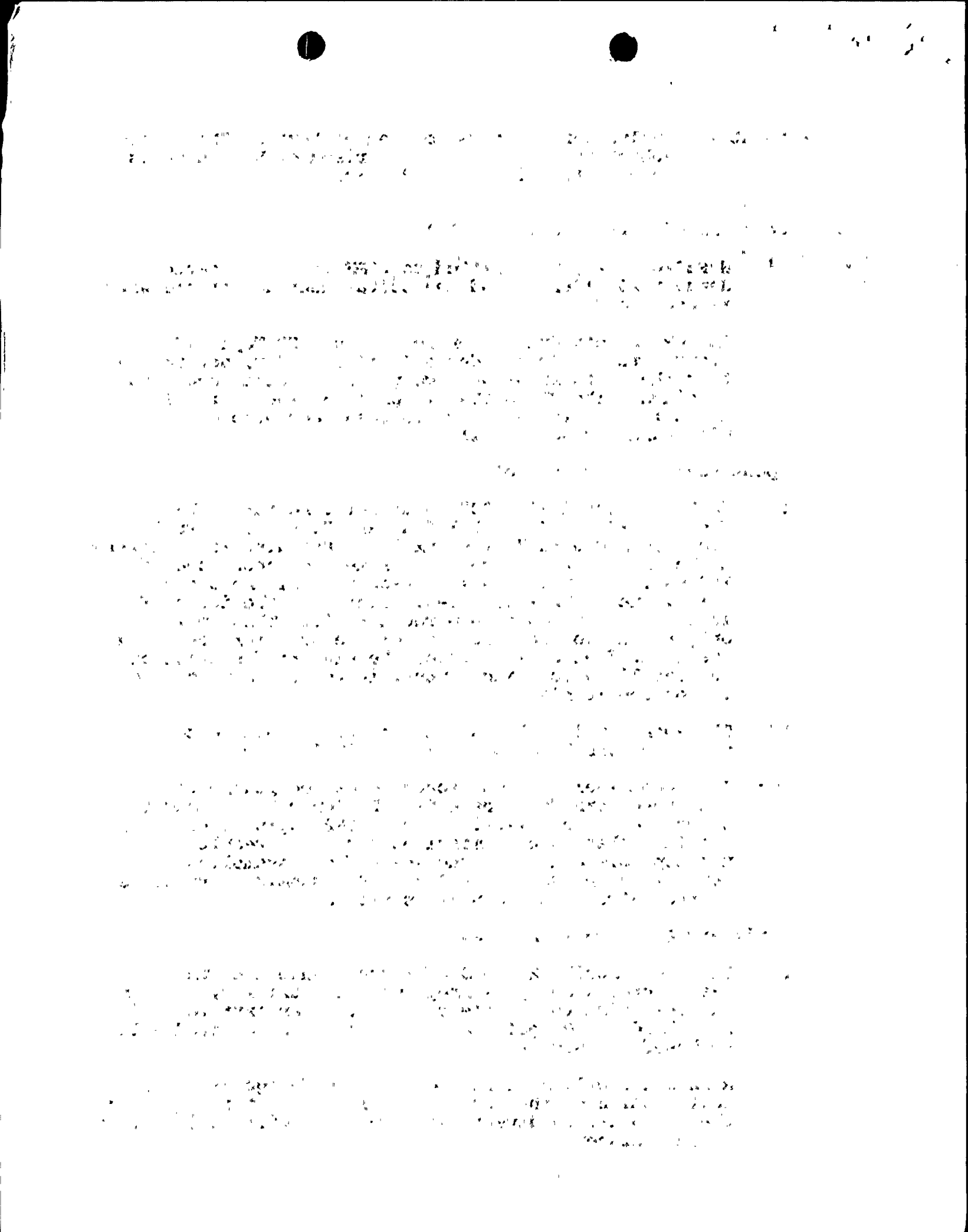
E': The spent fuel pool was found to be acceptable to withstand SSE loads per NUREG/CR-1821.

W': The spent fuel pool was found to be acceptable to withstand tornado loads under SEP Topic III-2, and to withstand tornado missiles under SEP Topic III-4.A. The fact that tornado missiles would not result in unacceptable damage to the spent fuel assemblies was determined in RG&E's April 22, 1983 submittal relative to the "Structural Reanalysis Program".

