

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES
TRIP REPORT

SUBJECT: Trip Report for Observation and Sampling of Nye County Early Warning
Drilling Program Wells
(20.06002.01.141.011)

DATE/PLACE: September 28 thru October 3, 2003
Nye County, Nevada

AUTHORS: Bradley Werling and Miriam Juckett

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PERSONS PRESENT:

Bradley Werling and Miriam Juckett of the Center for Nuclear Waste Regulatory Analyses (CNWRA) traveled to Las Vegas and Nye County, Nevada to participate in a Nye County Early Warning Drilling Program sampling event. Representatives of Nye County invited several organizations to participate and collect water samples from completed wells in the Early Warning Drilling Program. The number of organizations and individuals participating in the sampling event varied from day to day. Participants included representatives of Nye County and its subcontractors, Los Alamos National Laboratory, United States Geological Survey, State of Nevada, U.S. Department of Energy (DOE)/Bechtel SAIC Company and the University of Nevada at Las Vegas.

BACKGROUND AND PURPOSE OF TRIP:

Nye County, with funding from the DOE, established the Early Warning Drilling Program in fiscal year 1999. The Early Warning Drilling Program is designed to protect residents of Nye County against potential radionuclide contamination and to produce data regarding the geology, chemistry, and hydrology of strata located along the potential flow path of groundwater emanating from Yucca Mountain and vicinity. CNWRA staff participated in the recent sampling event to observe practices and procedures used to collect water samples for the DOE Yucca Mountain program and to obtain water samples for independent chemical analyses.

The Early Warning Drilling Program has proceeded in several phases. Most of the work during this sampling event involved the recently completed Phase IV Early Warning Drilling Program wells (NC-EWDP-16P, 24P, 27P, 28P, and 29P). Two Phase II wells (NC-EWDP-4PB and 19P) were also sampled. See Figure 1 for approximate location of the Early Warning Drilling Program boreholes. In general, the phase IV wells were located west of Fortymile Wash and north of Lathrop Wells Cone wells. Nye County will provide detailed descriptions of each borehole, including summary lithologic logs, water level data, and well completion information at their web site (www.nyecounty.com) under the Early Warning Drilling Program section.

In general, the depth and nature of construction for the Early Warning Drilling Program wells can be discerned from the well designation. Those designated as "P" wells are piezometers and are

