

## Supplement to WCAP-11668 - Gamma-Body Offsite Dose Calculation

### Analytical Assumptions

#### Source Term

The noble gas concentrations in the primary coolant prior to the accident are based upon 1% fuel defects. This is approximately equal to the proposed Technical Specification limit for non-iodine nuclides of 100/E  $\mu\text{Ci/gm}$ .

#### Dose Calculations

The following assumptions and parameters were used to calculate the noble gas activity released to the atmosphere and the corresponding gamma-body doses following a SGTR.

1. The mass of reactor coolant discharged into the secondary system through the rupture is presented in Tables II.5 and II.6.
2. No retention of noble gas in the secondary system is assumed. All noble gas activity transferred to the secondary system, from the primary, is released to the atmosphere.
3. No credit was taken for radioactive decay during transport to the site boundary and outer boundary of the low population zone.

#### Offsite Gamma-Body Dose Calculation Model

Offsite gamma-body doses are calculated using the equation:

$$D_{\gamma\text{-body}} = 0.25 \sum_i \left[ \bar{E}_{\gamma i} \left( \sum_j (IAR)_{ij} \left( \frac{\chi}{Q} \right)_j \right) \right]$$

Where:

|                          |   |                                                                                      |
|--------------------------|---|--------------------------------------------------------------------------------------|
| $D_{\gamma\text{-body}}$ | = | gamma-body dose due to immersion in a semi-infinite cloud of noble gas               |
| $\bar{E}_{\gamma i}$     | = | average gamma energy of noble gas nuclide i in mev/dis. (Table III.7)                |
| $IAR_{ij}$               | = | integrated activity of noble gas nuclide i released during the time interval j in Ci |
| $(\chi/Q)_j$             | = | atmospheric dispersion factor for time period j in sec/m <sup>3</sup>                |

## Results

| <u>Gamma-Body Doses</u>          | <u>Doses (Rem)</u> |               |                  |
|----------------------------------|--------------------|---------------|------------------|
|                                  | <u>Case 1</u>      | <u>Case 2</u> | <u>Guideline</u> |
| Exclusion Area Boundary (0-2 hr) | 0.08               | 0.11          | 25               |
| Low Population Zone (0-8 hr)     | 0.005              | 0.007         | 25               |



Table III.7

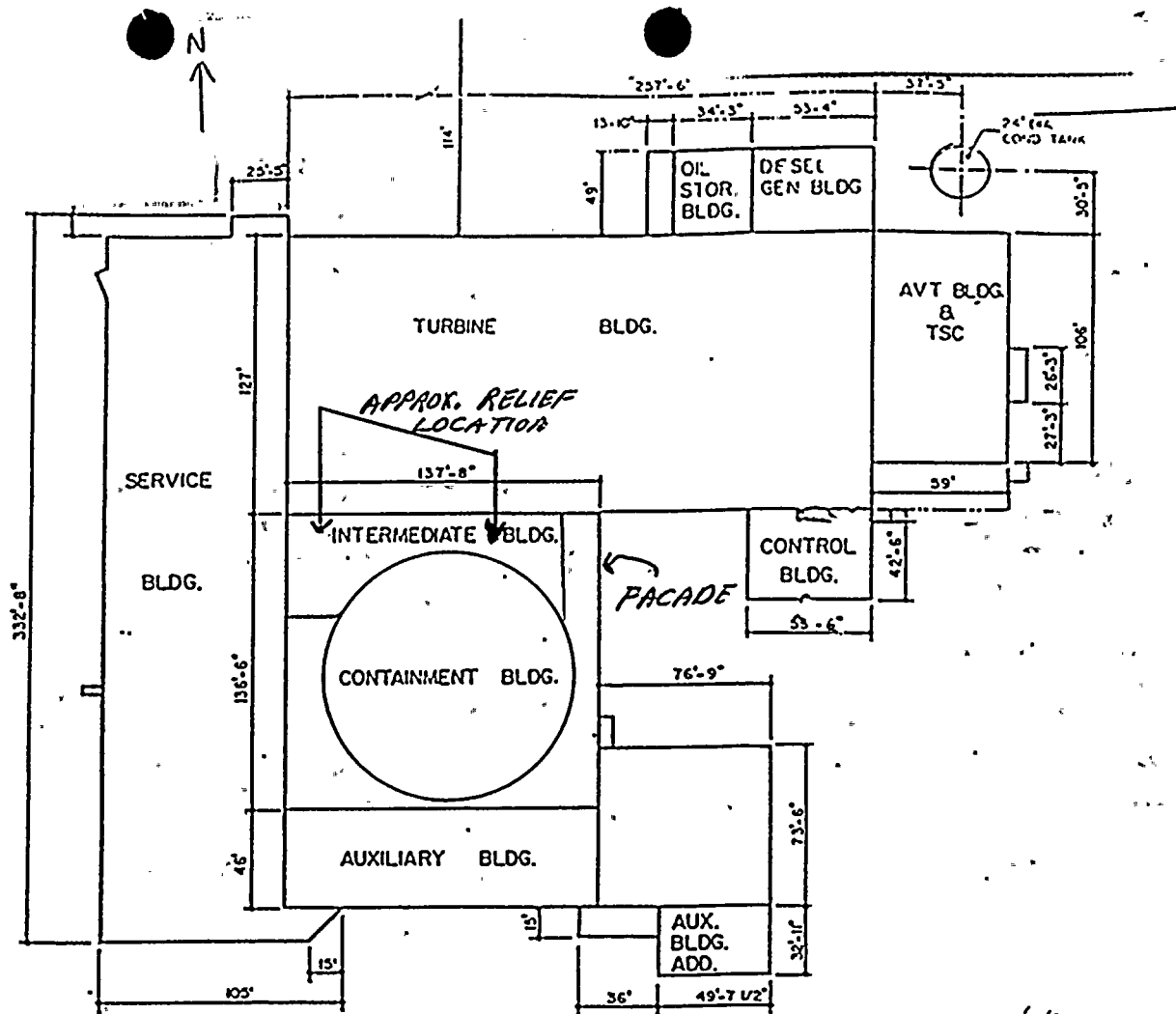
Reactor Coolant Noble Gas Activity ( $\mu\text{Ci/gm}$ ) and Average Gamma Energy (Mev./Dis)

