



GE Nuclear Energy

ABWR

To 10E4
BOB PALLA
NRC

Date 30 JUNE 92

Fax No. _____

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From JACK DUNCAN

Mail Code _____
175 Curtner Avenue
San Jose, CA 95125

Phone (408) 925-6947

FAX (408) 925-1193
or (408) 925-1687

Subject ABWR PRA CONSEQUENCE ANALYSIS

Message The updated analysis follows.
Section 10E.3 will be updated
to reflect these results.

c. JN Fox
KAC
PDK
COS
LEB

This analysis corresponds to
items CA-3 and CA-4 on the
last page of the PRA punch list

ABWR PRA CONSEQUENCE ANALYSIS

The ABWR PRA consequence analysis reported in subsection 19E.3 (amendment 4) has been updated. The following revised and additional calculations are discussed here.

- The new consequence analysis for the PRA.
- Additional results are also presented.

1. Consequence Analysis Results

This calculation was performed as described in Amendments 4 and 8, subsection 19E.3.1 and 19E.3.2. Updated data from the plant performance analysis was used. Thus, the following tables in amendment 4 or 8 are not changed:

- Table 19E.3-1
- Table 19E.3-2 - except for the addition of a radial interval from 30-50 miles.
- Table 19E.3-3
- Table 19E.3-4
- Table 19E.3-5

The CRAC event release parameters (Table 19E.3-6 in amendment 10) were updated to reflect the new parameters from the updated containment event trees, the added decomposition event trees, and the MAAP analysis. In addition, the relationship between the accident classes used in the MAAP analysis and the grouping used in the CRAC cases are shown in Table 1-1. For example, CRAC Case 1 represents the six indicated MAAP cases shown below Case 1. The basic inputs for CRAC were adjusted to adequately represent the several MAAP cases. Seismic results represented in amendment 10, Table 19E.3-6 are not reflected since analysis of seismic results beyond design basis are now treated by a seismic margins analysis. The new event release parameters are shown in Table 1-1.

The risk and dose results of the consequence analysis are represented in Table 1-2 (which will replace amendment 8 Table 19E.3-7) and compared to the goals established by the Licensing Review Basis. The goals are satisfied by a wide margin.

Table 19E.3-8 and Figure 19E.3-2 will not be needed for the 19E.3 update because the rupture disk is now included in the base calculations.

The probability of exceeding various dose levels as a function of dose is shown in Figure 1-1 which will replace amendment 8 Figure 19E.3-1. The goal of not exceeding 25 Rem at 10^{-6} probability is achieved.

2. Additional Results

Additional results were also obtained for NRC review so that a future applicant may use these results as part of an effort to justify simplified emergency planning. These results (Table 2-1) show key parameters for dominant accident sequences.

TABLE 1-1 Event Release Parameters

(See paragraph 19E3.2.2 for definition of parameters)

