SUMMARY ANNUAL REPORT

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NYE COUNTY

NUCLEAR WASTE REPOSITORY PROJECT OFFICE

INDEPENDENT SCIENTIFIC INVESTIGATIONS PROGRAM

JULY 2000

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EXECUTIVE SUMMARY

This annual summary report, prepared by the Nye County Nuclear Waste Repository Project Office (NWRPO), summarizes the activities that were performed during the period from May 1, 1999 to April 30, 2000. The activities were conducted in support of the Independent Scientific Investigation Program (ISIP) of Nye County at the Yucca Mountain site.

The Nye County Nuclear Waste Repository Project Office (NWRPO) is responsible for protecting the health and safety of the Nye County residents. The NWRPO's On-Site Representative is responsible for designing and implementing the ISIP. Nye County has identified several key scientific issues of concern that may affect repository design. These issues have been studied and raised in reports and public meetings during the past four years by representatives of Nye County. The U.S. Department of Energy (DOE) has addressed many of the issues. However, some issues cannot be fully addressed until additional data are collected, analyzed, and evaluated.

Additionally, Nye County continues to conduct its own independent studies to evaluate the significance of these issues, and to determine whether or not further studies are needed. The reader is referred to previous reports (Nye County Nuclear Waste Repository Project Office, 1998a; Multimedia Environmental Technology, Inc. (MET), 1995; MET, 1996; and MET, 1997) for detailed explanations of the specific concerns and progress on Nye County's efforts toward resolving the many issues associated with the proposed repository at Yucca Mountain.

This report summarizes the results of monitoring from two boreholes and the Exploratory Studies Facility (ESF) tunnel that have been instrumented by Nye County since March and April 1995. The preliminary data and interpretations presented in this report do not constitute and should not be considered as the official position of Nye County. This report also provides summary information on Nye County's Early Warning Drilling Program (EWDP) and the preliminary findings that have resulted from this program in support of the ISIP.

Due to a focus shift towards efforts on Nye County's EWDP, several elements of the ISIP technical investigation remained inactive. The ISIP presently includes borehole and tunnel instrumentation, monitoring, and data compilation and analysis, as well as the preliminary numerical modeling activities that are being conducted to address the concerns of Nye County. The instrumentation has been largely completed and only the data collection activities and preliminary numerical modeling were continued during this report period. Data analyses efforts were limited to data reduction for presentation purposes; the analysis and evaluation of the data will be performed in the near future. A primary emphasis

was placed on the analysis and evaluation of the new data from EWDP wells and assessing the validity of numerical modeling as a predictive tool.

Nye County also continues to evaluate new data and information as they become available from the DOE's Yucca Mountain Project studies as part of the ISIP.

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this report is to summarize the results of the tasks performed and report on activities that were conducted in support of Nye County's Independent Scientific Investigation Program (ISIP) at the Yucca Mountain site during the period from May 1, 1999 to April 30, 2000. The largest element of Nye County's Yucca Mountain Project oversight activities is the ISIP. Under this program element, the County gathers its own data for independent analysis of geologic and hydrologic conditions at the site and monitors and reviews DOE's scientific characterization of Yucca Mountain.

The two major areas of the ISIP are divided into Technical Investigations and the Early Warning Drilling Program. Since early 1995, Nye County has monitored pressure and temperature instruments in boreholes UE-25 ONC#1 and USW NRG-4 using equipment installed by the County as part of its Technical Investigations. The purpose of these activities is to evaluate long-term pneumatic conditions at strategic depths below ground surface. The response to fluctuations in atmospheric conditions and other possible disturbances, including those resulting from site characterization activities such as the ESF tunnel construction, are being monitored. Nye County also installed instruments to measure temperature, pressure, humidity and wind speed within the Exploratory Studies Facility (ESF) and Enhanced Characterization of the Repository Block (ECRB) tunnel to understand the ventilation processes that could potentially impact the performance of the repository. Additionally, Nye County has collected gas samples from the vadose zone in ONC#1 to establish background conditions and to evaluate changes in the chemical composition of the gases. Changes in the chemical compositions of the gases in the vadose zone with time may be used to evaluate the impact of the ESF construction and to obtain transport properties of the rock mass at the site. Furthermore, Nye County is conducting numerical simulations to evaluate factors (including tunnel ventilation) that affect both short- and long-term pneumatic and moisture conditions in the repository host rock.