3. Auxiliary Building (Concrete)

L: In RG&E's April 22, 1983 submittal concerning the "Structural Reanalysis Program", the Auxiliary Building was specified to be able to withstand an extreme roof snow load of 100 psf. Any modifications required will be based on this value.

Rain loads will be factored into the design of the low roof section of the auxiliary building. It is expected that scuppers to divert the rain water will be installed in the parapet.



Ro: Piping loads due to normal (and accident) operation are included in the load combinations used in the seismic piping upgrade program. This program was reviewed in conjunction with SEP Topic III-6, "Seismic Design Considerations".

E': The auxiliary building was found to be able to withstand the SSE, with the exception of some steel members, in NUREG/CR-1821. RG&E has committed to upgrade these members in conjunction with the "Structural Reanalysis Program", as described in our April 22, 1983 letter on SEP Topics II-2.A, III-2, III-4.A, and III-7.B.

W': The auxiliary building will be modified to withstand tornado effects, as described in RG&E's April 22, 1983 letter on SEP Topics II-2.A, III-2, III-4.A, and III-7.B, "Structural Reanalysis Program".

Yr, Yj, Ym: As determined in the NRC Safety Evaluation for SEP Topic III-5.B, dated April 21, 1983, there are no significant pipe breaks postulated in the auxiliary building. The effects of Yr, Yj, and Ym on the structures are thus considered minimal.

4. Auxiliary Building (Steel)

Same as Auxiliary Building (Concrete)

5. Control Building (Concrete)

L: Same as Auxiliary Building (Concrete)

E': The control building was found to be able to withstand SSE loads, as noted in NUREG/CR-1821.

W': RG&E's April 22, 1983 submittal for SEP Topics II-2.A, III-2, III-4.A, and III-7.B, "Structural Reanalysis Program" provided the information which will be used to design modifications such as the relay room tornado missile shield, required for the control building to withstand tornado effects.

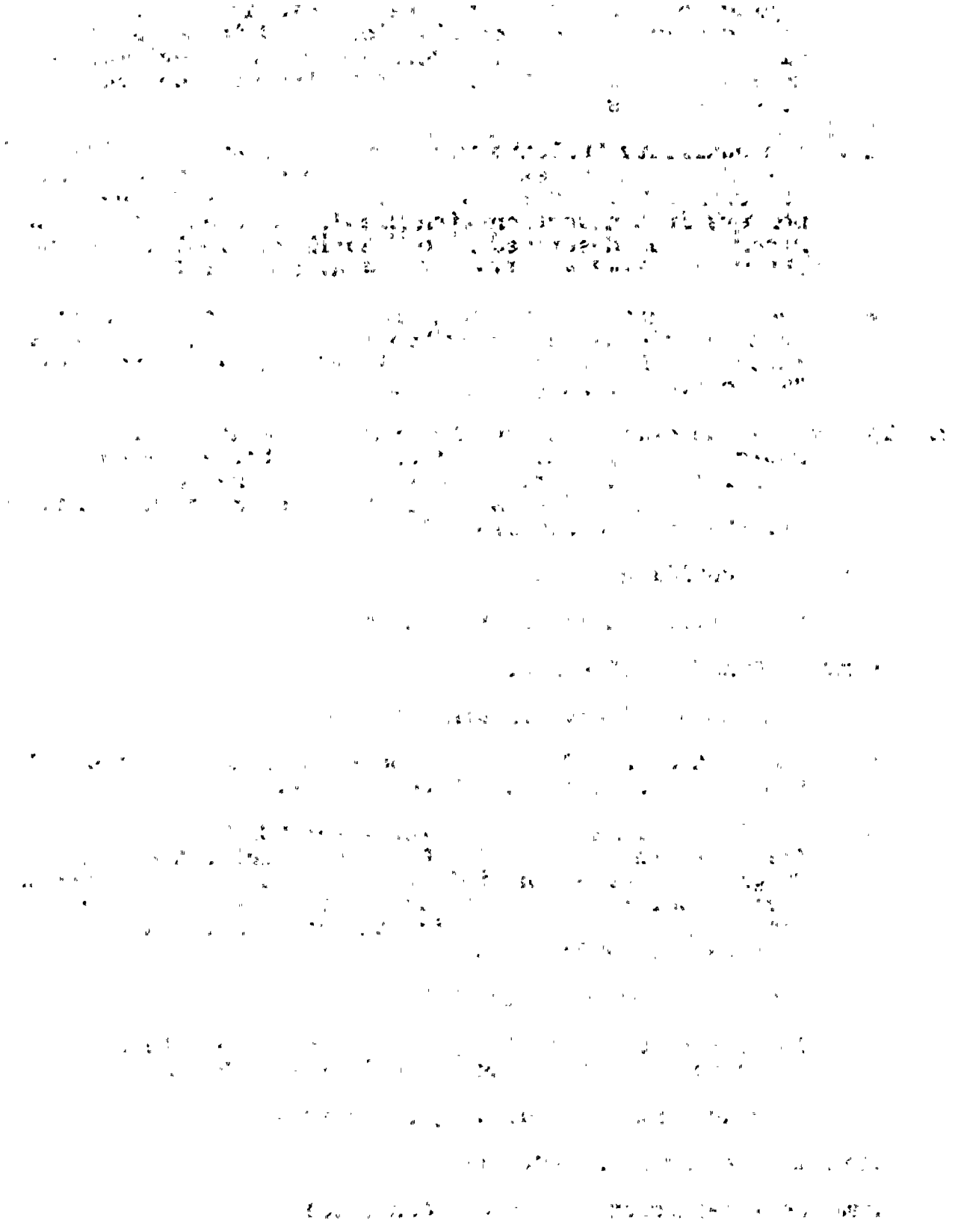
6. Intermediate Building (Concrete)

