Tennessee Valley Authority
Browns Ferry Nuclear Plant
Alternative Source Term Implementation

TVA/NRC Meeting

Nuclear Reactor Regulation - Rockville MD

January 16, 2002

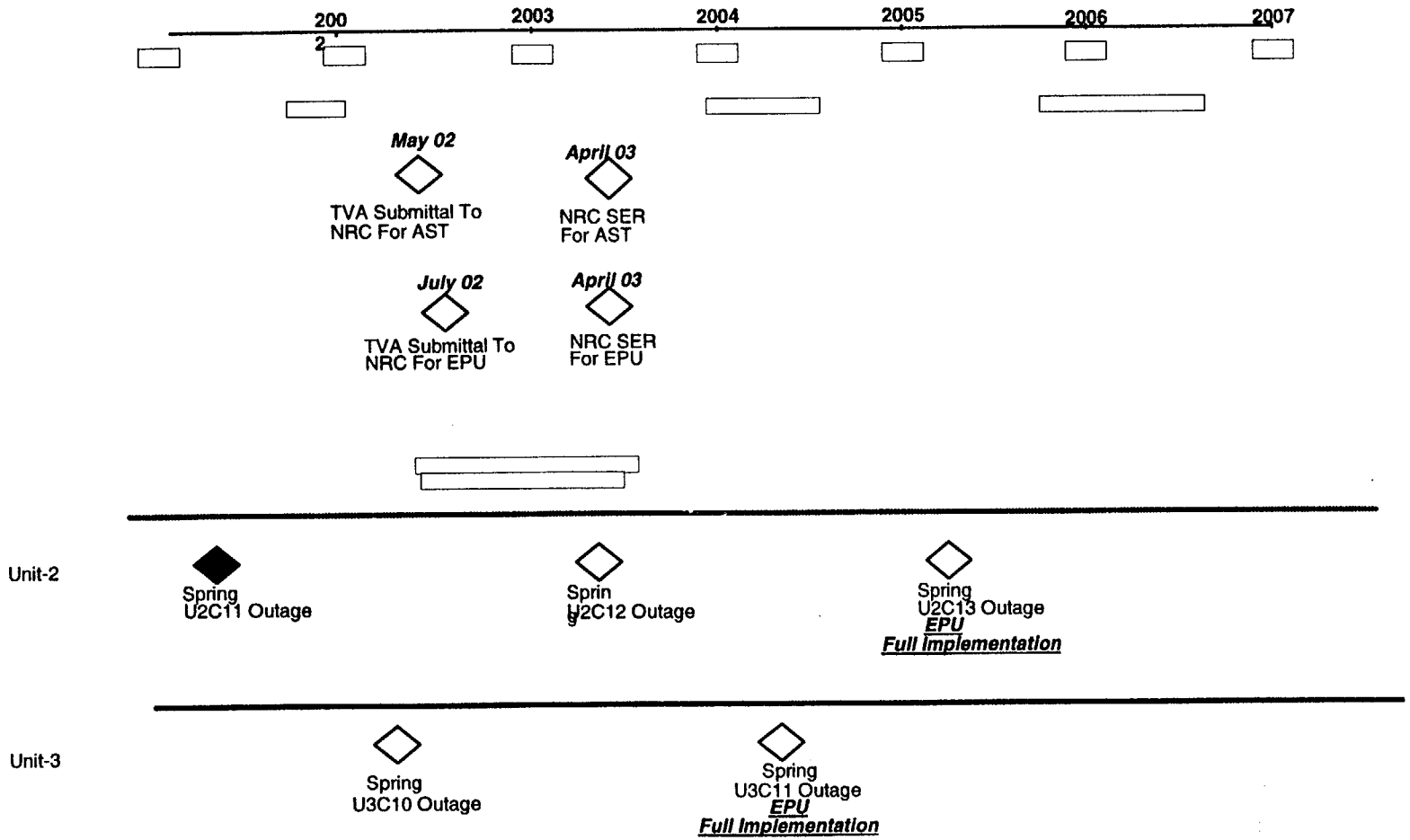
Agenda

- 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