Nye County's Early Warning Program (EWDP) is actively drilling, sampling, and installing a network of strategically located monitoring wells to fill in the large gap in our understanding of the hydrologic environment and conditions in the region between the proposed repository and the County's populated areas in the Amargosa Desert and tributary hydrographic basins.

Nye County continues to evaluate new data and information as they become available from the DOE's Yucca Mountain Project studies. New data comes from a number of sources including Nye County's Early Warning Drilling Program, on-going studies being conducted by the Yucca Mountain Project, investigations by the State of Nevada, and work being sponsored by Nye County and being conducted by the U.S. Geological Survey and the University of Nevada.

An additional aspect of Nye County's investigation in the vicinity of Yucca Mountain is related to the evaluation of numerical modeling of groundwater flow, particularly with regard to the availability and suitability of the data being used to develop models. Nye County continued its evaluations of the regional and site-scale groundwater flow models. These evaluations have included the extraction of a portion of the YMP regional model to verify its suitability for use as input into the site-scale model (Nye County Nuclear Waste Repository Project Office, *in press* 2001).

1.2 INFORMATION PRODUCED THIS PERIOD

Information produced by Nye County as part of their ISIP is disseminated in a number of formats including formal reports, white papers, presentations, data packages, and posting to the Internet. The following is a list of the pertinent reports that Nye County has produced during the current reporting period:

1) Preliminary Numerical Model of the Amargosa Valley and Yucca Mountain Areas, Nye County, Nevada (Draft), September 1999.

2) Instrumentation, Calibration, Collection, and Processing of Data in Exploratory Shaft Facility Tunnels, Technical Procedure 9.3, October 1998.

3) Calibration of UE 25 ONC#1 Instrumentation, December 1999.

4) Analysis of Interference Test at Amargosa Valley, Nye County, Nevada, January 2000.

5) Analysis of Bond Gold Interference Test, Amargosa Valley, Nye County, Nevada, May 2000.

Nye County has been an active participant in the many meetings, workshops, and technical exchanges associated with YMP as part of the ISIP. Nye County has provided requested presentations to the Nuclear Waste Technical Review Board, the Advisory Committee on Nuclear Waste, the Death Valley Flow Model Technical Interaction and Devils Hole workshops, and the Nevada Test Site Community Advisory Board, among others. The presentations and interactions at these meetings have provided a valuable forum for the exchange of technical information and ideas.

Nye County has also prepared a number of white papers as part of its general oversight activities during the reporting period. These papers cover a broad spectrum of topics related to the Yucca Mountain Project and include:

1) Federal Land and Facilities in Nye County (White Paper No. 2)

2) The Nye County Nuclear Burden (White Paper No. 3)

3) Transferring the Nation's Nuclear Waste Burden to Nye County (White Paper No. 4)

4) Nuclear Facility Siting and Operation Protecting Site County (White Paper No. 5)

5) Nye County Nuclear Waste Repository Oversight Program (White Paper No. 6)

6) Groundwater Availability and Quality Issues (White Paper No. 7)

7) Nye County Comprehensive Community Protection Plan (White Paper No. 10)

8) Centralized Interim Storage of Spent Nuclear Fuel (White Paper No. 12)

9) DOE's High-Level Nuclear Waste Disposal Program: The Funding Problem (White Paper No. 13)

10) Post Licensing Oversight (White Paper No. 15)

11) Ongoing Institutional Oversight: Financial Assurances (White Paper No. 16)

Nye County has cooperated with the U.S. Geological Survey in the geologic mapping of quadrangles in southern Nye County. In 1999, the U.S.G.S. issued "Geologic Map of the Mound Spring Quadrangle, Nye and Clark Counties Nevada, and Inyo County, California" by S.C. Lundstrom, S.A. Mahan, R.J. Blakely, J.B. Paces, G.L. Dixon, and O.W. Young. Nye County has plans to continue this mapping effort with new quadrangles to be mapped in 2000 and 2001.

