CHAPTER 15

ACCIDENT ANALYSES

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CHAPTER 15

ACCIDENT ANALYSES

15.0 ACCIDENT ANALYSES

This section of the referenced DCD is incorporated by reference with no departures or supplements.

15.1 INCREASE IN HEAT REMOVAL FROM THE PRIMARY SYSTEM

This section of the referenced DCD is incorporated by reference with no departures or supplements.

15.2 DECREASE IN HEAT REMOVAL BY THE SECONDARY SYSTEM

This section of the referenced DCD is incorporated by reference with no departures or supplements.

15.3 DECREASE IN REACTOR COOLANT SYSTEM FLOW RATE

This section of the referenced DCD is incorporated by reference with no departures or supplements.

15.4 REACTIVITY AND POWER DISTRIBUTION ANOMALIES

This section of the referenced DCD is incorporated by reference with no departures or supplements.

15.5 INCREASE IN REACTOR COOLANT INVENTORY

This section of the referenced DCD is incorporated by reference with no departures or supplements.

15.6 DECREASE IN REACTOR COOLANT INVENTORY

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

15.6.5.3.7.3 Atmospheric Dispersion Factors

HAR COL 2.3-4 Add the following paragraph at the end of DCD Subsection 15.6.5.3.7.3.

Site-specific χ/Q values provided in Subsection 2.3.4 are bounded by the values given in DCD Tables 15A-5 and 15A-6.

15.7 RADIOACTIVE RELEASE FROM A SUBSYSTEM OR COMPONENT

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

15.7.3 RELEASE OF RADIOACTIVITY TO THE ENVIRONMENT DUE TO A LIQUID TANK FAILURE

HAR COL 15.7-1 Add the following text at the end of DCD Subsection 15.7.3.

This event is defined as an unexpected and uncontrolled release of radioactive water produced by plant operations from a tank rupture. The AP1000 tanks that normally contain radioactive liquid are listed in DCD Table 15.7-201.

It is noted that no outdoor tanks contain radioactivity. In particular, the AP1000 does not require boron changes for load follow, and so does not recycle boric acid or water; therefore, the boric acid tank is not radioactive.

The spent resin tanks are excluded from consideration because most of their activity is bound to the spent resins, and they have minimal free water that would be subject to migration from the tank in the event of a tank failure. Tanks inside the containment building were not considered because the containment building, a seismic Category I structure, is a freestanding cylindrical steel containment vessel (DCD Subsection 1.2.4.1). Credit is taken for the steel liner to mitigate the effect of a postulated tank failure.

The Liquid Radwaste System (WLS) waste monitor tanks located in the radwaste building extension are considered because of their location in a non-seismic building. These three tanks have a maximum capacity of 15,000 gallons each, and contain processed fluid ready for discharge. The radwaste building has a well sealed, contiguous basemat with integral curbing that can hold the maximum liquid inventory of any tank. Floor drains in the area lead to the liquid radwaste system. The foundation for the entire building is a reinforced concrete mat on grade. Failure of any one of these tanks would be contained within the building and would involve low activity processed liquids being held for pending discharge. Any release to the environment would be leakage through cracks in the concrete. The radiological consequences of such leakage are bounded by the effluent holdup tanks. Therefore, these tanks are excluded as a limiting fault.

The remaining four tank applications were considered - the effluent holdup tanks, waste holdup tanks, monitor tanks (located in the auxiliary building), and chemical waste tanks. Of these tanks, the effluent holdup tanks have both the highest potential radioactive isotope inventory and the largest volume. The other tanks need not be considered further because they have lower isotopic activity and because rooms in which they are located are not on the lowest level of the auxiliary building (and thus intervening interior floors would mitigate the uncontrolled release of a ruptured tank). Therefore, the AP1000 effluent holdup

tank is limiting for the purpose of calculating the effects of the failure of a radioactive liquid-containing tank. This failure is classified as a limiting fault.

The consequences of the postulated failure of an effluent holdup tank are presented in detail in Subsection 2.4.13.

15.7.6 COMBINED LICENSE INFORMATION

HAR COL 15.7-1 This COL Item is addressed in Section 15.7.3.

HAR COL 15.7-1

Table 15.7-201 (Sheet 1 of 2)
AP1000 Tanks Containing Radioactive Liquid

Tank	Location[a]	Nominal Tank Volume	Radioisotope Contents	Considerations/Features to Mitigate Release
PXS Tanks (IRWST and CMT's)	Inside Containment	NA	NA	Inside containment; release need not be considered.
Spent Fuel Pool	Auxiliary Building	NA	NA	Not a tank, per se. Fully lined and safety related. Located entirely inside aux. building; does not have any potential for foundation cracks to allow leakage directly to environment. Leakage would be to another room of auxiliary building.
WLS Reactor coolant drain tank	Inside containment	NA	NA	Inside containment; release need not be considered.
WLS Containment sump	Inside containment	NA	NA	Inside containment; release need not be considered.
WLS Effluent Holdup Tanks	Auxiliary Building El 66'-6"	28,000 gal	Essentially reactor coolant	Located in unlined room at lowest portion of the auxiliary building.
WLS Waste Holdup Tanks	Auxiliary Building El 66'-6"	15,000 gal	Less than reactor coolant	Located in unlined room at lowest portion of auxiliary building.

HAR COL 15.7-1

Table 15.7-201 (Sheet 2 of 2)
AP1000 Tanks Containing Radioactive Liquid

Tank	Location[(a)]	Nominal Tank Volume	Radioisotope Contents	Considerations/Features to Mitigate Release
WLS Monitor Tanks A, B, C	Auxiliary building El 66'-6" and 117'-6"	15,000 gal	Effluent prepared for environmental discharge – much less than reactor coolant	Located in unlined room at lowest portion of auxiliary building.
WLS Monitor Tanks D, E, F	Radwaste Building	15,000 gal	Effluent prepared for environmental discharge – much less than reactor coolant	Located in unlined room at grade level in curbed, non-seismic building.
WLS Chemical Waste Tank	Auxiliary building El 66'-6"	8,900 gal	Less than reactor coolant	Located in unlined room at lowest portion of auxiliary building.
WSS Spent Resin Storage Tanks	Auxiliary Building El 100'	300 ft^3 (liquid volume will be much less)	Approx. reactor coolant	Located entirely inside auxiliary building; does not have any potential for foundation cracks to allow leakage directly to environment. Leakage would be to another room of auxiliary building.

[a] Floor elevations are based on design plant grade of 100 ft as provided in the DCD.

15.8 ANTICIPATED TRANSIENTS WITHOUT SCRAM

This section of the referenced DCD is incorporated by reference with no departures or supplements.

APPENDIX 15A EVALUATION MODELS AND PARAMETERS FOR ANALYSIS OF RADIOLOGICAL CONSEQUENCES OF ACCIDENTS

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

15A.3.3 Atmospheric Dispersion Factors

Replace the third paragraph in DCD Subsection 15A.3.3 with the following:

HAR COL 2.3-4 Site-specific χ/Q values provided in Subsection 2.3.4 are bounded by the values given in DCD Tables 15A-5 and 15A-6.

APPENDIX 15B REMOVAL OF AIRBORNE ACTIVITY FROM THE CONTAINMENT ATMOSPHERE FOLLOWING A LOCA

This section of the referenced DCD is incorporated by reference with no departures or supplements.