FINAL SAFETY ANALYSIS REPORT

CHAPTER 15

TRANSIENT AND ACCIDENT ANALYSIS

15.0 TRANSIENT AND ACCIDENT ANALYSIS

This chapter of the U.S. EPR Final Safety Analysis Report (FSAR) is incorporated by reference with departures and supplements as identified in the following sections.

The U.S. EPR FSAR includes the following COL Item in Section 15.0:

A COL applicant that references the U.S. EPR design certification will provide for staff review, prior to the first cycle of operation, the analysis results demonstrating that the uncompensated DNBR and LPD satisfies the SAFDL with a 95/95 assurance in accordance with ANP-10287P.

The COL Item is addressed as follows:

The analyses results demonstrating that the uncompensated DNBR and LPD satisfies the SAFDL with a 95/95 assurance in accordance with ANP-10287P shall be provided to the NRC staff for review prior to the first cycle of operation.

15.0.1 Radiological Consequence Analysis

No departures or supplements.

15.0.2 Computer Codes Used in Analysis

No departures or supplements.

15.0.3 Radiological Consequences of Design Basis Accidents

15.0.3.1 {Introduction

CCNPP Unit 3 will depart from the U.S. EPR FSAR by utilizing the site-specific short-term atmospheric dispersion factors for the Low Population Zone (LPZ). U.S. EPR FSAR Table 5.0-1 and U.S. EPR FSAR Table 2.1-1 provide the Accident Atmospheric Dispersion Factor (χ/Q) of 1.75E-04 sec/m^3 at the Low Population Zone (LPZ) - 1.5 miles during the 0-2 hr period. The corresponding CCNPP Unit 3 site-specific value provided in Table 2.3.4-1 is 2.151E-04 sec/m^3. This value is also listed in Table 15.0-1.

The site-specific Accident Atmospheric Dispersion Factors, including the 0-2 hour (LPZ - 1.5 miles) χ/Q of 2.151E-04 sec/m^3, were used in calculation of doses resulting from the accident scenarios specified in this Section. In each case, the resulting LPZ doses were determined to be below regulatory limits.

15.0.3.2 Event Categorization

No departures or supplements.

15.0.3.3 Analytical Assumptions

No departures or supplements.

15.0.3.3.1 Non-Safety-Related Systems Credited in the Analyses and Operator Action

No departures or supplements.

15.0.3.3.2 Loss of Offsite Power Assumptions

No departures or supplements.

15.0.3.3.3 Atmospheric Dispersion Factors

Table 15.0-1 provides the short-term atmospheric dispersion factors for the LPZ that are utilized to calculate the radioactive doses associated with the various design basis events for CCNPP Unit 3.

15.0.3.3.4 Core Radionuclide Inventory Assumptions

No departures or supplements.

15.0.3.3.5 Iodine Appearance Rates

No departures or supplements.

15.0.3.3.6 Analytical Methods

No departures or supplements.

15.0.3.4 Receptor Variables

No departures or supplements.

15.0.3.5 Small Line Carrying Primary Coolant Break Outside of the Reactor Building Accident

No departures or supplements.

15.0.3.5.1 Sequence of Events and Systems Operations

No departures or supplements.

15.0.3.5.2 Input Parameters and Initial Conditions

No departures or supplements.

15.0.3.5.3 Results

CCNPP Unit 3 incorporates by reference the doses for the main control room and the exclusion area boundary presented in U.S. EPR FSAR Table 15.0-23 for the small line break outside of the Reactor Building. The CCNPP Unit 3 TEDE dose at the LPZ for the small line break outside of the Reactor Building is provided in Table 15.0-2. The CCNPP Unit 3 LPZ dose is below the regulatory limit.

15.0.3.6 Steam Generator Tube Rupture Accident

No departures or supplements.

15.0.3.6.1 Sequence of Events and Systems Operations

No departures or supplements.

15.0.3.6.2 Input Parameters and Initial Conditions

No departures or supplements.

15.0.3.6.3 Results

CCNPP Unit 3 incorporates by reference the doses for the main control room and the exclusion area boundary presented in U.S. EPR FSAR Table 15.0-29 for the steam generator tube rupture.

The CCNPP Unit 3 TEDE doses at the LPZ for the steam generator tube rupture for both of the source terms are presented in Table 15.0-2. The CCNPP Unit 3 LPZ doses are below the regulatory limits.

15.0.3.7 Main Steam Line Break Outside of Reactor Building Accident

No departures or supplements.

15.0.3.7.1 Sequence of Events and Systems Operations

No departures or supplements.

15.0.3.7.2 Input Parameters and Initial Conditions

No departures or supplements.

15.0.3.7.3 Results

CCNPP Unit 3 incorporates by reference the doses for the main control room and the exclusion area boundary presented in U.S. EPR FSAR Table 15.0-34 for the main steam line break outside of the Reactor Building. The CCNPP Unit 3 TEDE doses at the LPZ for the main steam line break outside of the Reactor Building for each of the four source terms are presented in Table 15.0-2. The CCNPP Unit 3 LPZ doses are below the regulatory limits.

15.0.3.8 Locked Rotor Accident

No departures or supplements

15.0.3.8.1 Sequence of Events and Systems Operations

No departures or supplements.

15.0.3.8.2 Input Parameters and Initial Conditions

No departures or supplements.