E': The intermediate building was found to be able to withstand SSE loads, as noted in NUREG/CR-1821.

W': Same as Auxiliary Building (Concrete)

7. Intermediate Building (Steel)

Same as Intermediate Building (Concrete)



8. Cable Tunnel

E': Although not specifically evaluated in NUREG/CR-1821, the cable tunnel, which is a reinforced concrete structure, below grade, has greater capacity to withstand SSE forces than other structures at Ginna, which were found to be acceptable in NUREG/CR-1821. Thus, the cable tunnel is considered acceptable.

W': Since the cable tunnel is a reinforced concrete structure, below grade, no harmful effects due to tornado winds and missiles would be expected.

9. Screenhouse

L: See Auxiliary Building (Concrete)

E': The overall seismic structural evaluation performed in NUREG/CR-1821 showed that the Ginna structures are acceptable to withstand SSE loadings, with minor changes needed in the auxiliary and turbine building steel. Although no specific analysis was performed for the screenhouse, this structure is considered to have the greatest seismic capability of any of the auxiliary structures. Thus, the judgment can be made that the screenhouse was shown during the Senior Seismic Review Team review, as documented in NUREG/CR-1821, to be adequately designed for SSE loadings.

W': The modifications required to meet tornado effects are described in RG&E's April 22, 1983 submittal concerning SEP Topics II-2.A, III-2, III-4.A, and III-7.B, "Structural Reanalysis Program". As noted in that submittal, the screenhouse will not be designed to withstand tornado missile effects. Alternative shutdown methods which do not rely on the screenhouse are described in that submittal.

Yr, Yj, Ym: As determined in the NRC Safety Evaluation for SEP Topic III-5.B, dated April 21, 1983, alternative shutdown methods are available to provide cooling water to the diesel generators and auxiliary feedwater pumps, in the event of a high or moderate energy line failure in the screenhouse. The loads are thus not required to be considered in the screenhouse design basis.

10. Diesel Generator Building (Concrete)

L: See Auxiliary Building (Concrete)

E': The diesel generator building was determined to be acceptable for SSE loadings, as shown in NUREG/CR-1821.

W': The modifications required to meet tornado effects are described in RG&E's April 22, 1983 letter concerning SEP Topics II-2.A, III-2, III-4.A, and III-7.B, "Structural Reanalysis Program".

