

NYE COUNTY EARLY WARNING DRILLING PROGRAM

INTERIM STATUS REPORT



**Nye County Nuclear Waste Repository Office
Pahrump, Nevada**

HYDROSTRATIGRAPHY

AQUIFER TESTING

WATER CHEMISTRY

HOT WATER

PHASE 2 PLANS

Presented to:

Nuclear Waste Technical Review Board

July 28th - 30th 1999

Presented by:

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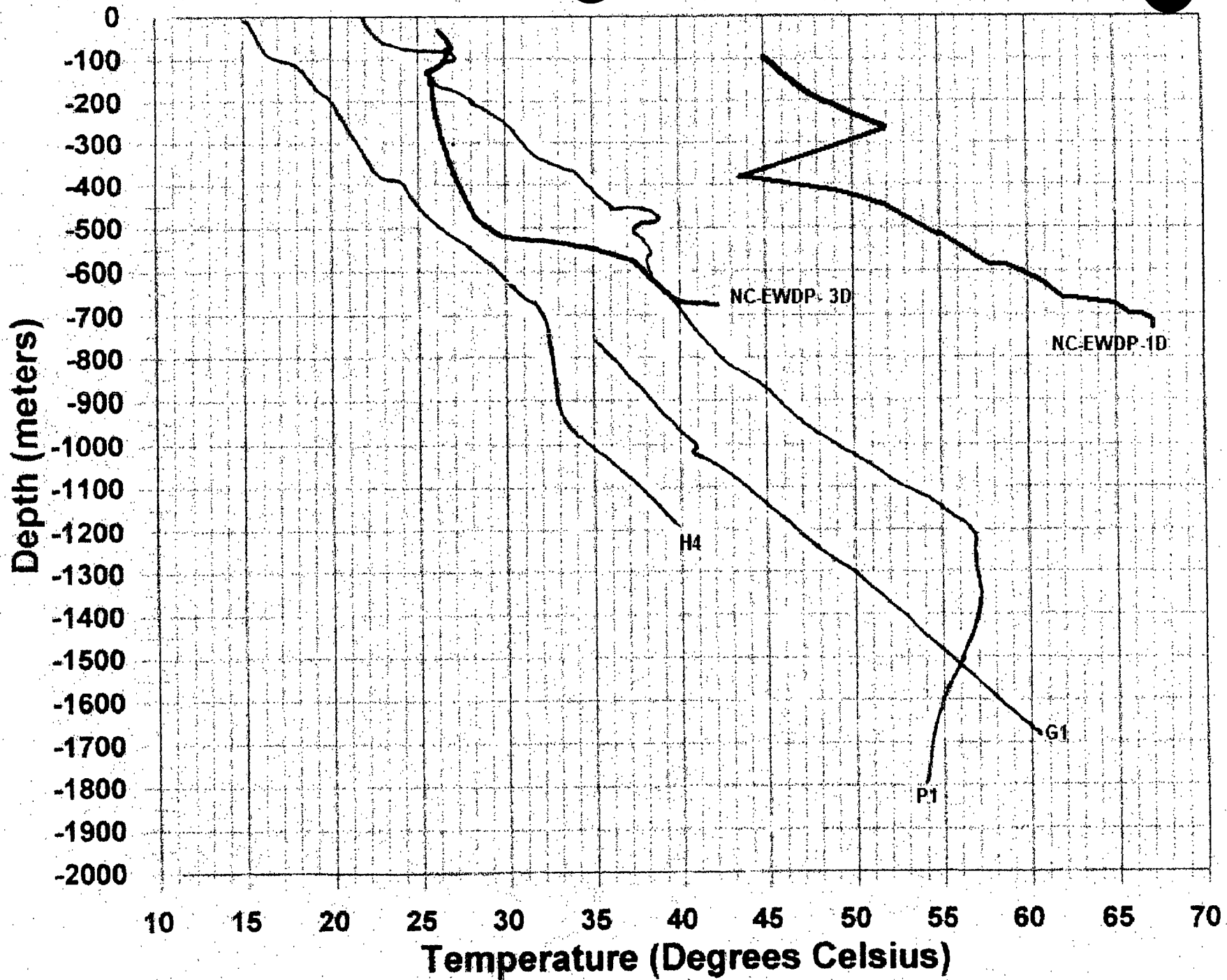
HOT WATER

