The sum of the values for affected land areas for all release scenarios, as given in Tables 7.2-9, 7.2-10, and 7.2-11, is also shown in Table 7.2-5. Each of these values has also been multiplied by their release category frequency.

The values for total early and latent fatalities per reactor-year (RY) were conservatively calculated as the sum of all release scenarios. Tables 7.2-6 and 7.2-7 support the calculated dose per RY and dollars per RY risks presented in Table 7.2-5 for internal events. The release frequency data come from Table 7 of the DC Applicant's ER (MHI 2007).

External events were considered in Subsection 19.1.5 of the US-APWR design control document (DCD) and in FSAR Subsection 19.1.5. FSAR Subsection 19.1.5 provides discussion of high winds and tornadoes, external flooding, transportation and nearby facility accidents, and aircraft crashes. The FSAR concludes that all of these external events make an insignificant contribution to the total core damage frequency (CDF). Seismic events are discussed in Subsection 19.1.5 of the US-APWR DCD and are not incorporated into the total CDF. Therefore, external events were determined to be negligible compared to internal events and were not incorporated into the release frequencies.

Due to the extremely low frequency of severe accidents, the severe accident population dose for the CPNPP site is also low. The weighted total dose risk from internal events for the year 2006, which had the most conservative met data, is 3.00×10^{-1} person-rem/RY, as shown in Table 7.2-11. This dose is based on the calendar year 2056 projected population distribution. To obtain the average individual dose, this value is divided by the calendar year 2056 population of 2,760,243 people within 50 mi of the CPNPP site, as given in Tables 2.5-1 and 2.5-2, resulting in a dose of 1.09×10^{-7}rem/RY. This value is lower than the background radiation. Idaho State University indicates that the average individual dose caused by all other sources in the United States is 3.6×10^{-1} rem/yr (ISU 2008). Because the weighted total dose risk from severe accidents is lower than the background radiation, it can also be concluded that the impact on the local biota would be negligible. Additionally, biota tend to be less sensitive to radiation than humans, and the primary concern regarding biota is survival of the species, not individual fatalities.

The liquid pathways dose is not expected to be significant. The MACCS2 analysis resulted in a water ingestion dose risk of 1.63×10^{-2} person-rem/RY for the year 2006, which provided the most conservative water ingestion dose risk, as shown in Table 7.2-5 for internal events. This dose accounts for airborne deposition directly onto surface water bodies and deposition onto land that is washed off into surface water bodies, which is eventually consumed in drinking water. NUREG-1437 Table 5.17 indicates that, for a freshwater site such as CPNPP, drinking water is the dominant liquid pathway compared to fish ingestion and shoreline exposure. Furthermore, the water ingestion dose risk of 1.63×10^{-2} person-rem/RY is small compared to the total dose risk of 3.00×10^{-1} person-rem/RY. Aquifers in the vicinity of the site are provided in Section 2.3, and a list of public surface water users is provided in Tables 2.3-34 and 2.3-36. In addition to surface water, groundwater must be considered in the liquid pathways dose. As discussed in Subsection 2.3.1.5.6 and FSAR Subsection 2.4.12.3.1, the estimated travel time for groundwater from CPNPP Unit 3 to Squaw Creek Reservoir (SCR) through ~~undifferentiated fill/ regolith~~engineered fill, which represents the ~~most~~fastest conservative pathway, is ~~720.9~~62 days,

RCOL2_02.0 4.12-9 S04

~~or approximately 2 years,~~ which would allow ample time for interdiction and other prevention activities. RCOL2_02.04.12-9 S04

The results of severe accidents for current generation reactors are compared to the severe accident risk calculated in the MACCS2 analysis in Table 7.2-8, where the data for the current generation reactors were taken from System Energy Resources Inc. (SERI 2004). The conclusion is that the low frequency of releases associated with the US-APWR design makes the severe accident risk of a future unit at this site extremely low. Additional severe accident analysis results are reported in Tables 7.2-9, 7.2-10, and 7.2-11. The CDF in these tables comes from Table 7 of the DC Applicant's ER (MHI 2007).

The significance of the impacts associated with each severe accident issue has been identified as either SMALL, MODERATE, or LARGE, consistent with the criteria that the NRC established in 10 Code of Federal Regulations (CFR) 51, Appendix B, Table B-1, Footnote 3 as follows:

> SMALL – Environmental effects are not detectable or are so minor that they are not expected to destabilize nor noticeably alter any important attribute of the resource. For purposes of assessing radiological impacts, the NRC has concluded that those impacts that do not exceed permissible levels in the NRC's regulations are considered small.
>
> MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, any important attribute of the resource.
>
> LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize any important attributes of the resource.

In accordance with National Environmental Policy Act (NEPA) practice, ongoing and potential additional mitigation is considered in proportion to the significance of the impact to be addressed (i.e., impacts that are SMALL receive less mitigative consideration than impacts that are LARGE).

As discussed previously, the frequency of releases is extremely low. Also, the average individual dose risk of 1.09×10^{-7} rem/RY, as calculated above, is lower than the average individual dose caused by all other sources in the United States of 3.6×10^{-1} rem/yr; therefore, the CPNPP site risks would be acceptable.

The MACCS2 analysis also considers potential economic impacts as a result of postulated severe accidents at a nuclear reactor on the CPNPP site. MACCS2 calculated severe accident costs based on the following:

- Evacuation costs.
- Value of crops contaminated and condemned.
- Value of milk contaminated and condemned.
- Costs of decontamination of property.