U.S. DEPARTMENT OF ENERGY
CONTINENTAL SCIENTIFIC DRILLING - THERMAL REGIMES
VALLES CALDERA #2A PROJECT

• DRILLING AND LOGISTICS

LOCALE: SULPHUR SPRINGS, VALLES CALDERA, NEW MEXICO
DEPTH: 528 m (1731 FT)
BOTTOM HOLE TEMPERATURE: 212°C (414°F)
CORE RECOVERY: >98%; "H" TO 528 m
COST: $190,000
SPUD DATE: SEPTEMBER 3, 1986
COMPLETION: SEPTEMBER 28, 1986
RIG: DIAMOND CORE, LONGYEAR 44
MUD: POLYMERS, BENTONITE, SODA ASH
STATUS: AVAILABLE UNTIL AT LEAST 1990; FLOWING
SPECIAL CONCERNS:

A) BLOWOUT PREVENTER NECESSARY
B) H_2S MONITORING NECESSARY (>1000 PPM H_2S)
C) THREE CASINGS WITH ACID RESISTANT CEMENT
D) SPECIAL CORE RETRIEVAL SYSTEM BUILT
E) LOGS (NEUTRON, GAMMA, TEMPERATURE (8), PRESSURE (4), SPINNER (4)
F) PERFORATION OF LINER: 3 m @ 490 m AND 210°C
G) FLUID SAMPLES: SEVERAL COMPLETE SUITES BY SURFACE FLOW TESTS; ONE COMPLETE SUITE BY IN SITU SAMPLER

HOLE IDENTIFICATION: RDO-8 (GRDO)
VC-2A (GENERAL USAGE)

• SCIENTIFIC OBJECTIVES

1. PENETRATE VAPOR-DOMINATED ZONE AND "BOILING INTERFACE" BETWEEN LIQUID AND VAPOR-DOMINATED ZONES TO INVESTIGATE PLUMBING AT TOP OF HIGH-TEMPERATURE HYDROTHERMAL SYSTEM.
2. DETERMINE AGE AND EVOLUTION OF VAPOR-DOMINATED ZONE.
3. INVESTIGATE POSSIBLE ORE MINERALIZATION IN ACTIVE HYDROTHERMAL SYSTEM.
4. INVESTIGATE STRUCTURE AND STRATIGRAPHY AT INTERSECTION OF RING-FRACTURE ZONE AND WESTERN RESURGENT DOME.

• INSTITUTIONAL INVOLVEMENT

PRINCIPAL INSTITUTIONS: LOS ALAMOS NATIONAL LABORATORY AND UNIVERSITY OF UTAH RESEARCH INSTITUTE (SCIENCE), SANDIA NATIONAL LABORATORIES (DRILLING)
OTHER DOE LABS: LAWRENCE BERKELEY LABORATORY, ARGONNE NATIONAL LABORATORY
U.S. GEOLOGICAL SURVEY
SEVEN U.S. UNIVERSITITIES

• FOREIGN PARTICIPATION

GEOLOGICAL SURVEY OF JAPAN
TOKYO UNIVERSITY (JAPAN)

• NEW KNOWLEDGE GAINED THUS FAR

1. ACID (STEAM-CONDENSATE) ZONE AT SURFACE ONLY 5 m THICK.
2. VAPOR-DOMINATED ZONE EXTENDS TO ~240 m.
3. VAPOR- AND LIQUID-DOMINATED ZONES ARE SEPARATED BY REGION OF FRACTURED BUT TIGHTLY SEALED ROCK.
4. PERFORATED ZONE @ 490 m CONTAINS LIQUID-DOMINATED (NEUTRAL-CLHORIDE) FLUID WITH HIGH Cl, As, B, Br, AND Li; TDS ≃6000 mg/kg.
5. SUB-ORE GRADE MOLYBDENUM DEPOSIT DISCOVERED FROM 35 TO 150 m (≤0.6 wt% MOS_2).
6. MINERAL ASSEMBLAGE IN MOLY ZONE INDICATES FORMATION FROM LIQUID-DOMINATED SYSTEM. FLUID INCLUSIONS INDICATE FORMATION TEMPERATURES OF 200 TO 225°C.
7. DATING INDICATES MOLY ZONE <1.0 Ma BUT >0.5 Ma; THUS, VAPOR-DOMINATED ZONE <0.5 Ma.
8. BEDDING IN IGNIMBRITE CORE INDICATES UP TO 45° OF ROTATION DUE TO INTRACALDERA SLUMPING AND/OR RESURGENCE.