During the reporting period, Nye County made significant advances in the use of the Internet for the timely dissemination and distribution of data collected during the ISIP activities. Data collected at the ESF Tunnel, ONC-1, and NRG-4 are available on Nye County's web page (www.nyecounty.com) in both spreadsheet and graphical form. Data from the EWDP is presented for each monitoring well location and includes field lithologic logs, well completion diagrams, summary lithologic logs, geophysical logs and daily drilling summaries.

Finally, Nye County continues its publication of the NWRPO UPDATE, a newsletter that has a wide distribution throughout Nye County and Nevada. This newsletter is focused on the citizens of Nye County and provides them with up-to-date information on the status and progress of not only the County's activities, but YMP, State of Nevada, and Nuclear Regulatory Commission activities as well.

1.3 SIGNIFICANT FINDINGS

Findings identified during this period of investigation are summarized below.

1) Data from ESF and ECRB showed that ventilation has a significant and potentially long-lasting effect on the moisture conditions in the vicinity of the proposed emplacement tunnels. Ventilation experiments should be designed to obtain data at conditions predicted for the repository. The naturally-ventilated repository experimentation might be much less costly than the current heated alcove experiment.

2) Evaluation of some of the reports and experimental results from the heated alcove tests leads Nye County to concur with the conclusion of the expert elicitation panel. The panel concluded that complexity of the coupled thermal, hydrological, mechanical, and chemical effects are almost impossible to model and evaluate with the current state-of-the-art analytical tools.

3) Data collected as part of the EWDP suggests that existing numerical flow models at both the regional and the site-scale level are hampered by the lack of data and the lack of a comprehensive conceptual model of the hydrologic regime and conditions in the Yucca Mountain region.

4) The preliminary findings of the EWDP include higher than expected groundwater temperatures, permeable zones in the aquifers of the region that could provide fast pathways for contaminant transport should the proposed repository at Yucca Mountain not provide full containment of the high-level wastes. Other findings include a high degree of compartmentalization of the aquifers present in the region.

2.0 COLLECTION AND ANALYSIS OF ONC1, ESF, and ECRB DATA

Monitoring of ONC#1 was continued as in previous years. Instrumentation in NRG-4 was removed previously so that it could be used in the EWDP wells. Evaluation of the data from NRG-4 well indicated that adequate temperature and pressure data were obtained from this borehole, and preliminary data analysis has begun. The data will be used in numerical simulations of the unsaturated zone with the emphasis on pneumatic pathway and ventilation analysis.

Nye County instruments were placed in the ECRB prior to sealing the tunnel with the bulkhead. Unfortunately, most of the data were lost due to inadequate battery life and power failure.

2.1 RESULTS OF MONITORING

This section briefly describes the results of monitoring pressure and temperature in UE-25 ONC#1. Figures 2.1 through 2.3 are example plots of the data obtained from this borehole.

Figure 2.1 illustrates the change in piezometric head in the saturated zone. There was a slight rise in the piezometric head (about 0.3 feet) in both zones that are the near water table, followed by a drop in piezometric head early in August. The drop in piezometric head might be attributable to the earthquake that occurred early in the morning of August 2nd, 1999 (see Section 5); however, the data are not strong enough to make a definite conclusion.

Pneumatic pressure heads in all seven unsaturated zone probes are plotted in Figure 2.2. The pneumatic head is calculated by subtracting the pressure exerted by the column of the air above each probe. This correction normalizes the reading in the pressure probes to that of the atmospheric probe (Port0). The data suggest that all probes have been responding almost synchronously to barometric changes. These data indicate that most of the Topopah Springs Welded Unit responds to the changes in the atmospheric pressure in the ESF tunnel.