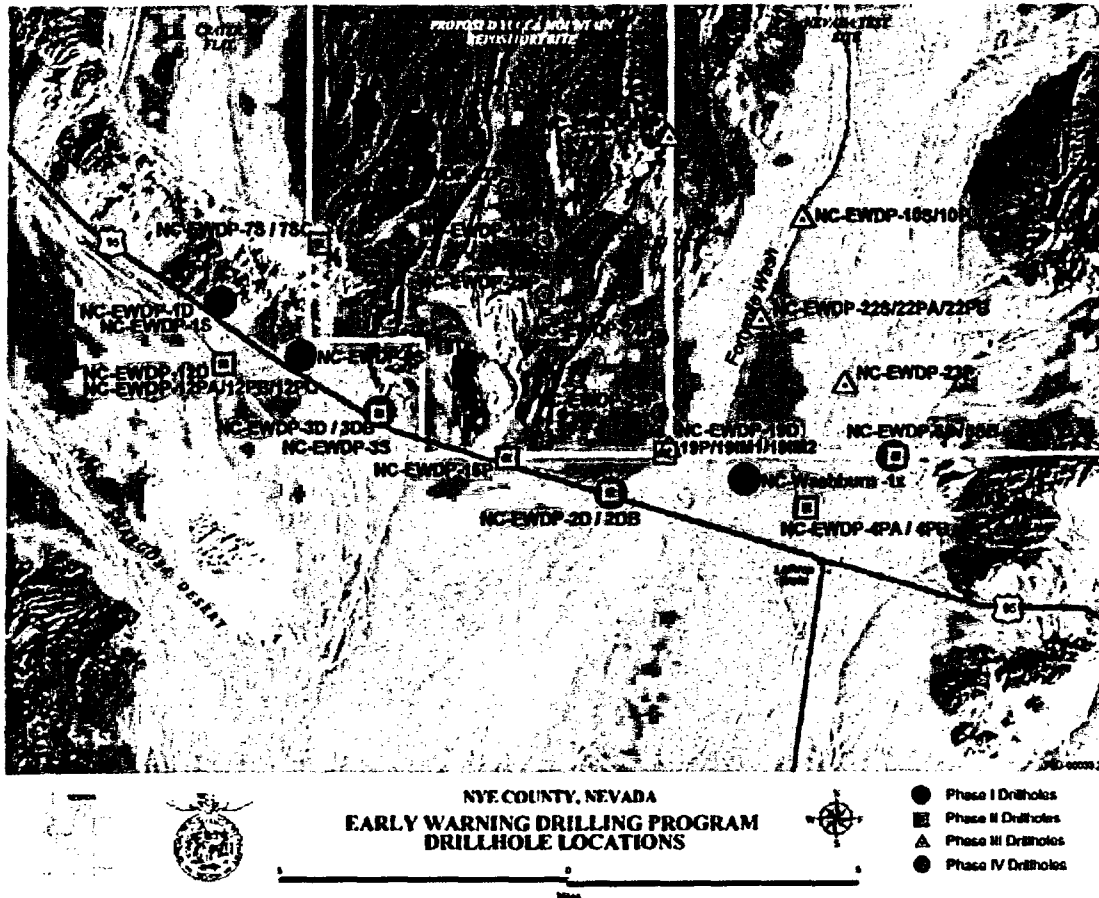


Figure 1. Approximate Locations of Early Warning Drilling Program Wells. Image Courtesy of Nye County (www.nyecounty.com)

completed with one or multiple separate PVC pipes (2 inches in diameter) that are screened at discrete depths. All of the wells sampled during this event were "P" wells that contained only one screened area or zone.

SUMMARY OF ACTIVITIES:

Nye County plans to conduct sampling of various Early Warning Drilling Program wells from the end of September through November 2003. Nye County's original plans for the week of September 29 to October 3, 2003 called for the sampling of eight wells. CNWRA staff planned to participate during the first four days, sampling from seven wells. Well 16P produced only very turbid water when pumped. Attempts by Nye County to clean the well by airlifting were unsuccessful. Therefore no samples were collected from 16P. Nye County has not determined when 16P will be rescheduled for sampling. The actual pump rates were about half of the expected pump rates. In order to remain on schedule, Nye County personnel brought in a contractor to pump well 4PB overnight.

Sampling generally proceeded with Nye County personnel opening the well, measuring and recording static water level, installing the pumping apparatus, and purging the well. Wells were pumped to discharge at least three borehole volumes prior to sampling. Nye County personnel (K. Gilmore) and Los Alamos National Laboratory personnel (A. Meijer) each provided in-line monitoring probes that were capable of measuring pH, conductivity, oxidation-reduction potential, dissolved oxygen, and temperature of the well discharge. Data from these in-line probes could be used to monitor the adequacy of the well purging and for comparison with field measurements. Once samples were ready to be taken, each interested group collected water from the same discharge point, which was upstream of the discharge tubing for the in-line probe assemblies. The volume and type of container used for the collection of samples varied depending on the needs and interests of each organization collecting samples.

During the sampling event, CNWRA staff conducted field analyses and collected samples for subsequent laboratory analyses. For each well, approximately 3 liters of water were collected and were split and/or processed into subsamples for subsequent laboratory analyses. Sample types and quantities are listed in Table 1. CNWRA field analyses included measurement of temperature, pH, oxidation-reduction potential, conductivity, dissolved oxygen, and alkalinity. Table 2 provides preliminary results of CNWRA field measurements and readings collected from the Nye County in-line monitoring probe.

