WBS: 1.2.21.3
QA: QA

Civilian Radioactive Waste Management System
Management & Operating Contractor

Data Qualification Report: Water-Level Data from the Nye County Early Warning Drilling Program

TDR-NBS-GS-000012 REV 00

April 2000

Prepared for:

U.S. Department of Energy
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Under Contract Number
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Civilian Radioactive Waste Management System
Management & Operating Contractor

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April 2000

Prepared by:

F. Harvey Dove 04-20-00

F. Harvey Dove, Chairperson — Date

Paul Sanchez, Team Member — 4/21/2000 Date

Lawrence Saraka, Team Member — 04-21-00 Date

Approved by:

Robert Howard, Responsible Manager — 4/21/2000 Date

EXECUTIVE SUMMARY

The objective of this work is to evaluate unqualified, water-level data gathered under the Nye County Early Warning Drilling Program (EWDP) and to determine whether the status of the data should be changed to "qualified" data in accordance with AP-SIII.2Q (*Qualification of Unqualified Data and the Documentation of Rationale for Accepted Data*). The corroboration method (as defined in Attachment 2 of AP-SIII.2Q) was implemented to qualify water-level data from Nye County measurements obtained directly from the Nye County Nuclear Waste Repository Program Office (NWRPO). Comparison of United States Geological Survey (USGS) measurements contained in DTN GS990608312312.003 with the Nye County water-level data has shown that the differences in water-level altitudes for the same wells are significantly less than 1 meter. This is an acceptable finding.

Evaluation and recommendation criteria have been strictly applied to qualify Nye County measurements of water levels in selected wells measured by the USGS. However, the process of qualifying measured results by corroboration also builds confidence that the Nye County method for measurement of water levels is adequate for the intended use of the data (which is regional modeling). Therefore, it is reasonable to extend the term of "qualified" to water-level measurements in the remaining Nye County Phase I wells on the basis that the method has been shown to produce adequate results for the intended purpose of supporting large-scale modeling activities for the Yucca Mountain Project (YMP).

The Data Qualification Team recommends the Nye County, water-level data contained in Appendix D of this report be designated as "qualified." These data document manual measurements of water-levels in eight (8) EWDP Phase I drillholes (NC-EWDP-1D, NC-EWDP-1S, NC-EWDP-2D, NC-EWDP-3D, NC-EWDP-3S, NC-EWDP-5S, NC-EWDP-9S, and NC-EWDP-Washburn-1x) that were obtained prior to the field installation of continuous monitoring equipment.

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1. INTRODUCTION

The objective of this work is to evaluate unqualified, water-level data gathered under the Nye County Early Warning Drilling Program (EWDP) and to determine whether the status of the data should be changed to qualified data in accordance with AP-SIII.2Q (*Qualification of Unqualified Data and the Documentation of Rationale for Accepted Data*). The water-level data are labeled "unqualified" because the data were not collected under an approved, quality assurance program for the Yucca Mountain Project (YMP). However, "qualified" water-level data for some of the same Nye County wells have been obtained using U.S. Geological Survey (USGS) procedures and personnel. An initial comparison of USGS and Nye County measurements showed very little difference (if any) in the water-level data. The good agreement between independent measurements suggests that the Nye County water levels are adequate for their intended purposes. The development plan describing proposed implementation of this qualification activity is available under the title "Data Qualification Plan for the Qualification of Water-level Data from the Nye County Early Warning Drilling Program" (DI No. TDP-NBS-GS-000009, Revision 1).

2. NYE COUNTY EARLY WARNING DRILLING PROGRAM

The Nye County EWDP was initiated in 1998, and it is currently scheduled to continue through 2001. The purpose of the EWDP is to establish a groundwater monitoring system to alert Nye County residents, located in Armagosa and Pahrump Valleys, in advance of the arrival of any potential, radionuclide contamination migrating toward their local water resources. The EWDP is intended to also provide additional geologic and hydrologic information of a complex hydrogeologic flow system related to Yucca Mountain.

The first phase of the three-phase, Nye County program was completed in 1999. Manual measurements of water-levels in eight (8) EWDP Phase I drillholes (NC-EWDP-1D, NC-EWDP-1S, NC-EWDP-2D, NC-EWDP-3D, NC-EWDP-3S, NC-EWDP-5S, NC-EWDP-9S, and NC-EWDP-Washburn-1x) were obtained prior to the installation of continuous monitoring equipment. Phase II activities are currently in progress.