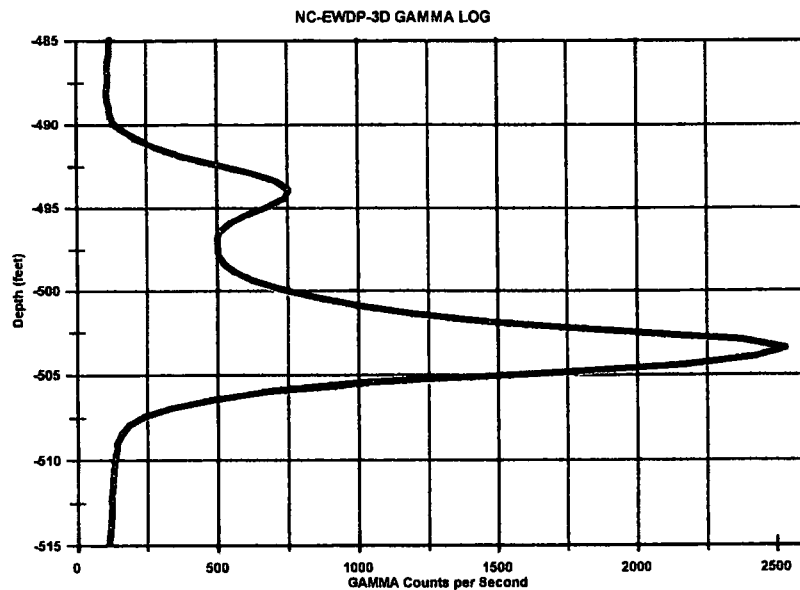
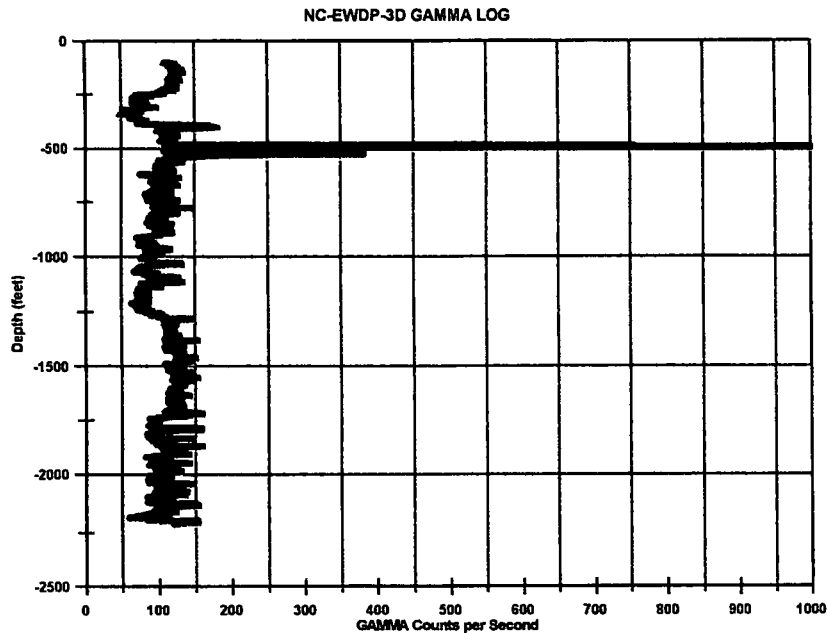
LIMITATIONS

- o **Steep temperature profiles were detected during geophysical logging at NC-EWDP-1D and NC-EWDP-3D. These logs were completed in open boreholes.**
- o **Direct comparison with past temperature logs is complicated by differences in approach.**

