NextEra Energy Seabrook, LLC
(Seabrook Station, Unit 1)
License Renewal Application

NRC Staff Answer to Motion for Summary Disposition of Contention 4B

ATTACHMENT 4B-K

NUREG-1150
Vol. 1

Reactor Risk Reference Document

Main Report

Draft for Comment

U.S. Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

10 percent to 80 percent for iodine, 5 percent to 70 percent for cesium, and 0.8 percent to 60 percent for tellurium.

Three variations of station blackout were also analyzed by IDCOR. The release fractions obtained for two of the cases with late containment failure were identical. Figure 5.5 compares the IDCOR values with the NUREG-1150 range for Bin 10, a late overpressure bin with leakage rather than rupture. Also shown in the figure are Source Term Code Package results. For each elemental group, the IDCOR results fall below or near the bottom of the NUREG-1150 uncertainty band.

A station blackout scenario was also analyzed by IDCOR in which there was assumed to be a preexisting breach in containment at the start of the accident. These results are compared with the range obtained for the corresponding Bin 1 in NUREG-1150 and with a Source Term Code Package run for a scenario within the bin. Again, the MAAP results are consistently below the NUREG-1150 range, indicative of technical disagreements in the source term models.

5.3.3 Plant-Specific Perspectives

The source term results for the Zion plant are quite similar to those obtained for the Surry plant and the plant-specific perspectives are the same. The uncertainties in the estimated source terms are quite large. The principal contributors to the uncertainties are basically the same as for the Surry plant. Comparisons made between the Source Term Code Package results and MAAP results indicated that the MAAP estimates for environmental release fractions were significantly smaller. It is very difficult to determine the precise source of the differences observed, however, without performing controlled comparisons for identical boundary conditions and input data.

5.4 Results for Sequoyah Nuclear Power Station Unit 1

5.4.1 Ranges of Source Term Results

The source term issues included in the statistical sampling analysis are very similar to those considered for the other PWR plants (Ref. 5.21). A few issues were added because of the unique aspects of the ice condenser design.

Decontamination Factor for Ice Condenser

Retention of radionuclides in the ice condenser region is a very important aspect limiting the release of radionuclides to the environment in this plant design. The effectiveness of the ice condenser is affected by the operability of the air-return fans. On the one hand, prior to containment failure the air-return fans can recycle the containment air through the ice condenser a number of times providing an opportunity for additional retention at each pass. By returning noncondensible gases to the lower compartment region, however, the air-return fans tend to reduce the effectiveness of the ice in retaining radionuclides for any single pass, since the decontamination factor is very sensitive to the fraction of steam in the flowing gas. Three boundary conditions were considered: (1) containment failure at vessel breach with the air-return fans operating, (2) containment failure prior to vessel breach with the air-return fans operating, and (3) containment failure at or before vessel breach with the air-return fans off.

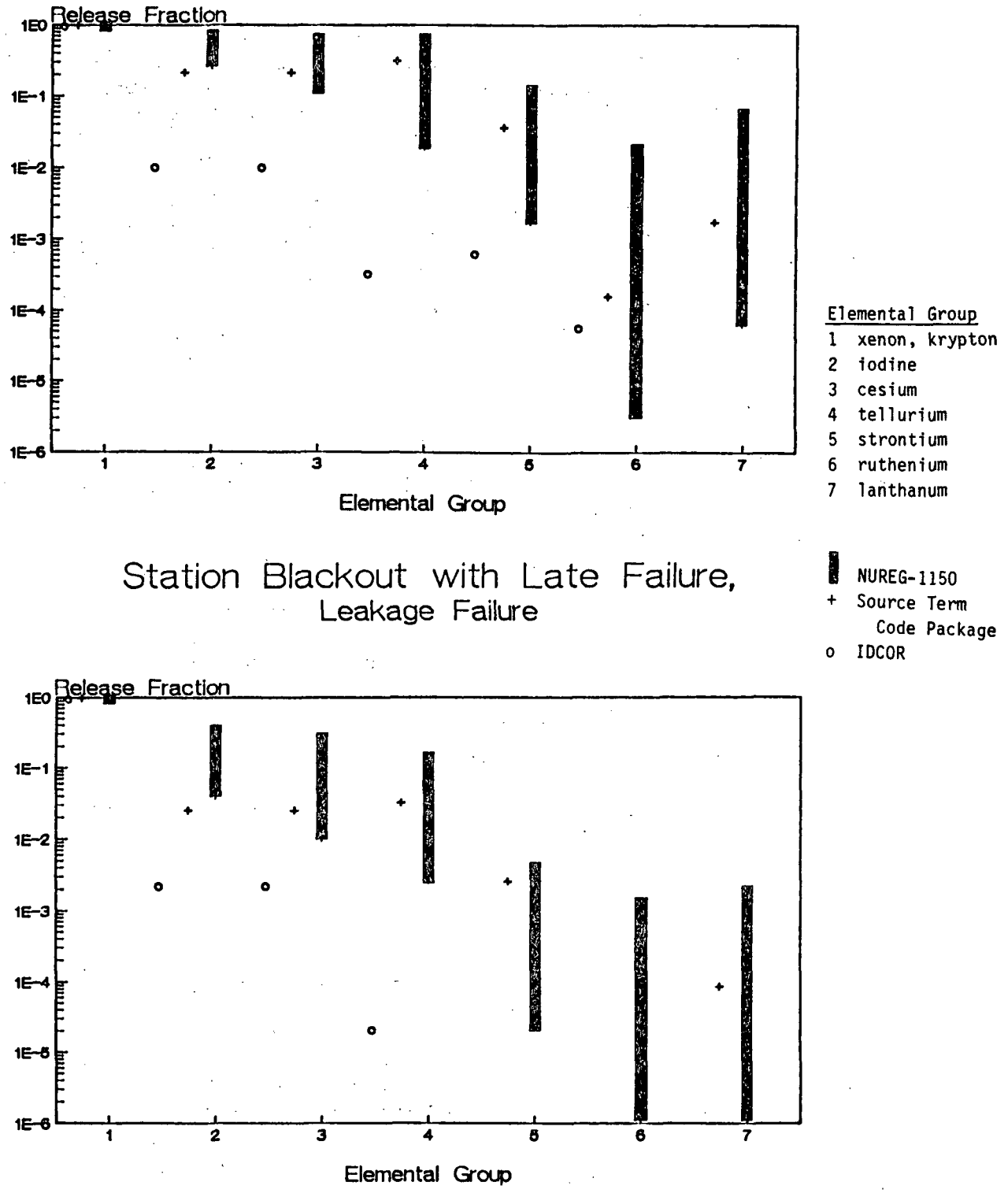

Figure 5.5 Comparison of results for station blackout scenarios at Zion

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This document discusses the risks of severe accidents in a set of commercial nuclear power plants. This risk is characterized by the types and frequencies of accidents leading to severe core damage, the performance of containment structures under severe accident loadings, possible radioactive releases into the environment if the containment were to fail, and the offsite consequences of such releases.

Volume 1 of this document summarizes the principal results of the risk analyses, and displays these results in the context of specific regulatory issues (e.g., safety goals).

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