

**Tennessee Valley Authority
Browns Ferry Nuclear Plant
Alternative Source Term Implementation**

**TVA/NRC Meeting
Nuclear Reactor Regulation - Rockville MD
January 16, 2002**

Agenda

- ◆ **Introduction/Meeting Objectives**
- ◆ **Schedule**
- ◆ **Background**
- ◆ **Analysis Approach**
- ◆ **Analysis Attributes**
- ◆ **Submittal Contents**
- ◆ **Summary and Open Discussion**

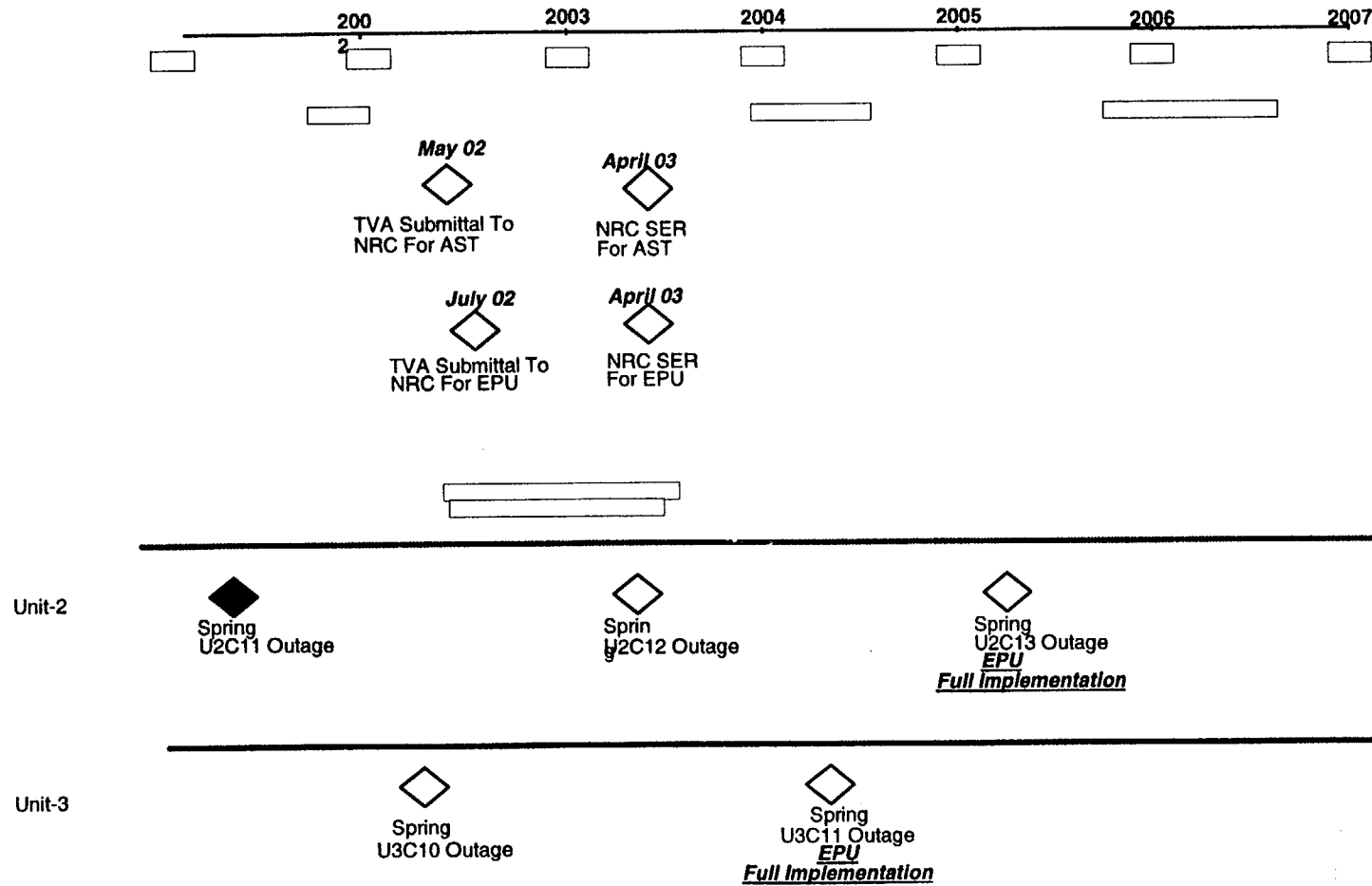


Introduction/Meeting Objectives

- ♦ **Introduction**
- ♦ **Previous Meeting Extended Power Uprate**
- ♦ **Meeting Objectives**
 - **Discuss the BFN Approach**
 - **Discuss Submittal Content and Depth of Information**
 - **Obtain NRC Concurrence of TVA's Proposed Methodology**
 - **Gain NRC Insights From Other Alternative Source Term Submittals**



Schedule



Steve Austin



Background

- ♦ **BFN Design Features**
 - **BWR - 4**
 - **Mark I Containment**
 - **Inerted Primary Containment**
 - **Secondary Containment Common to Units 1, 2, and 3**
 - **Three Trains of Standby Gas Treatment**
 - **600 Foot Stack**
 - **Units 1, 2, and 3 Control Rooms Have a Common Control Room Emergency Ventilation (CREV) System**
- ♦ **2000 NRC Safety Evaluation For Increased Main Steam Isolation Valve Leakage**
 - **Implemented Main Steam Ruggedness**
 - **Completed Implementation March 2001**

Background (Cont.)