CONCLUSIONS:

The Early Warning Drilling Program continues to be a source for important site characterization information that will impact the licensing process. Additional chemical and mineralogical data gained from the Phase IV wells will help to bound radionuclide transport parameters used in predicting the potential for radionuclide migration and may provide information regarding the fate of water transported away from Yucca Mountain and vicinity.

OTHER PERTINENT ITEMS:

CNWRA plans to collect samples and conduct field analyses from NC-EWDP-19IM1 and 19IM2 (October 27-30, 2003) during this Early Warning Drilling Program sampling event that ends in November 2003.

PROBLEMS ENCOUNTERED:

None.

PENDING ACTIONS:

Chemical analyses of the water samples is underway.

RECOMMENDATIONS:

U.S. Nuclear Regulatory Commission (NRC) and CNWRA staff should continue involvement in the Early Warning Drilling Program. Through direct participation, NRC and CNWRA personnel

Table 1. Sample Types and Volumes Collected for Each Well During the September/November 2003 Early Warning Drilling Program Sampling Event. A Total of 6 Wells Were Sampled.

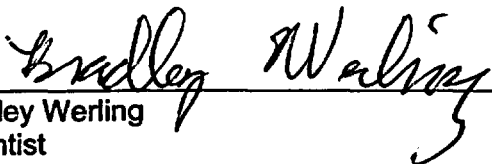
Sample volume and container type	Filtration	Preservation	Analyses
Two 40mL, amber glass	filtered, 0.45 μm	none	Inorganic carbon (in duplicate)
250 mL, amber glass	filtered, 0.45 μm	none	stable isotope ratio, (H/D and $^{16}\text{O}/^{18}\text{O}$)
500 mL, high density polyethylene	not filtered	none	anions, cations, trace metals
1 liter, high density polyethylene	filtered, 0.45 μm	none	anions, cations, trace metals
1 liter, high density polyethylene	filtered, 0.45 μm	1+1 HNO_3 (trace metal grade)	cations, trace metals

Table 2. Summary of Preliminary Field Chemistry Measurements for the September/November 2003 Early Warning Drilling Program Sampling Event

Well	Time of Sample	Water Temperature (°C)	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Eh (mV) (NHE)	Alkalinity (mg/L) (as CaCO ₃)	Measurement source
27P	12:00	34.8	8.26	427	3.05	586.3	176	CNWRA
24P	14:25	33.7	7.74	324	2.10	456.0	124	CNWRA
28P	0900	29.6	8.45	470	4.62	653.7	175	CNWRA
29P	0820	26.3	8.36	314	6.32	547.4	105	CNWRA
19P	1450	28.4	7.54	282	5.24	606.0	107-109	CNWRA
4PB	0820	22.6	9.38	323	6.96	507.8	106	CNWRA


can (i) improve communication with the public and interested parties, (ii) provide rapid response to procedural and quality assurance issues through awareness of sampling practices and (iii) be better prepared to evaluate the anticipated DOE license application based on a first-hand knowledge of the collection practices and limitations of the data generated within the Early Warning Drilling Program characterization process. These direct interactions and first-hand awareness are important to meeting NRC goals of increasing public confidence, reducing the regulatory burden, and streamlining the licensing process.

SIGNATURES:



Bradley Werling
Scientist

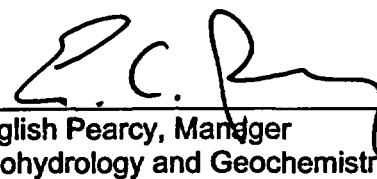
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Miriam Juckett
Scientist

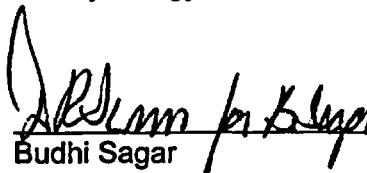
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