Attachment 2: Evaluation of Load Combinations Designated as "Ax" in Table 10.4, "Comparison of Loading Combination Criteria" in TER-C5257-322

1. Concrete Containment

Loading Case

7 In the NRC's April 21, 1982 SER for SEP Topic III-2, "Wind and Tornado Loadings," the evaluation was made that the containment can acceptably withstand all tornado loads and combinations.

8 The only additional load to be added to other loads already analyzed is Ra (accident operation pipe reaction). The Ra load is specifically analyzed in RG&E's seismic piping upgrade program, previously described in SEP Topic III-6, "Seismic Considerations." In most cases, it was found that the Ra load is very small relative to other loads, such as seismic loads, and can thus be considered negligible. However, in a few cases, it was determined that Ra was an important load relative to support design. An investigation of these specific areas disclosed that the support loading (which included Ra) was not an important loading factor for the concrete elements to which the support was attached. Thus, with respect to the concrete containment structure, it has been determined that the Ra load is not significant.

11 As previously determined (see load case 7 above), wind and tornado loadings are not considered significant with respect to the concrete containment.

14 The only additional loads are Ra (accident pipe reaction) and Rr (dynamic effects associated with the pipe break). As noted in 8 above, the Ra load has been found not to be significant with respect to loading on the concrete containment structure.

The effects of Rr were evaluated under SEP Topic III-5.A, "High Energy Line Break Inside Containment." For the LOCA, all dynamic effects are retained within the compartment shield walls; the Rr loads are thus not applicable. For the steam line break, an evaluation was made of the effect of a steam line whipping into the containment wall. The analysis provided in the III-5.A Safety Evaluation Report showed that the containment structure would not be perforated by the pipe whip. It was further stated that, since no severe radiological consequences would be expected to

occur as the result of a steam line break, containment integrity was not of paramount importance (even though no loss of integrity would occur).

Thus, it can be concluded that any possible effects due to the occurrence of Ra and Rr loads have been considered, and that these loads are not significant with respect to the concrete containment structure.

2. Containment Liner

Loading Case

7 As noted in the NRC's Safety Evaluation Reports for SEP Topics III-2 and III-4.A, the load combinations including seismic loads (such as loading case 6) would be controlling relative to load combinations which include wind and tornado loads. The liner is protected from tornado missile loads by the reinforced concrete containment structure. In loading case 6, Pv is negligible (ambient) and Ro is not applicable. Thus, load combination 7 is considered acceptable by the acceptability of load combination 6.

8 The only non-encircled load is Ra (piping reaction load under accident conditions). This load is being considered in the seismic piping upgrade program, previously discussed in SEP Topic III-6 and this current criteria is met.

14 As discussed under loading case 8 above, Ra is being considered in the seismic piping upgrade program. As discussed in loading case 14 for the containment concrete, the Rr loads were discussed in SEP Topic III-5.A. No Rr loads due to LOCA will affect the containment liner, since the effects are contained within the compartment shield walls. In the event of a steam line break, the liner integrity need not be maintained, since no severe radiological source term would be expected. The concrete containment wall, however, was shown not to be perforated, and thus containment integrity will be maintained. It can therefore be concluded that the significant portions of load combination 14 are being considered in the Ginna design.

3. Spent Fuel Pool

Loading Case

10 It was shown in the SER's for SEP Topics III-2 and III-4.A, that the Spent Fuel Pool would not be affected by wind and tornado (including missile) loadings.

13 The spent fuel pool was shown to be adequate to withstand SSE loads, per NUREG/CR-1821. Temperature variations as the result of failures in the Spent Fuel Pool Cooling system were considered, and found acceptable, in the NRC's SER for SEP Topic IX-1, "Fuel Storage," dated January 27, 1982.

4. Auxiliary Building (Concrete)

Loading Case

10 The Ginna "Structural Reanalysis Program" submitted April 22, 1983 provided information concerning wind and tornado loadings, combined with dead and live loads, as well as piping loads. Since To is ambient, this load is not considered significant.

13 As noted in SEP Topic III-5.B, "Pipe Break Outside Containment," no significant pipe breaks are postulated in the auxiliary building. Therefore, Yr + Yj + Ym are considered not applicable. Loading case 13 thus reduces to Loading Case 9. The seismic piping upgrade program, discussed in SEP Topic III-6, meets the load combination denoted by loading case 9. Since To is ambient, it can be considered negligible.

