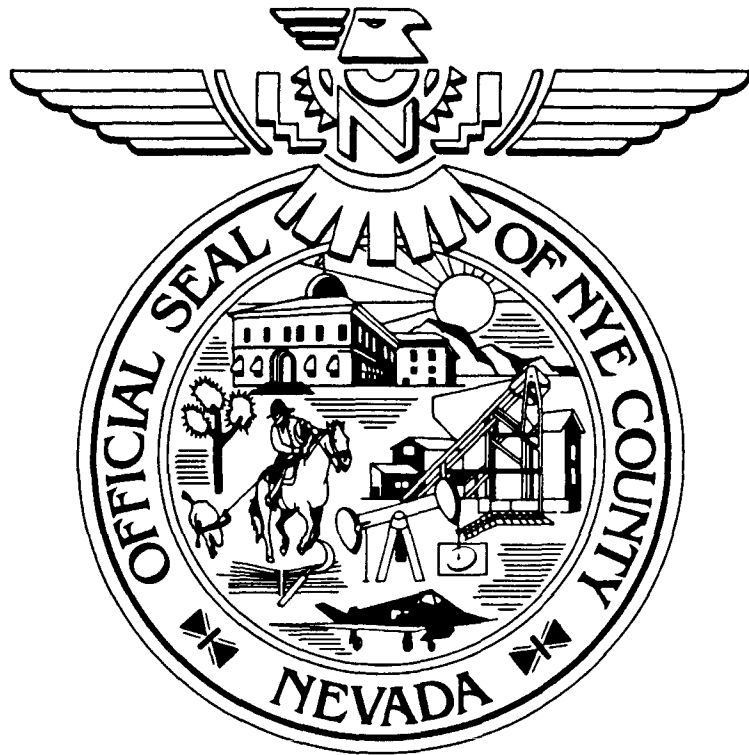


NYE COUNTY INDEPENDENT SCIENTIFIC INVESTIGATIONS YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT

PRESENTATION TO THE U.S. NUCLEAR WASTE TECHNICAL REVIEW BOARD



PRESENTER

Les W. Bradshaw, Project Manager
Nuclear Waste Repository Project Office
Nye County, Nevada

DISCUSSANT

Martin D. Mifflin
Mifflin and Associates
ISI Program Manager

October 19, 1993

PURPOSES

- **PRESENT TECHNICAL OVERSIGHT APPROACH WITH FOCUS ON DRILLING COMPONENT OF INDEPENDENT SCIENTIFIC INVESTIGATION (ISI) PROGRAM**
- **DESCRIBE STATUS OF NYE/DOE COORDINATION FOR ON-SITE DRILLING INITIATIVE**

[NOTE: ADDITIONAL PROGRAM INFORMATION PROVIDED IN BACKGROUND SECTION OF THIS PACKAGE, INCLUDING:

- **DESCRIPTION OF NYE COUNTY'S NUCLEAR WASTE REPOSITORY OVERSIGHT PROGRAM**
- **ADDITIONAL BACKGROUND ON THE ISI COMPONENT**
- **HIGHLIGHT KEY SITE PERFORMANCE ISSUES TARGETED BY ISI**

TECHNICAL OVERSIGHT APPROACH REPOSITORY OVERSIGHT PROGRAM

- TECHNICAL OVERSIGHT COMPONENTS INCLUDE:
 - ON-SITE REPRESENTATION FOR HANDS-ON, REAL-TIME MONITORING & ANALYSIS OF YMP FIELD ACTIVITY
 - REACTIVE MONITORING
 - DOCUMENT REVIEW AND COMMENT
 - INTERACTION WITH OTHER REGULATORY AND OVERSIGHT AGENCIES
 - PROACTIVE (AND QUALITY ASSURED) INDEPENDENT SCIENTIFIC INVESTIGATION
 - SURFACE-BASED SAMPLING AND ANALYSIS
 - DOE RAW DATA REVIEW AND ANALYSIS
 - DRILLING, DATA COLLECTION, AND ANALYSIS
- TECHNICAL OVERSIGHT WILL BE COORDINATED WITH OTHER AFFECTED PARTIES WHERE EFFECTIVE AND EFFICIENT