In Figure 2.3, the pneumatic gradient is compared with the pressure fluctuations in the ONC#1 borehole for the period from April 1 to April 19, 2000. The pneumatic gradient is calculated by subtracting the pneumatic head measured by the borehole probe from that measured by the atmospheric probe. Figure 2.3 shows that for the month of April 2000, airflow was mostly upward. Similarly, Figure 2.4 is a comparison of the pneumatic gradient with the pneumatic head for the months of November and December of 1999, when the gradient was more pronounced. This observation might be attributed to the severity of the weather changes in winter.

Data from EWDP boreholes are presented in Figures 2.5 through 2.7 for a selected time period (April 1999 through May 2000). The response to an earthquake is pronounced in Figure 2.5 for

NC-EWDP-1S. Only Probe 2, which is about 228.2 feet below ground surface, seems to have responded to the earthquake event. At the end of August, the piezometric level had almost recovered completely. However, in early September, another steep decline in the piezometric level was observed. This response is attributed to changes in well instrumentation and other activities that occurred at the well.

Figure 2.8 shows location of the underground environmental monitoring stations that have been monitored for air temperature, pressure, humidity, air velocity, and rock moisture conditions by U.S. Geological Survey and Nye County during the period from 1999 to 2000. The tunnel-boring machine (TBM) stations refer to the set of instruments that was mounted on the TBM and that moved with the TBM. Data for the moving stations have been presented in previous annual reports.

Figures 2.9 through 2.11 present samples of the data set collected during construction of the ECRB. The time period was selected to present maximum data coverage available. The relative humidity, temperature, pressure, and air velocity were monitored by Nye County instruments mounted in the 17.5 ft diameter ECRB tunnel. Figures 2.10 and 2.11 show matric potentials monitored by heat dissipation probes installed at various depths into the host rock by U.S. Geological Survey. Evaluation and analysis of these data are currently underway. Nye County and the U.S. Geological Survey have obtained additional data since completion of the ECRB. Nye County is awaiting receipt of the complete data set from the U.S. Geological Survey to conclude its analysis. The data obtained from ECRB are of particular interest and importance in design of ventilation systems, and for predicting the impact of ventilation on removal of rock moisture.

There are a few observed effects that confirm the conclusion reached earlier from analysis of the mobile stations mounted on the ESF TBM. As the forced ventilation velocity increases, the humidity decreases due to introduction of relatively dry air from outside the tunnel. However, as the excavation is deepened, more freshly cut and wetter rocks are exposed to ventilation. For this reason, there seems to be a general increase in relative humidity as well as temperature.

All heat dissipation probes installed by the U. S. Geological Survey reflected relatively wet conditions (about 0.1 to 1 bar) and as the tunnel excavation progresses, the probes reflect dryer rock conditions. The dryer rock conditions result from moisture removal by ventilation.

2.2 CALIBRATION OF UE-25 ONC#1 INSTRUMENTS

A down-hole calibration check was performed as part of requirements and procedures set forth in NWRPO's Technical Procedure TP-9.2. In this procedure, down-hole Westbay instruments are disengaged from the measuring ports and left hanging in the borehole, while datalogging proceeds as if formation data are being collected. Because the pressure in the Westbay casing is known, the air (or water) column in the tube can be used to check the performance and reliability of the instruments. The procedure is not intended

to replace laboratory calibration. Because of transportation, assembly, and other downhole complications, the procedure is intended to ensure that the calibrated transducers are assembled correctly and are functioning properly.

The purpose of this section is to report on the measurements, findings, and interpretation of the data obtained during down-hole calibration of ONC#1 borehole. The purposes of and requirements for the calibration are described in TP 9.2.

2.2.1 Data Collection Procedures

The procedures for data collection are described in TP 9.2 and will not be repeated here.

2.2.2 Data Analysis Procedures

Initially, manual calculation of the pressure with depth for the air column is performed to provide a base-line initial pressure profile. Because in air, variation of pressure with depth is non-linear and depends on both temperature and pressure, the final calculation of the pressure profile is performed using the A-T2VOC model. The A-T2VOC model incorporates a comprehensive variable equation for air and water that provides a more accurate pressure profile.