5. Auxiliary Building (Steel)

Loading cases 8 and 11 are comparable to loading cases 10 and 13 under "Auxiliary Building (Concrete)," and the discussion provided there also applies to the auxiliary building steel structures.

6. Control Building

Loading Case

10 The control building was generally found to be acceptable to withstand tornado loadings, per the NRC's SER for SEP Topic III-2. RG&E has committed to provide some additional tornado and tornado missile protection for the control building, in our April 22, 1983 submittal concerning SEP Topics II-2.A, III-2, III-4.A, and III-7.B, "Structural Reanalysis Program."

13 The control building was determined acceptable to withstand SSE loads, as stated in NUREG/CR-1821.

As noted in SEP Topic III-5.B, "Pipe Break Outside Containment," a pressure diaphragm wall has been installed between the turbine building and control

building to resist pressure loadings resultant from a postulated high energy line failure in the turbine building. Further, there are no high energy lines in the vicinity of the control building which could impact the pressure diaphragm wall. Thus, no Yr + Yj + Ym loads are applicable to the control building.

7. Intermediate Building (Concrete)

Loading Case

10 The "Structural Reanalysis Program" submitted by RG&E includes the effects of wind and tornado loadings on the intermediate building. Pipe reactions loads were considered in this analysis. Since To is ambient, it can be considered negligible.

13 The seismic piping upgrade program considers portions of loading case 13 (D + L + E'). It was not assumed that a pipe break would occur simultaneously, or as a result of the event, since the piping systems which could result in significant loadings from Ta, Pa, Ra, and Yr + Yj + Ym are seismically designed and supported.

As noted in SEP Topic III-5.B, an inservice inspection program has been instituted by RG&E, and accepted by the NRC, which would prevent full diameter breaks in the steam and feedwater piping systems. Thus, only crack breaks in the main piping, or full-diameter breaks in the small branch lines, need to be postulated. The modifications implemented by RG&E as a result of the review of postulated piping failures in the intermediate building (e.g., jet shields and missile barriers) consider the effects of the resultant piping dynamic loads.

Thus, although the intermediate building does not meet loading case 13 explicitly, RG&E believes that the present design basis is acceptable.