PROACTIVE INDEPENDENT SCIENTIFIC INVESTIGATION VADOSE ZONE DRILLING

- **VADOSE ZONE DRILLING UNDERTAKEN IN REACTION TO LIMITED SURFACE-BASED PROGRAM**
- **COSTLY DRY-CORE DRILLING METHODOLOGY LIMITS BOREHOLES AND DATA**
- **INSUFFICIENT 3D DATA BASE WILL BE ESTABLISHED FOR:**
 - **SOIL GAS CIRCULATION (PNEUMATIC PATHWAYS)**
 - **FRACTURE FLOW/PERCHED WATER**
 - **MOISTURE CONTENTS**
 - **ISOTOPE HYDROLOGY AND HYDROCHEMISTRY**
- **INCREASED RISK THAT MODEL BOUNDARY CONDITIONS AND EXPERT JUDGEMENT WILL BE DEFICIENT OR WRONG**
- **AN ORDER-OF-MAGNITUDE IN COST SAVINGS PER BOREHOLE ARE PROJECTED FROM "OFF-THE-SHELF" DRILLING AND INSTRUMENTATION**

PROACTIVE INDEPENDENT SCIENTIFIC INVESTIGATION VADOSE ZONE DRILLING

- **NYE COUNTY HAS ACCESS TO TWO BLM PERMITTED SITES ON WHICH TO CONDUCT ITS DRILLING PROGRAM**
 - **NEAR, BUT OUTSIDE YUCCA MOUNTAIN CONTROLLED AREA**
 - **DRY, DUAL WALL, REVERSE CIRCULATION METHODOLOGY**
 - **CONTINUOUS CUTTINGS (AND PERIODIC CORE, IF NEEDED) AND LOGGING**
 - **ANALYTICAL SUPPORT FOR WATER SAMPLES, MOISTURE CONTENT AND PETROLOGY**
 - **QA AND SAMPLE MANAGEMENT ALTERNATIVES STILL UNDER CONSIDERATION**
- **WESTBAY INSTRUMENTATION PACKAGE WILL BE USED FOR CONTINUOUS MONITORING**
 - **ZONE ADJUSTED BY USE OF PACKERS**
 - **ANALYTICAL SUPPORT FOR MOISTURE CONTENT, PETROLOGY, GAS/GAS WATER/ WATER SAMPLES, AND OTHER ISOTOPIC/DATING**

PROACTIVE

**INDEPENDENT SCIENTIFIC INVESTIGATION
ON-SITE VADOSE ZONE DRILLING ALTERNATIVE**

- **NYE COUNTY AND YMP TECHNICAL PERSONNEL INFORMALLY EXPLORED COORDINATED ON-SITE DRILLING INITIATIVE**
- **FORMAL CONSIDERATION SINCE JUNE 16, 1993; FOUR NYE COUNTY BOREHOLES UNDER CONSIDERATION**
 - **THREE BOREHOLES IN CONJUNCTION WITH CURRENTLY EXISTING WATER TABLE BOREHOLES**
 - **ONE BOREHOLE AT A FUTURE UZ BOREHOLE LOCATION**
- **VALUE ADDED FOR DOE: IMPROVED 3D ACQUIFER PARAMETER DATASETS MEET NRC CONCERN AND ENHANCED DATA BASE**
- **VALUE ADDED FOR NYE COUNTY: SITE-SPECIFIC DATA COLLECTION AND OPPORTUNITIES TO CONDUCT CROSS-BOREHOLE TESTING**

PROACTIVE INDEPENDENT SCIENTIFIC INVESTIGATION VADOSE ZONE DRILLING

COMPARISON OF NYE COUNTY "OFFSHELF" DRY DRILLING DATASETS AND DOE YMP DATASETS

DRILLING DATASET	NYE COUNTY "OFFSHELF" DUAL WALL DRY DRILLING	YMP LM - 300
CONTINUOUS CORE		X
WIRESLINE CORE, SIDEWALL CORE	X	
STRATIGRAPHY/LITHOLOGY	X	X
MATRIX MOISTURE CONTENTS	X	X
FRACTURE MINERAL COATINGS	X - CUTTINGS	X - CORE
FRACTURE APERTURES		X - CORE
RECOGNITION PERCHED WATER	X	X
RECOGNITION REGIONAL SATURATION	X	X
SAMPLES OF WATER DURING DRILLING	X	?
VERTICAL WATER SAMPLE PROFILING	X	?
GEOPHYSICAL LOGGING	X	X
FRACTURE IMAGING	X	X
NEUTRON LOGGING	X	X
MOST OTHERS	X	X