Figure 2.12 is a schematic diagram of the instrumentation and stratigraphy in ONC#1. A one-dimensional mesh for calculation of pressure is also shown. Figure 2.13 shows the temperature variation with time and Figure 2.14 shows pressure variation with time, during the calibration period for the unsaturated zone probes (the upper seven MOSDAX probes). Figure 2.15 is a plot of the variation with time of the pressure in the saturated zone probes.

All the probes except PRB-8 functioned normally during calibration; both temperature and pressure for PRB-8 appeared erratic. Examination of the data prior to disengaging the probes (Figures

Table 1 - Absolute deviation from mean difference between various probes and Probe-0 (atmospheric).

	PRB-0	PRB-1	PRB-2	PRB-3	PRB-4	PRB-5	PRB-6	PRB-7	PRB-8	PRB-9
Depth in feet	0.0	517.6	778.4	1029.4	1167.2	1201.6	1231.2	1334.5	1477.2	1501.8
Absolute deviation from mean	0.011	0.003	0.003	0.004	0.004	0.004	0.005	0.005	1.241	0.007
Mean pressure	12.882	13.130	13.261	13.384	13.423	13.444	13.456	13.493	22.105	29.107

2.16, 2.17, and 2.18) indicates that all probes were functioning normally prior to disengagement. It is suspected that during calibration, PRB-8 was not fully dislodged from the measuring port.

To test the stability of the probes, the difference in pressure between each probe and the atmospheric probe is calculated. The raw data are used and the value of the atmospheric pressure is subtracted from the pressure of a particular probe at the same time. Because the casing tube is open to the atmosphere, the lag time for pressure transfer is very small and not sensed within the logging interval of 5 to 15 minutes.

These differences for all the logged times during the calibration period are plotted in Figure 2.19. All probes responded to atmospheric fluctuation synchronously except for PRB-8. The absolute deviations from the mean are also plotted for all the probes; PRB-8 has the largest deviation. Table 1 summarizes the differences. All deviations are less than 0.01 psi except for PRB-8. Therefore, it is believed that all probes except PRB-8 experienced minimal drift.

Figure 2.20 is a plot of the result of A-T2VOC calculation compared with the mean pressure of the probes in the unsaturated zone. The largest deviation in this case is about 0.0725 psi. Considering variations during calibration period, this value shows excellent correlation between the measured and calculated values. Figure 2.21 presents calculation of the difference between down-hole and the atmospheric pressures. Because the temperature of the probes was used to calculate the pressures, the reliance on the temperature values is also verified in this process.

To examine the response time of the uppermost unsaturated-zone probe (PRB-1) to the atmospheric fluctuations, a regression plot of PRB-0 and PRB-1 is shown in Figure 2.22. During most of the calibration process the response is synchronous except for two points. It should be noted that in those two cases, the amount of deviation is less than 0.02 psi. This deviation can be attributed to the lag time required for the pressure wave to travel 517.6 feet in a 2.25-inch tube (the inside diameter of the Westbay casing). Figure 2.23 shows the responses with time for the two probes. The pressures for Probe-1 in this figure are shifted by a constant value for comparison purposes.

The results of the 24-hour calibration demonstrate that all probes have been functioning properly as installed. Functionality of PRB-8 could not be verified because of the potential problem in disengagement of the probe.

3.0 COLLECTION AND ANALYSIS OF EWDP DATA

3.1 RESULTS TO DATE

To date, Nye County has completed Phases I and II of the EWDP. These two phases have included almost 20,000 feet of exploratory drilling and sampling, the construction of 18 wells and piezometers at ten locations, the completion of five aquifer tests, and aeromagnetic and gravity surveys of a large area of southern Nye County. Additionally, conductor casings have been drilled and set at two additional locations for deep drilling during Phase III. Seventeen of the EWDP wells have been pumped and water samples obtained for chemical analyses.

The EWDP has resulted in a number of preliminary findings that were summarized briefly in Section 1.3. To date, the EWDP has confirmed that flow within the regional hydrologic regime is compartmentalized, both laterally and vertically. The potentiometric data collected to date has established that there are areas of shallow groundwater that are likely associated with geologic structures and that upward vertical hydraulic gradients predominate throughout a large area of the north–central portions of the Amargosa Desert hydrographic basin. Nye County's scientists continue to work with the data from the EWDP and the County continues to provide the results of their studies to all interested parties.