| Accident | P(i) | TL | DR | TLL | FPR | RH | Release Fractions | | |
|------------|--------------------|------|----|------|--------|----|-------------------|---------|---------|
| | | | | | | | NG | Iodine | Cesium |
| NCL | 1.34E-7 | 2.7 | 10 | 1.7 | 3.3E+5 | 37 | 0.05 | 3.8E-6 | 5.1E-5 |
| CASE1 | 2.08E-8 | 20 | 1 | 19.2 | 3.3E+5 | 37 | 1 | 1.5E-07 | 1.3E-05 |
| LCHPFSRN | | | | | | | | | |
| LCHPPSRN | | | | | | | | | |
| LB...SRN | | | | | | | | | |
| SB...SRN | | | | | | | | | |
| LCL...SRN | | | | | | | | | |
| LCLPFSRN | | | | | | | | | |
| CASE2 | <10 ⁻¹⁰ | 19 | 1 | 18.2 | 3.3E+5 | 37 | 1 | 5.0E-06 | 5.0E-06 |
| LCLPPFCR | | | | | | | | | |
| LCLPFSCR | | | | | | | | | |
| CASE3 | <10 ⁻¹⁰ | 50 | 10 | 49.2 | 3.3E+5 | 37 | 1 | 2.8E-04 | 2.2E-03 |
| LCHPFSD90 | | | | | | | | | |
| CASE4 | <10 ⁻¹⁰ | 20 | 1 | 19.2 | 3.3E+5 | 37 | 1 | 1.6E-03 | 1.6E-03 |
| DF100FSR | | | | | | | | | |
| DF100PFR | | | | | | | | | |
| CASE5 | <10 ⁻¹⁰ | 19 | 1 | 19.2 | 3.3E+5 | 37 | 1 | 6.0E-03 | 5.3E-04 |
| LBLCPFRN | | | | | | | | | |
| CASE6 | <10 ⁻¹⁰ | 19 | 10 | 18.2 | 3.3E+5 | 37 | 1 | 3.1E-02 | 7.7E-02 |
| LCHPPSD90 | | | | | | | | | |
| LBLCPFD90 | | | | | | | | | |
| LBLCFSD90 | | | | | | | | | |
| CASE7 | 4.4E-10 | 20 | 10 | 19.2 | 3.3E+5 | 37 | 1 | 8.9E-02 | 9.9E-02 |
| LCLPFSD90 | | | | | | | | | |
| LCHPPFPM | | | | | | | | | |
| LCLPPFD90 | | | | | | | | | |
| CASE8 | 2.1E-10 | 2 | 10 | 1.2 | 1.0E+6 | 37 | 1 | 1.9E-01 | 2.5E-01 |
| LCHPPFEH | | | | | | | | | |
| CASE9 | 1.7E-10 | 23.6 | 10 | 12.2 | 3.3E+5 | 37 | 1 | 3.7E-01 | 3.6E-01 |
| SBRCPPFD90 | | | | | | | | | |

Table 1-2 Consequence Goals and Results

| Goal | Numerical Goal | ABWR |
|---|---------------------------------------|-----------------------|
| Individual Risk | $<3.9 \times 10^{-7}$ ($<0.1\%$) | 1.4×10^{-13} |
| Societal Risk | $<1.7 \times 10^{-6}$ ($<0.1\%$) | 8.4×10^{-13} |
| Radiation Dose Probability at 25 Rem | $<10^{-6}$ | $<10^{-9}$ |

