U.S. Department of Energy
Office of Civilian Radioactive Waste Management

YUCCA MOUNTAIN PROJECT

Yucca Mountain Project Update

Presented to:
Nuclear Waste Technical Review Board

Presented by:
J. Russell Dyer
Department of Energy
Yucca Mountain Site Characterization Office

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Topics for Discussion

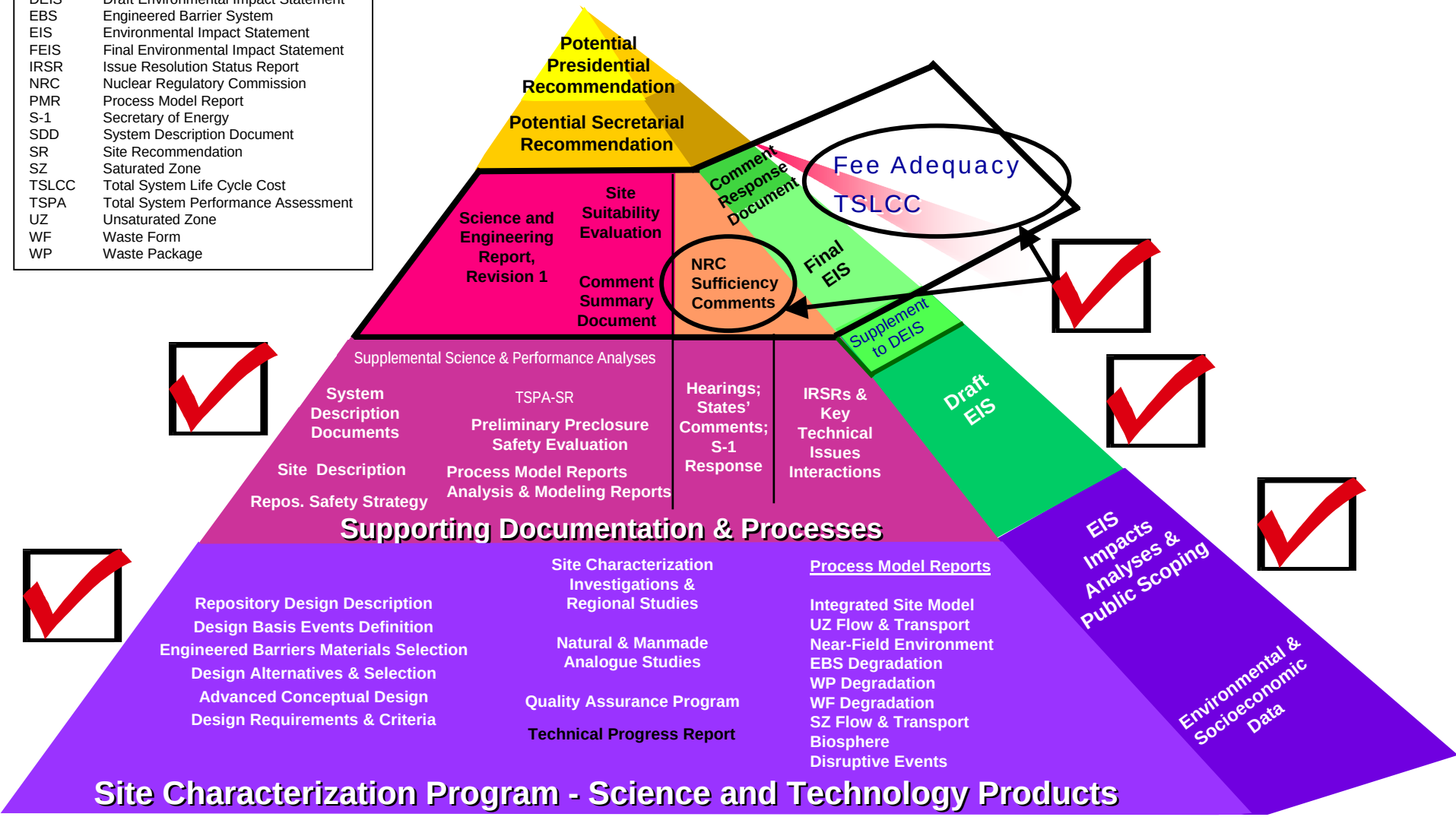
- **Recent Accomplishments**
- **Project Path Forward**
- **Continuing Technical Advancement**
- **Cultural Evolution of the Yucca Mountain Project**

Recent Accomplishments

- **In keeping with its stated mission, the Yucca Mountain Project has provided a technical basis for a national decision regarding the development of a repository at Yucca Mountain**
- **We appreciate the Board's participation and contributions, particularly those instances where the Board's insights and observations helped us to develop a more robust technical basis**

Site Recommendation Documentation Structure

AMR	Analysis/Model Report
DEIS	Draft Environmental Impact Statement
EBS	Engineered Barrier System
EIS	Environmental Impact Statement
FEIS	Final Environmental Impact Statement
IRSR	Issue Resolution Status Report
NRC	Nuclear Regulatory Commission
PMR	Process Model Report
S-1	Secretary of Energy
SDD	System Description Document
SR	Site Recommendation
SZ	Saturated Zone
TSLCC	Total System Life Cycle Cost
TSPA	Total System Performance Assessment
UZ	Unsaturated Zone
WF	Waste Form
WP	Waste Package