In January 2000, the U.S. Geological Survey published Open-File Report 00-188, "Aeromagnetic Survey of the Amargosa Desert, Nevada and California: A Tool for Understanding Near-Surface Geology and Hydrology" by Richard J. Blakely, Victoria E. Langenheim, David A. Ponce, and Gary L. Dixon. This report summarizes the methods, techniques, data, and findings of a regional aeromagnetic survey that was sponsored by Nye County in cooperation with Clark County, Nevada and Inyo County, California.

The results of the aeromagnetic survey have been used in conjunction with the published geologic maps and reports on the structural geology of the Yucca Mountain region to develop a reinterpretation of the structural geology and structural history of the Yucca Mountain region. Dr. Tom Anderson with the University of Pittsburgh is conducting this work on behalf of Nye County.

The structural reinterpretation of the Yucca Mountain region is critical to producing an accurate geologic framework to characterize the hydrogeologic systems of the area. Nye County's benefit from this study is a comprehensive tectonic evolution of the geologic basins concentrating on the Amargosa and Pahrump Valleys.

The geologic basins are controlled by the dominant structures in the region and in turn the basins control the water flow systems and aquifers. The regional structural analysis project has produced a model presented at the 1999 Devils Hole meeting, which explains the tectonic evolution and interprets the basin

development over time. The structural analysis focused on mapped and inferred fault locations based on data gathered from the literature and new interpretations based on fieldwork and structural analysis. The fault sets, fault systems and basins were analyzed in conjunction with recent aeromagnetic data produced by the USGS. The results show impressive correlation.

Structural and tectonic analysis is critical to developing real world interpretations of the hydrogeologic systems in the region and most importantly the fast flow paths for water in the subsurface. The data developed in the structural analysis will enhance the EWDP drilling program as a tool for determining the sites of future water monitoring wells and the geologic data gathered from the EWDP wells will be used to verify the structural geologic analysis.

Nye County has continued its analyses of core and cuttings samples from ONC#1 and EWDP boreholes. The petrographic analysis of secondary mineralization in tuffs obtained from ONC#1 determined that fluid flow in fractures has occurred both in the past and present. It is believed that fluid transport in ONC#1 samples is confined to open fault fractures not in the rock matrix (Nye County Nuclear Waste Repository Project Office, 1998b). No geochronological analyses were conducted for these samples.

Nye County has also continued its evaluations of the groundwater chemistry at its EWDP wells. All Phase I and II wells except NC-EWDP-7S have been sampled and the analytical results are available on the Internet for the Phase I boreholes. The results are briefly summarized in the following summary.

The dominant cation in the groundwaters from NC-EWDP-1S/D, NC-EWDP-3S and NC-EWDP-9S is Na+K and the dominant anion is bicarbonate. The sulfur isotopic data suggest three sources 1) Paleozoic marine sulfate, 2) evaporitic minerals in the soil and vadose zone and 3) mixtures of sulfides and sulfates in the aquifer rocks. The waters were dated with radiocarbon and found to be between 10 to 40 ka. Other isotopic investigations reveal some of the waters from deeper zones are older while some the shallow waters are juvenile. Tritium content from the wells is at background concentrations. U and Sr isotopic values support compartmentalization of flow systems south of Yucca Mountain.

3.2 EWDP QUALITY ASSURANCE PROGRAM

All EWDP activities are conducted under Nye County's Quality Assurance Program. Pertinent Quality Assurance Documents include:

Work Package 4. Borehole Testing Plan for Early Warning Drilling Program, Rev. 0, dated 12 Nov. 1998

Work Package 5. Early Warning Drilling Program Drilling & Well Construction Work Plan, Rev. 1, dated 10 Jan. 2000

Work Package 6. Early Warning Drilling Program Geophysical Logging Work Plan, Rev. 0, dated 2 Nov. 2000