| Nuclide | RCS Activity<br>( $\mu\text{Ci/gm}$ ) | $\bar{E}$ (Mev/Dis) |
|---------|---------------------------------------|---------------------|
| Kr-85m  | 1.28E0                                | 0.16                |
| Kr-85   | 5.36E0                                | 0.0023              |
| Kr-87   | 8.11E-1                               | 0.79                |
| Kr-88   | 2.38E0                                | 2.2                 |
| Xe-131m | 2.39E0                                | 0.0029              |
| Xe-133m | 3.5E0                                 | 0.02                |
| Xe-133  | 2.03E2                                | 0.03                |
| Xe-135m | 3.7E-1                                | 0.43                |
| Xe-135  | 6.4E0                                 | 0.25                |
| Xe-138  | 4.61E-1                               | 1.2                 |

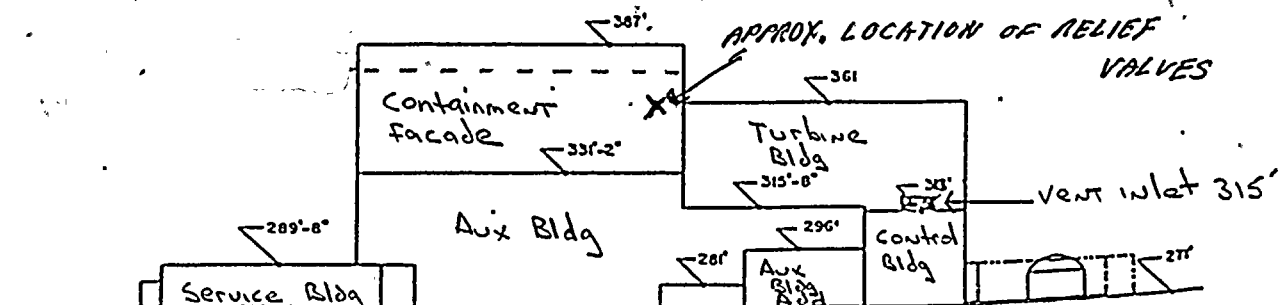
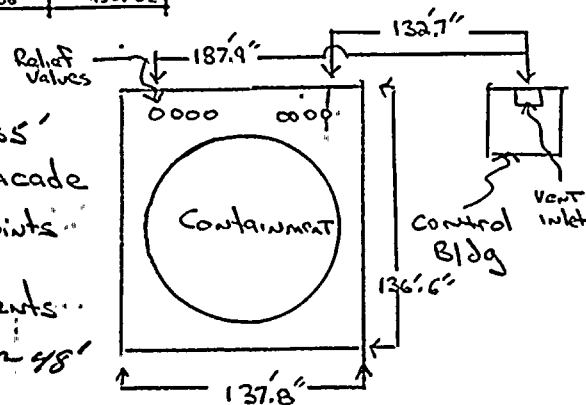
Attachment 2

RG&E to NRC Letter Dated 11/16/95

Site Plot and Photos



- 1) not to scale, dims. as marked
- 2) Inter Bldg Roof inside Containment Facade at 2335'
- 3) relief valve discharge pipe is 36' below the top of the facade
- 4) out board rust streaks on photo are S/G ARV discharge points
- 5) note roughing filler enclosure on top of control bldg
- 6) large pipes in North facade are plant & containment vents
- 7) RELIEF VALVE DISCHARGE CLOSEST TO CONTROL ROOM IS ~48' WEST OF EAST FACE OF FACADE



SOUTH ELEVATION