- ♦ **Current Radiological Analysis Approach**
 - **ORIGEN - Source Terms**
 - **Traditional Regulatory Methods**
 - **Atmospheric Dispersion Coefficients**
 - **Used in MSIV Increased Leakage Submittal and Associated NRC SER**
 - **UFSAR Amendment 19**
 - **Use Existing Values For AST**
 - **ECCS Leakage**



Analysis Approach

- ♦ **Requirements of 10 CFR 50.67, Revised Accident Source Term**
- ♦ **Follow Reg Guide 1.183, “Alternative Radiological Source Terms for Evaluating Design Basis Accidents As Nuclear Power Reactors”**
- ♦ **Full Implementation**
- ♦ **Reran ORIGEN Source Term at EPU Conditions**
- ♦ **Suppression Pool Water pH Control**
- ♦ **Filtration Efficiencies**
- ♦ **No Plant Modifications Anticipated**

Analysis Attributes

- ♦ **Based on Design Basis Accidents**
 - **Loss of Coolant Accident**
 - **Main Steam Line Break**
 - **Control Rod Drop Accident**
 - **Fuel Handling Accident**
- ♦ **NUREG - 0737 - Mission Doses**
- ♦ **Expressed in Terms of Times and Rates of Appearance of Radioactive Fission Products Released Into Containment**
- ♦ **Types and Quantities of the Radioactive Species Released**
- ♦ **Chemical Forms of Iodine Released**

Drywell Sprays

- ♦ **Safety Related Redundant Mode of RHR**
- ♦ **Credit for Drywell Sprays (Loss of Coolant Accident)**
 - **Boiling Water Reactor Sprays Already Credited for AST**
 - **Perry**
 - **Grand Gulf**
 - **Manual Actuation**
 - **Drywell Congestion**
 - **Reduced Spray Being Credited for BFN**
 - **Reduced Fall Height Being Credited for BFN**
 - **Standard Review Plan 6.5.2 Used for Spray Removal Rate**

Main Steam Line Break (MSLB) X/Q

Outside Containment



- ♦ **Current Analysis Approach**
 - **Turbine Building Remains Intact**
 - **No Credit for Deposition**
 - **ARCON96 Steady-State Plume X/Q**
 - **Release Over 2 Hour Time Period**
 - **Release Through Unit 1 Turbine Building Exhaust (Highest X/Q)**
 - **Includes Consideration for Dual CREV Intake**

Main Steam Line Break X/Q (Cont.)

Outside Containment



- ♦ **RG 1.183 MSLB X/Q Scenario**
 - **Puff Release Directly to Environment**
 - **Puff X/Q Used**
 - **Immediate Release Assumed**
 - **No Credit for Deposition**
 - **Rising Puff Credited**
 - **NRC Puff Model in Draft Regulatory Guide 1111, “Atmospheric Relative Concentrations for Control Radiological Habitability Assessments at Nuclear Power Plants” Will be Considered**

Use of AEB-98-03

- ♦ **Use of AEB-98-03 Approach With DW Spray Credit and Multiple Steam Line/Condenser Volumes in Series**
 - **TVA Plans to Use AEB-98-03 but With DW Sprays and Multiple Steam Line/Condenser Control Volumes in Series**
 - **DW Sprays Remove Large, Dense Particles**
 - **Multiple Steam Line/Condenser Volumes in Series Decreases the Sedimentation Velocity Distribution in Downstream Control Volumes**

Submittal Contents

- ♦ **Previous Submittals**
 - **Duane Arnold**
 - **Columbia**
- ♦ **Review and Incorporate Applicable AST RAIs**
- ♦ **Describe Changes**
- ♦ **Identify the Computer Codes Utilized**
- ♦ **Identify Inputs and Assumptions**
- ♦ **Describe the AST Results**
- ♦ **Identify Affected UFSAR Sections**

Summary and Open Discussion



- ♦ **Evaluations and Acceptance Criteria Will be Consistent With Those Required by 10 CFR 50.67 and Reg Guide 1.183**
- ♦ **Evaluate Design Bases Accidents**
 - **Acceptable Radiological Analysis Methods and Assumptions**
- ♦ **Update the Design/Licensing Bases for BFN**
 - **Technical Specifications**
 - **FSAR**
 - **Calculations**
- ♦ **Open Discussion**