Work Package 8. Sample Management Plan for EWDP, Rev. 1, dated 31 Sep. 1999

3.2.1 Data Collection Procedures

In conducting its EWDP data collection activities, the NWRPO recognizes the requirements for clearly reproducible methods and procedures that will allow the data to be used by all interested groups and individuals. Toward that end, Nye County has expended considerable effort in the development of a Quality Assurance Program that is fully in compliance with the requirements of NQA-1. The procedures for EWDP data collection are described in the following Nye County Quality Assurance Technical Procedures:

TP 7.0 Drill Site Management, Rev. 1, dated 15 July 1999

TP 8.0 Field Logging and Handling of Borehole Samples, Rev. 1, dated 31 July 1999

TP 8.1 Field Collection and Handling of Water Samples, Draft, dated 16 December 1994

TP 9.0 Pump-Spinner Logging of Pre-Completed Boreholes, Rev. 0, dated 14 January 1999

Other data collection procedures for routine water level measurements and conventional constant discharge aquifer tests are in accordance with the National Handbook of Recommended Methods for Water-Data Acquisition, USGS, Reston, Va., 1977. Surveying using global positioning systems is conducted in accordance with the system manufacturers specifications. Water level data is posted on Nye County's web page with the associated metadata that provides information on the source, location, period, censuring, processing, and limitations on the data.

3.2.2 Data Analysis Procedures

EWDP data analysis procedures include Quality Assurance Procedures for field measurements and laboratory analyses including:

TP 8.2 Thin Section Preparation Procedure, Draft, dated 17 Feb. 1995

TP 8.3 Sample Collection, Identification & Control for Mineralogy-Petrology Studies, Draft, dated 21 Feb. 1995

TP 8.5 Petrography & Modal Analysis Procedure, Draft, dated 25 Feb. 1995

TP 8.6 X-Ray Diffraction Procedure, Draft, dated 25 Feb. 1995

TP 8.7 SEM, TEM, Electron Microprobe Procedure, Draft, dated 2 6 Feb. 1995

TP 8.9 Differential Spectrometer (K, U, T,) for Core, Cuttings, & Other Samples, Draft, Dated 24 Feb. 1995

TP 9.2 Instrument Calibration and Collection and Processing of Data from Boreholes, Draft-Ver. 2, dated 22 Mar. 1996

TP 9.4 Gas Sampling Procedure of ONC#1 and Other Westbay Instrumented Wells, Rev. 1 Dated 20 Oct. 1997

These procedures are in draft status as they were incorporated into Nye County's QA program from existing contractor's QA program. However, they are currently being updated to Nye County's revision 0. and should be available on the Internet in early 2001. Other activities include the interpretation of geophysical logs, water chemistry sampling and analyses, map preparation, data graphing, aquifer test analysis, and data calculations. The specific procedures and metadata associated with these activities are presented and discussed in the individual reports that detail the results of specific investigations which are available on the Internet and in the Nye County Quality Assurance Records Center. A comprehensive report of ISIP technical investigations (July 2001) will summarize all of the findings from the 5 year grant period.

4.0 SUMMARY AND CONCLUSIONS

This report summarizes the Nye County monitoring results at ONC#1 during 1999 to 2000. Nye County began instrument installation at ONC#1 in March 1995. The ISIP presently includes borehole and tunnel instrumentation, monitoring, data analysis, and numerical modeling activities to address the concerns of Nye County. Nye County staff continued only data collection activities. Data analysis was limited to reducing data for presentation and continued entry into the County's databases. The databases contain all data collected from ONC#1, NRG-4, ESF and EWDP and are maintained by Nye County staff. Geologic information from many wells in the vicinity of Yucca Mountain has also been included entered into the databases.

Nye County's current focus is on the EWDP; therefore several elements of the technical investigation remained inactive. The main emphasis was placed on evaluation of the new data from the EWDP wells, analysis of the data, and modeling to improve planning efforts. Evaluations of the structural geology, the petrology of samples from EWDP boreholes, and the chemistry of groundwater samples taken from EWDP wells is on-going and is helping to further define the conditions in the Yucca Mountain region. Nye County has also been evaluating critical new data and information as they become available from the DOE's Yucca Mountain Project studies.

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