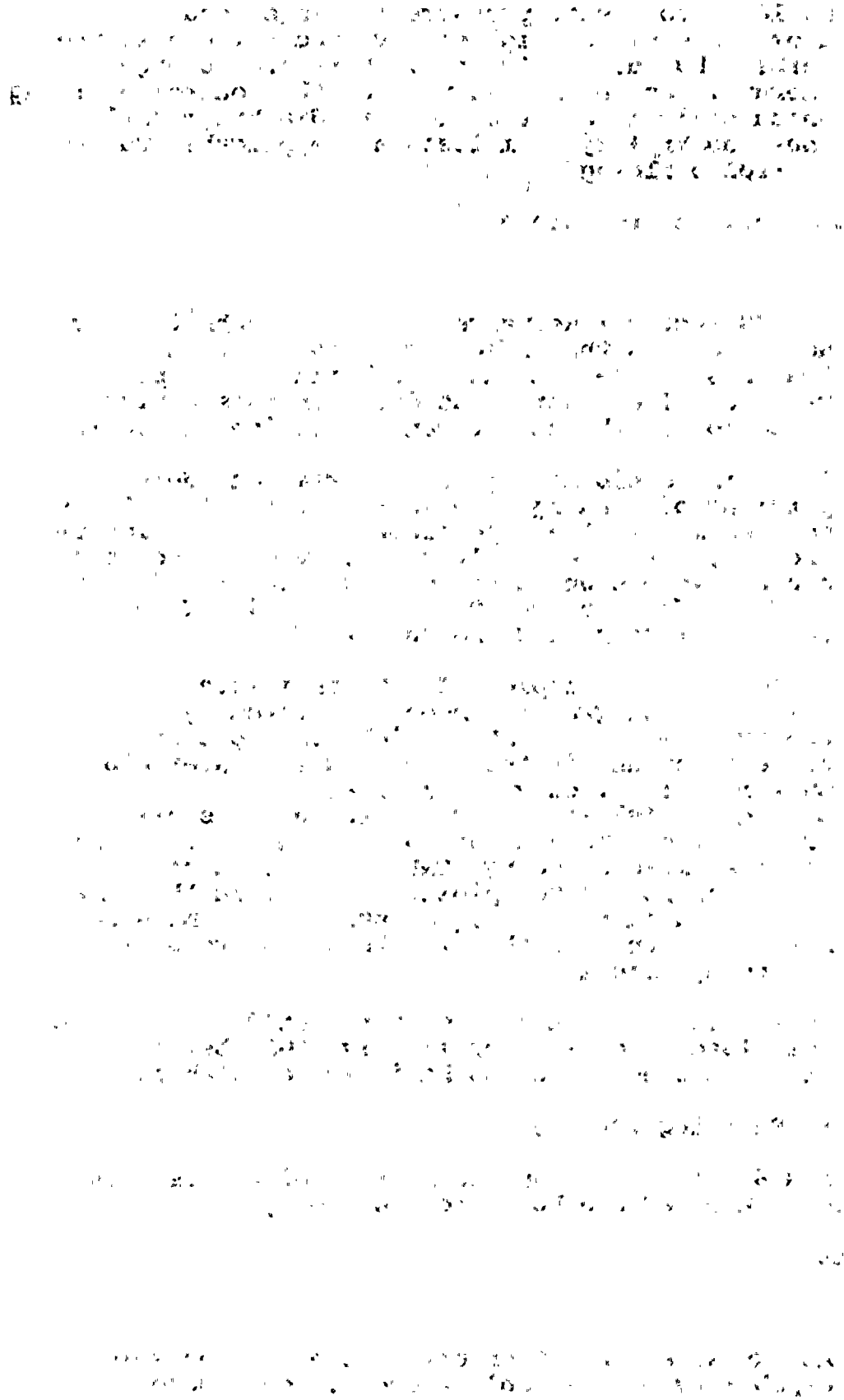
8. Intermediate Building (Steel)

Loading cases 8 and 11 are comparable to loading cases 10 and 13 under "Intermediate Building (Concrete)."

9. Cable Tunnel

Loading Case

13 As explained in Attachment 1, item 8, the seismic capability of the cable tunnel is considered



acceptable based on the analysis of Ginna structures, as denoted in NUREG/CR-1821. This evaluation did not assume the concurrent effects of a high energy line break, for the reasons provided in loading case 13 for the intermediate building (concrete). However, the effects of increased temperature on the concrete structure as the result of the design basis high energy line failure is evaluated in Attachment 3 to this report, Section 5.5 "Elements Subject to Temperature Variation."

Since there is no high energy piping in the cable tunnel, the effects of Ra, Yr, Yj, and Ym can be considered insignificant.

10. Screenhouse

Loading Case

10	The "Structural Reanalysis Program" for SEP Topics II-2.A, III-2, III-4.A, and III-7.B, submitted April 22, 1983, provided the information relative to modifications RG&E plans to implement for the screenhouse. D, L, and Ro were considered in the analysis. To is ambient, and can be considered negligible. Tornado missile protection will not be provided. Alternative shutdown methods in the event of tornado missile damage are described in that report.
13	In SEP Topic III-5.B, "Pipe Break Outside Containment," RG&E proposed alternative shutdown methods (not using the screenhouse) to be implemented in the event of postulated pipe breaks in the screenhouse. The loads Yr + Yj + Ym thus need not be considered in the screenhouse design basis. Loading case 13 thus essentially reduces to loading case 7, which was previously shown to be acceptable.

11. Diesel Generator Annex (Concrete)

Loading Case

10	The "Structural Reanalysis Program" for SEP Topics II-2.A, III-2, III-4.A, and III-7.B, submitted April 22, 1983, provided the information relative to modifications RG&E plans to implement for the diesel generator building for tornado protection. D + L were considered in the analysis. Since To is ambient, it can be considered negligible.
13	Since there are no postulated piping failures in the diesel generator annex, the terms Yr + Yj + Ym are not applicable. Loading case 13 thus reduces to loading case 9. The seismic capability of the diesel generator buildings was found acceptable in NUREG/CR-1821.