4.4.2.2 Evaluation of Departures from Tier 2 Information That Do Not Affect Ex-Vessel Severe Accident Criteria

The discussion in Section 4.3 of the main body of NEI 96-07, Revision 1, also applies to Part 52 licensees for changes under 10 CFR 50.59 or Section VIII of the design certification rule(s), i.e., VIII.B.5 is analogous to 10 CFR 50.59 for departures that do not affect ex-vessel severe accident criteria with one exception as discussed below. Departures that affect ex-vessel severe accident design features are discussed in Section 4.4.2.3.

Note that the counterpart of 10 CFR 50.59(c)(2)(i-viii) in Section VIII of the design certification rule(s) is Section VIII.B.5.b(1-8) of the design certification rules.

Does the Proposed Departure Result in More Than a Minimal Increase in the Consequences of an Accident?

The discussion in Section 4.3.3 of the main body of NEI 96-07, Revision 1, also applies to Part 52 licensees for evaluation of changes under Section VIII.B.5.b.iii of the design certification rule(s), with the one difference. With respect to the consequences of accidents, the dose limits for members of the public for Part 52 licensees are found in 10 CFR 52.47 (in terms of total effective dose equivalent) rather than 10 CFR 100 (in terms of thyroid and whole body dose) for Part 50 licensees.[1] Differences from the guidance in Section 4.3.3 of the main body of NEI 96-07, Revision 1, are noted in italics below.

General Design Criterion 19 of Appendix A to 10 CFR 50 requires radiation protection to permit access to and occupancy of the control room under accident conditions without personnel receiving radiation exposure in excess of *5 rem TEDE as defined in 10 CFR 50.2* for the duration of the accident. *10 CFR 52.47* establishes requirements for the exclusion area and low population zones around the reactor so that an individual located at any point on its boundary immediately following onset of the postulated fission product release would not receive a radiation dose in excess of *25 rem total effective dose equivalent (TEDE).* In the Standard Review Plan (SRP), NUREG-0800, the NRC established lower acceptance criteria for certain events that are considered to have greater likelihood than the limiting accidents. For example, for a *Small Line Break Accident*, the SRP acceptance guideline is that the dose be less than or equal to a small fraction (i.e., 10 percent) of the *10 CFR 52.47* dose value or *2.5 rem TEDE.*

[1] Each DCD contains the applicable radiation protection requirements for that DCD as approved in the associated design certification rule, e.g. the ABWR DCD requirements are based on 10 CFR 100.

Therefore, for a given accident, calculated or bounding dose values for that accident would be identified in the UFSAR/*plant-specific DCD*. These dose values should be within the GDC 19 or *10 CFR 52.47* limits, as applicable, as modified by SRP guidelines (e.g., small fraction of *10 CFR 52.47*), as applicable. An increase in consequences from a proposed activity is defined to be no more than minimal if: (1) the increase is less than or equal to 10 percent of the difference between the current calculated dose value and the regulatory guideline value (*10 CFR 52.47* or GDC 19, as applicable); and (2) the increased dose does not exceed the current SRP guideline value for the particular design basis event. The current calculated dose values are those documented in the most up-to-date analyses of record. This approach establishes the current SRP guideline values as a basis for minimal increases for all facilities, not just those that were specifically licensed against those guidelines.[2]

The following examples illustrate the use of the total effective dose (TEDE) concept and the current SRP accident dose criteria.

Example 1

The calculated fuel handling accident (FHA) dose is 3.0 rem TEDE at the exclusion area boundary. As a result of a proposed change, the calculated FHA dose would increase to 4.0 rem TEDE. Ten percent of the difference between the calculated value and the regulatory limit is 2.1 rem TEDE [10% of (25 rem - 4rem)]. The SRP acceptance guideline is 6.3 rem TEDE. Because the calculated increase is less than 2.1 rem TEDE and the total is less than the SRP guideline, the increase is not more than minimal.

Example 2

The calculated dose consequence for a particular steam generator tube rupture accident is 2.6 rem TEDE at the exclusion area boundary. As a result of a proposed change, the calculated dose consequence would increase to 4.0 rem TEDE. The increase is not more than minimal because the new calculated dose does not exceed the applicable SRP guideline of 25 rem TEDE, nor does the incremental change in consequences (1.4 rem) exceed 10 percent of the difference between the previous calculated value and the regulatory limit of 25 rem TEDE. Ten percent of the difference between the regulatory limit (25 rem) and the calculated value (4 rem) is 2.1 rem (10% of 21). Since 1.4 rem is less than 2.1, rem this change does not cause more than a minimal increase in consequences.

[2] *Similar to Part 52 licensees,* for licensees who adopt the alternative source term, evaluations against this criterion should be in terms of total effective dose equivalent and the limits established by 10 CFR 50.67 (effective January 24, 2000).

Example 3

The calculated dose consequence of a fuel handling accident is 2.5 rem TEDE at the exclusion area boundary. Because of a proposed change, the calculated dose consequence would increase to 4.7 rem TEDE. The SRP guideline for this accident is 6.3 rem TEDE and is still met. The incremental increase in dose consequence (2.2 rem), however, exceeds 10 percent of the difference to the regulatory limit or 2.0 rem [10% of (25 rem – 4.7rem)]. Therefore, the change results in more than a minimal increase in consequences and thus requires prior NRC approval.

Example 4

The calculated dose to the control room operators following a loss of coolant accident is 4 rem TEDE. A change is proposed to the control room ventilation system such that the calculated dose would increase to 4.2 rem TEDE. The exposure acceptance criteria specified in GDC 19 is met if the total calculated radiological consequences for the control room doses are controlled to less than 5 rem TEDE. Although the new calculated dose is less than the regulatory limits, the incremental increase in dose (0.2 rem) exceeds the value of 10 percent of the difference between the previously calculated value and the regulatory value or 0.1 rem [10% of (5 rem - 4.2 rem)]. This change would require prior NRC review because the increase in consequences exceeds the minimal standard.

Example 5

The existing safety analysis for a fuel handling accident predicts an off-site dose of 4 rem TEDE. The SRP guideline for this event is 6.3 rem TEDE. A proposed change would result in an increase in the calculated dose to 5.8 rem TEDE. In this case, the proposed change would not cause more than a minimal increase in consequences because the new calculated value does not exceed the SRP guideline value (6.3 rem TEDE) or 10 percent of the difference between the previously calculated value and the regulatory value or 1.9 rem [10% of (25 rem - 5.8 rem)].