OBSERVATIONS

- o **Borehole temperature logs suggest significantly higher thermal gradients in the vicinity of NC-EWDP-1D and NC-EWDP-3D.**
- o **Strontium data suggest that the thermal signatures may not be reflecting a single source.**
- o **Hot water at 1D may have greater contribution from carbonate aquifer (high temp, high Strontium).**
- o **Hot water at 3D may reflect less contribution from carbonates (steeper gradient, lower temp, low Strontium).**
- o **The gamma spike at 3D may be providing additional clues.**





NC-EWDP-Gamma Spike

EVALUATION

- o Geophysical logs were rerun to verify spike.
- o Petrographic analysis of selected samples
- o Evaluation of water chemistry data

OBSERVATIONS

- o The gamma spike occurs at depth of 490-507' near the base of a 190' thick volcanic unit (Bullfrog Tuff) in a black ash flow tuff.
- o Peak in magnetic susceptibility coincides with gamma spike and is likely related to high concentration of hematite.
- o Peak Uranium activity coincides with gamma spike...no corresponding peaks in either Potassium or Thorium.
- o Pyrite is present through interval from 440-640' along with abundant iron oxides/hydroxides (goethite, limonite, and locally magnetite).
- o Presence of both pyrite and magnetic suggests thermodynamic disequilibrium.
- o Uranium mineralogy is still unknown but likely occurs as hydroxide secondary minerals (alteration products?)
- o Well displays an elevated temperature profile....gamma spike coincides with lowest temperature in borehole.

Speculation on the Source of the Gamma Spike

- 1. Injection of mafic magma in a dike feeding the Lathrop Wells Volcanic Center**
- 2. A pulse of uranium enriched hot water rises through the Pavits Spring Fm. to the base of the overlying volcanics.**
- 3. Groundwater oxidizes iron in the volcanics resulting in coexistence of pyrite with iron oxides and hydroxides.**
- 4. Uranium is deposited in lower volcanics as a "front" at the chemical boundary of the tuff.**

Other Observations - On-Going Activities

- o The current thermal profile suggests a remnant of a steeper profile associated with the mafic intrusion and volcanic activity.**
- o The lower strontium values at NC-EWDP-3D suggest that upwelling of hydrothermal water from the carbonate aquifer is not as likely as at NC-EWDP-1D.**
- o Additional petrographic studies are on-going to identify the uranium mineralogy, the mineralogy of the deeper sections of the borehole, and more definition of the iron mineralogy.**
- o Water samples were collected from 2 zones in NC-EWDP-3S in May 1999; results are pending.**

WHAT'S NEXT

- o **Evaluation of results from May 1999 samples**
 - Will look at K:NA:SiO₂
 - Strontium profiles

- o **Logging of NC-EWDP-1D inside of casing strings.**
 - Will log using existing temperature probe
 - Should allow an “apples to apples” comparison

- o **Any suggestions??**

PHASE 2 PLANS

o Deepen NC-EWDP-3D.

- obtain deeper temperature profile
- collect vertically distributed water samples
- determine depth to carbonate aquifer (hopefully).

o Longer-term, higher-discharge aquifer test at the Jackass Aeropark well.

- After the growing season is over...probably 7 to 10 days.
- Continuous monitoring at observation wells.
- Change from test well at NC-EWDP-4D to piezometers set above and below clay.

o Change NC-EWDP-12S from monitoring well to test well.

- test hydraulic communication between aquifers and across fault

o Investigate spring deposits, aquifers, and water levels in Crater Flat at NC-EWDP-7S.

- Define depth to water in paleodischarge area
- Define gradients in part of Crater Flat.

o Additional Deep and Intermediate Drilling

- Deep wells to carbonates at NC-EWDP-6D, 12D, 15D, and 20D
- Intermediate depth wells at NC-EWDP-7S, 22S, and 23S