PROACTIVE INDEPENDENT SCIENTIFIC INVESTIGATION VADOSE ZONE DRILLING

COMPARISON OF NYE COUNTY "OFFSHELF" DRY DRILLING DATASETS AND DOE YMP DATASETS

INSTRUMENTATION (MONITORING)	WESTBAY MULTIPOINT	VARIABLE INSTALLATIONS
MULTIZONE WATER SAMPLING	X	X
MULTIZONE GAS SAMPLING	X	X
MULTIZONE GAS PRESSURE	X	X
MULTIZONE FLUID POTENTIAL	X	X
MULTIZONE TEMPERATURE	X	X

PROACTIVE INDEPENDENT SCIENTIFIC INVESTIGATION PROCEDURAL ARRANGEMENTS

- **PROTOCOL AGREEMENTS TO OPTIMIZE OVERSIGHT**
- **PROTOCOL FOR ON-SITE REPRESENTATION**
 - **PROMOTES TIMELY INFORMATION EXCHANGE**
 - **ASSURES COUNTY ACCESS TO REPOSITORY PERSONNEL AND ACTIVITIES; SPLIT SAMPLES AND CORE FOR ANALYSIS; AND RAW, UNPUBLISHED DATA**
- **PROTOCOL FOR COORDINATED ON-SITE DRILLING IS STILL BEING NEGOTIATED**
 - **DEFINES ROLES AND RESPONSIBILITIES**
 - **ISSUES ARE ENVIRONMENTAL LIABILITIES, "APPLES AND ORANGES" COMPARISON AND THE APPROPRIATENESS OF NYE CONDUCTING DRILLING ON-SITE**
 - **DIFFERENCES WILL LIKELY BE RESOLVED; HOWEVER, TIMING IS INCREASINGLY BECOMING A FACTOR**
- **NYE COUNTY IS PREPARED TO RETURN TO ITS BLM PERMITTED SITES**

ADDITIONAL BACKGROUND INFORMATION

REPOSITORY OVERSIGHT PROGRAM

- **COUNTY BEGAN ACTIVE INVOLVEMENT IN REPOSITORY OVERSIGHT ISSUES IN 1983 (NWPA)**
- **ORIGINAL FUNDING THROUGH STATE OF NEVADA**
- **SOUGHT AND RECEIVED STATUTORY STANDING AS "SITUS" AFFECTED UNIT OF LOCAL GOVERNMENT (NWPAA, 1987)**
- **INDEPENDENT FUNDING FOR MONITORING AND OVERSIGHT WAS RECEIVED IN 1988; FY93 AT \$2.2 MILLION**
- **PROGRAM EMPHASIS**
 - **TECHNICAL OVERSIGHT/ON-SITE MONITORING**
 - **REGULATORY AND LICENSING PARTICIPATION**
 - **SOCIOECONOMIC MONITORING AND ASSESSMENT**

STATUTORY OVERSIGHT AUTHORITY - NWPAA 1987 REPOSITORY OVERSIGHT PROGRAM

- **DESIGNATE AND MAINTAIN AN ON-SITE REPRESENTATIVE**
- **REVIEW DOE ACTIVITIES FOR PUBLIC HEALTH AND SAFETY, ECONOMIC, SOCIAL AND ENVIRONMENTAL IMPACTS**
- **DEVELOP REQUEST FOR FINANCIAL AND TECHNICAL ASSISTANCE**
- **ENGAGE IN MONITORING, TESTING, OR EVALUATION**
- **PROVIDE INFORMATION TO COUNTY RESIDENTS**
- **REQUEST INFORMATION FROM, AND PROVIDE COMMENTS TO, ENERGY SECRETARY**