Figure 1-1 Whole Body Dose at 1/2 Mile
as a Probability of Exceedence

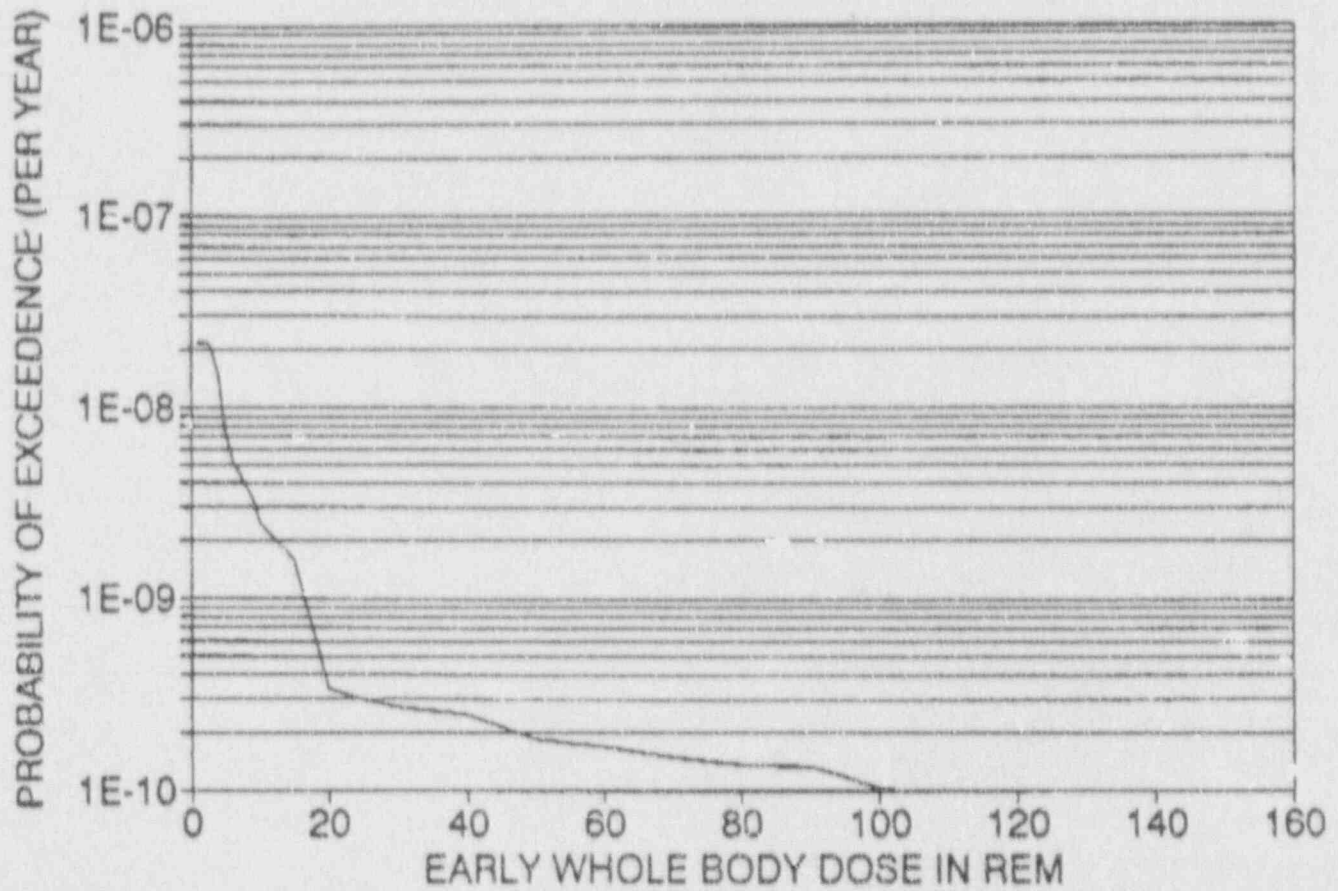


Table 2-1 Dominant Event Sequences

| | NCL | Case 1 |
|-----------------------|---------|---------|
| Release Frequency | 1.34E-7 | 2.08E-8 |
| Timing (hours) | | |
| - Vessel Breach | 0.8 | 0.8 |
| - Containment Failure | none | none |
| - Time of Release | 2.7 | 20 |
| - Duration of Release | 10 | 1 |
| Release Fractions | | |
| Xe-Kr | 0.0054 | 1.00 |
| I-Br | 3.8E-6 | 1.5E-7 |
| Cs-Rb | 5.1E-6 | 1.3E-5 |
| Te-Sb | negl | negl |
| Ba-Sr | negl | negl |
| Ru-Mo | negl | negl |
| Fatality Risk | 0 | 0 |
| Societal Risk | 6.8E-14 | 4.2E-13 |
| Person-Rem | 2,350 | 11,500 |

< TRANSACTION REPORT >

06-30-1962(TUE) 14:42

[RECEIVE]

| NO. | DATE | TIME | DESTINATION STATION | PG. | DURATION | MODE | RESULT |
|------|------|-------|---------------------|-----|------------|--------|--------|
| 3677 | 6-30 | 14:39 | 4089251193 | 7 | 0' 02' 15" | NORM.E | OK |
| | | | | 7 | 0' 02' 15" | | |