Project Path Forward

- **The Project continues to support the SR process**
- **Should the site be designated, the Project is planning to prepare and submit a license application**
- **Major work activities that will lead to development of a license application include**
  - **Addressing agreement items reached between Department of Energy (DOE) and NRC on the NRC's Key Technical Issues**
  - **Continuing pre-licensing interactions with the NRC and technical meetings with the Board**
  - **Continue scientific activities to address uncertainties**
  - **Development of more detailed designs**

Continuing Technical Advancement

- **Science will continue at Yucca Mountain**
  - **Test and Evaluation**
    - **Long-term thermal and hydrologic testing programs**
    - **Materials testing and evaluation**
    - **Site and regional environmental monitoring**
    - **Continuous improvement of models and analyses**
  - **Performance confirmation, as required by NRC**
- **Engineering activities will advance**
  - **Detailed surface, subsurface and waste package designs**
  - **Construction and fabrication techniques**
  - **Operational concepts and methods**
  - **Quality control and safety processes**

Resolving Technical Issues
- Fluoride Detection -

- **Water samples from superheated (>140°C) zones in the Drift Scale Test show relatively high fluoride concentrations (5-66 ppm) and low pH (3.1 - 3.5)**
  - **Fluoride could be deleterious to waste package and drip shield materials performance**
  - **Source was either Viton™ borehole packers or Teflon™ tubing, or the host rock itself**
- **Thermal Test Team responded rapidly and devised a strategy to identify the source of the fluoride**

Resolving Technical Issues
- Fluoride Detection -
(Continued)

- **Fluoride source test strategy:**
  - **Boreholes without suspect introduced materials were characterized to locate possible collection zones with temperatures above 140°C and with water vapor present**
  - **Water samples were collected; then Viton™ and Teflon™ were introduced; and then more samples were collected**
- **Results of tests:**
  - **Fluoride concentrations and low pH were detected only after introduction of suspect materials**
  - **Source of fluoride is de-gassing of hydrogen fluoride or leaching of fluoride at high test temperatures**

Resolving Technical Issues
- Fluoride Detection -
(Continued)

- **Outcome of recent detection of fluoride in water samples from the Drift Scale Test**
  - **Rapid management attention demonstrates Project's ability to move forward in the face of uncertainty**
  - **Technical concern was quickly and effectively resolved by investigators from the Thermal Test Team**
  - **Results have led to improved understanding of experimental environment and removed concerns raised by initial fluoride detection**
  - **Provided lesson-learned for engineers on materials selection for repository environment**

Evaluation of Thermal Operating Modes

- **DOE has completed an integrated evaluation and comparison of high- and low-temperature operating modes, as discussed in its May 30, 2001, letter**
  - **Draws on SSPA and Preliminary Preclosure Safety Assessment and previous work that addressed the risks, costs, and benefits of postclosure performance as a function of thermal conditions**

Evaluation of Thermal Operating Modes
(Continued)

- **Results of integrated evaluation and comparison**
  - **Either operating mode is likely to comply with applicable regulations and standards**
  - **Uncertainties associated with lower-temperature mode appear to be fewer**
  - **Costs of a higher-temperature mode are lower**
  - **Construction and operational safety could be improved in the higher-temperature mode**

Evaluation of Thermal Operating Modes
(Continued)

- **Work is ongoing to enhance the flexible design**
  - **Design evaluation study will be completed to support license application**
- **Scientific analyses are ongoing to improve the technical basis for the waste package**
  - **Evaluate the current technical basis for the 85°C temperature goal**
  - **Additional analyses will be completed in conjunction with in-drift design development**
  - **Further development of in-drift ventilation models**

Cultural Evolution

- **DOE is preparing culturally, as well as technically, for potential role as license applicant**
  - **Transition from collegial scientific research to more disciplined NRC licensing environment**
    - **Strict and literal procedural compliance**
    - **Attention to detail**
    - **Commitment to excellence**
    - **Inherent questioning attitude**
    - **Continuous improvement**
    - **Teamwork, collaboration, and communication**
    - **Self-assessment**
    - **Regular and critical reviews of work**

Cultural Evolution
(Continued)

- **In the coming months, DOE will take several important steps toward defining our evolving mission:**
  - **Strategic planning initiatives**
  - **Complete detailed multi-year work plans**
  - **Work with stakeholders and oversight bodies, including the Board, to clearly communicate our plans and objectives, and to seek your input and feedback**

Summary

- **The Yucca Mountain Project has provided a basis to the Secretary for a national decision regarding the development of a repository at Yucca Mountain**
- **The Project plans to develop and submit a license application, should the site be designated**
- **Work activities will include continuing technical advancements in science and engineering**
- **The Project is implementing cultural changes needed to make a transition from site characterization into licensing**