TECHNICAL OVERSIGHT APPROACH REPOSITORY OVERSIGHT PROGRAM

- **#1 REPOSITORY OVERSIGHT PROGRAM OBJECTIVE IS TO PROTECT PUBLIC HEALTH AND SAFETY**
- **FORMAL POSITION ON YUCCA MOUNTAIN SUITABILITY OR UNSUITABILITY FOR REPOSITORY HAS NOT BEEN TAKEN**
- **COUNTY CANNOT ACCEPT OTHERS' ASSURANCES THAT NYE'S WELL-BEING, AND OVERALL INTERESTS, WILL BE PROTECTED**
 - **YUCCA MOUNTAIN IS SOLE CANDIDATE SITE**
 - **EFFORTS TO PREMATURELY CLOSE ON LICENSING ISSUES**
 - **EFFORTS TO ADJUST STANDARDS TO SITE-SPECIFIC CONDITIONS**
 - **FINANCIAL INCENTIVE AND INSTITUTIONAL INCLINATION TO "LEGISLATE-AROUND" AND "ENGINEER-AROUND" SITE DEFICIENCIES**
 - **INSUFFICIENT "DATA DENSITY" ON YUCCA MOUNTAIN; OVER-RELIANCE ON USE OF MODELS AND EXPERT JUDGEMENT**
 - **LIMITED PROACTIVE OVERSIGHT UNDERWAY BY OTHER AGENCIES**

PROACTIVE INDEPENDENT SCIENTIFIC INVESTIGATION

- **PROACTIVE OVERSIGHT MUST BE STRATEGICALLY IMPLEMENTED**
 - **MAXIMUM IMPACT FROM LIMITED RESOURCES**
 - **TARGET SELECTED KEY ISSUES AFFECTING HEALTH AND SAFETY**
 - **OFFER SUFFICIENT CHALLENGE TO MAINTAIN INTEREST OF TOP-FLIGHT SCIENTISTS**
 - **DEMONSTRATE FEASIBILITY OF OTHER RESEARCH METHODOLOGIES IF:**
 - **POTENTIALLY MORE EFFECTIVE AND/OR LESS COSTLY**
 - **CAN IMPACT BREADTH AND DEPTH OF EMPIRICAL KNOWLEDGE OF SITE**
- **OPTIMAL PROACTIVE OVERSIGHT REQUIRES PROCEDURAL ARRANGEMENTS WITH OCRWM/YMP**

PROACTIVE INDEPENDENT SCIENTIFIC INVESTIGATION

- **KEY SITE PERFORMANCE ISSUES IDENTIFIED**
 - **VADOSE AND SATURATED ZONE HYDROGEOLOGY**
 - **DISTURBED ZONE SITE PERFORMANCE**
 - **HOT THERMAL LOAD SCENARIO**
 - **DISTURBED ZONE BOUNDARY DEFINITION**
 - **CLIMATE CHANGE PERFORMANCE**
 - **RETARDATION OF RADIONUCLIDES**
 - **TECTONIC/VOLCANIC AND SEISMIC RISKS**
 - **AGE DATING PROCESSES**
- **KEY ISSUE SUBSET TARGETED FOR ISI FOCUS BASED UPON PREVIOUSLY DESCRIBED STRATEGIC CONSIDERATIONS**

PROACTIVE

**INDEPENDENT SCIENTIFIC INVESTIGATION
FISCAL YEAR 1993-1994 PROGRAM**

- **VADOSE ZONE DRILLING, TESTING AND MONITORING**
- **LABORATORY AND FIELD RESEARCH**
 - **BUILD ANALYTICAL CAPABILITY AND SCIENTIFIC TEAM**
 - **FOCUS: AGE DATING & ISSUE/FALSE ISSUE RESOLUTION**
 - **OXYHYDROXIDES/COLLOIDS**
 - **LATHROP WELLS VOLCANIC DATES**
 - **BOIL-OFF RATES FOR WELDED TUFF**
 - **AUTHIGENIC MINERAL AGE DATING**
 - **QUATERNARY STRATIGRAPHY**
 - **AGE DATING PROBLEMS**
 - **COSMOGENIC DATING AND SOIL CARBONATES**
- **REGIONAL HYDROGEOLOGY (CARBONATE, TUFF, ALUVIAL
AQUIFERS)**