15.0.3.8.3 Results

CCNPP Unit 3 incorporates by reference the doses for the main control room and the exclusion area boundary presented in U.S. EPR FSAR Table 15.0-38 for the locked rotor accident. The CCNPP Unit 3 TEDE dose at the LPZ for the locked rotor accident is provided in Table 15.0-2. The CCNPP Unit 3 LPZ dose is below the regulatory limit.

15.0.3.9 Rod Ejection Accident

No departures or supplements.

15.0.3.9.1 Sequence of Events and Systems Operations

No departures or supplements.

15.0.3.9.2 Input Parameters and Initial Conditions

No departures or supplements.

15.0.3.9.3 Results

CCNPP Unit 3 incorporates by reference the doses for the main control room and the exclusion area boundary presented in U.S. EPR FSAR Table 15.0-44 for the rod ejection accident. The

CCNPP Unit 3 TEDE dose at the LPZ for the rod ejection accident is provided in Table 15.0-2. The CCNPP Unit 3 LPZ dose is below the regulatory limit.

15.0.3.10 Fuel Handling Accident

No departures or supplements.

15.0.3.10.1 Sequence of Events and Systems Operations

No departures or supplements.

15.0.3.10.2 Input Parameters and Initial Conditions

No departures or supplements.

15.0.3.10.3 Results

CCNPP Unit 3 incorporates by reference the doses for the main control room and the exclusion area boundary presented in U.S. EPR FSAR Table 15.0-48 for the fuel handling accident. The CCNPP Unit 3 TEDE dose at the LPZ for the fuel handling accident is provided in Table 15.0-2. The CCNPP Unit 3 LPZ dose is below the regulatory limit.

15.0.3.11 Loss of Coolant Accident

No departures or supplements.

15.0.3.11.1 Sequence of Events and Systems Operations

No departures or supplements.

15.0.3.11.2 Input Parameters and Initial Conditions

No departures or supplements.

15.0.3.11.3 Results

CCNPP Unit 3 incorporates by reference the doses for the main control room and the exclusion area boundary presented in U.S. EPR FSAR Table 15.0-53 for the LOCA. The CCNPP Unit 3 TEDE dose at the LPZ for the LOCA is provided in Table 15.0-2. The CCNPP Unit 3 LPZ dose is below the regulatory limit.

15.0.3.12 Postaccident Reactor Building Water Chemistry Control

No departures or supplements.

15.0.3.13 Control Room Radiological Habitability

No departures or supplements.}

15.0.4 PLANT COOLDOWN

No departures or supplements.

15.0.5 Compliance with Section C.I.15, "Transient and Accident Analyses," of Regulatory Guide 1.206

No departures or supplements.

15.0.6 References

No departures or supplements.

Table 15.0-1— {CCNPP Unit 3 LPZ Atmospheric Dispersion Factors}

LPZ Receptor Variables	Atmospheric dispersion factors (sec/m^3)
0 to 2 hr	2.151E-04
2 to 8 hr	1.176E-04
8 to 24 hr	6.865E-05
1 to 4 days	3.005E-05
4 to 30 days	9.179E-06

Table 15.0-2— {CCNPP Unit 3 LPZ Radiological Consequences of U.S. EPR Design Basis Accidents}

Design Basis Accident		Offsite Dose CCNPP Unit 3 LPZ rem (TEDE)	Acceptance Criterion rem (TEDE)
LOCA		9.1	25
Small line break outside of Reactor Building		0.4	2.5
SGTR	Pre-incident spike	0.3	25
	Coincident spike	0.3	2.5
MSLB	Pre-incident spike	0.1	25
	Coincident spike	0.2	2.5
	Fuel rod clad failure	2.6	25
	Fuel overheat	2.8	25
RCP locked rotor/broken shaft		0.9	2.5
Rod ejection		3.4	6.3
Fuel handling accident		1.2	6.3

15.1 INCREASE IN HEAT REMOVAL BY THE SECONDARY SYSTEM

This section of the U.S. EPR FSAR is incorporated by reference.

15.2 DECREASE IN HEAT REMOVAL BY THE SECONDARY SYSTEM

This section of the U.S. EPR FSAR is incorporated by reference.

15.3 DECREASE IN REACTOR COOLANT SYSTEM FLOW RATE

This section of the U.S. EPR FSAR is incorporated by reference.

15.4 REACTIVITY AND POWER DISTRIBUTION ANOMALIES

This section of the U.S. EPR FSAR is incorporated by reference.

15.5 INCREASE IN REACTOR COOLANT INVENTORY

This section of the U.S. EPR FSAR is incorporated by reference.

15.6 DECREASE IN REACTOR COOLANT INVENTORY EVENTS

This section of the U.S. EPR FSAR is incorporated by reference.

15.7 RADIOACTIVE RELEASE FROM A SUBSYSTEM OR COMPONENT

This section of the U.S. EPR FSAR is incorporated by reference.

15.8 ANTICIPATED TRANSIENTS WITHOUT SCRAM

This section of the U.S. EPR FSAR is incorporated by reference.

15.9 BOILING WATER REACTOR STABILITY

This section of the U.S. EPR FSAR is incorporated by reference.

15.10 SPENT FUEL POOL CRITICALITY AND BORON DILUTON ANALYSIS

This section of the U.S. EPR FSAR is incorporated by reference.