2.1 PROGRAM REQUIREMENTS

Nye County policy requires the Nuclear Waste Repository Project Office (NWRPO) in Nye County to establish and maintain a documented Quality Assurance Program (QAP). The Nye County QAP is independent from the YMP Quality Assurance Requirements Document (QARD). YMP staff made a line-item comparison between the Nye County QAP and the YMP QARD. The results of the YMP review, dated January 26, 1999, were that "the Nye County QAP did not meet the detailed requirements of the YMP QARD" (see Appendix A); however, the review noted that "the Nye County QAP may address applicable requirements of Nuclear Quality Assurance (NQA)-1." In a letter dated April 12, 1999, staff of the Nuclear Regulatory Commission (NRC) reported that "Revision 2 of the Nye County QAP Plan was in conformance with relevant criteria of Title 10 of the

Code of Federal Regulations (10 CFR) Part 60, Subpart G and 10 CFR Part 50, Appendix B" (see Appendix B).

2.2 PROCEDURES AND REPORTS

All NWRPO personnel, contractors and subcontractors who perform or manage quality-affecting functions must work under the procedures outlined in the Nye County QAP. The QAP assures that NWRPO scientific activities proceed in a systematic manner, using documented instructions, and procedures that ensure the validity, integrity, preservation, and retrievability of data gathered by the Nye County program.

The NWRPO QAP is based on a Nye County interpretation of Federal requirements (ANSI/ASME NQA-1, 10 CFR50, Appendix B) for nuclear power plants, adapted for waste repository research. The QAP is directed toward operational conformance with major fundamental elements of quality assurance, including the establishment of a test equipment and measurement control system and the refinement of a quality assurance records management system. The primary issue facing the NWRPO QAP is assuring the traceability and validity of data gathered by the county program. Field data and other relevant information is made available to the general public on a Nye County website, "www.nyecounty.com."

3. WATER-LEVEL QUALIFICATION METHOD

The corroboration method (as defined in Attachment 2 of AP-SIII.2Q) was implemented to qualify water-level data from Nye County measurements, stored electronically in the YMP Technical Data Management System (TDMS) under Data Tracking Number (DTN) "MO9909NYEEWDP0.000" and augmented with new data obtained from the NWRPO. The water-level data were transmitted by e-mail from Claire Muirhead (Nye County) to Harvey Dove (YMP) on April 13, 2000. The e-mail was stored on the YMP H-drive to maintain backup with a copy sent to Bill Zelinski (YMP) to support the request for new DTNs. The data sheets were visually inspected to ensure data integrity. The technical quality of the Nye County, water-level data was established using limited, independent water-level measurements recorded by the U.S. Geological Survey (USGS) on May 17 and 18, 1999. All hand measurements in the wells were obtained prior to the installation of continuous recording equipment.

The USGS data were subsequently reviewed and submitted to the TDMS on December 9, 1999. The USGS data were identified as "qualified" under DTN GS990608312312.003. These data were obtained using the USGS Technical Procedure, HP-61, R1-M1, Use of Hand Held Steel Tapes in Boreholes.

The USGS Technical Procedure HP-61 establishes the acceptance criteria (i.e., accuracy requirements) for water-level measurements. The HP-61 acceptance criteria includes the USGS statement, "the accuracy required for measurements produced using this procedure cannot be evaluated by itself but must be evaluated in reference to the intended use of the data."

3.1 EVALUATION CRITERIA

Implementation of the corroboration method for data qualification was conducted in accordance with TDP-NBS-GS-000009, Revision 1, as follows:

1. Evaluate documentation (i.e., an E-mail from Pat Tucci to Claudia Faunt dated May 20, 1999) of water-level measurements from Nye County EWDP wells jointly obtained by the USGS and Nye County on May 17 and 18, 1999 (see Appendix C).

2. Compare Nye County, water-level data contained in DTN MO9909NYEEWDP0.000 (including additional data supplied by NWRPO) with USGS data contained in DTN GS990608312312.003 for the same wells.

3.2 RECOMMENDATION CRITERIA

Water-level comparisons of USGS and Nye County data with a difference of less than 1.0 meter will be considered acceptable for their intended use. These data are intended for use in describing regional potentiometric surfaces applied to computer simulations using the YMP Saturated Zone Model. Boundary conditions of regional-scale models, as defined by water-level altitude data, can tolerate uncertainties on the order of 2.0 meters (Zyvoloski, 2000).

- An acceptable finding will indicate that the data are corroborated and enable qualification of the manual, water-level measurements from Nye County Phase I wells.

- A negative finding will indicate that the data are not corroborated and other data qualification methods must be conducted to enable qualification of the manual, water-level measurements from Nye county Phase I wells.

3.3 DATA QUALIFICATION TEAM

The Responsible Manager for this data qualification task is Robert Howard.

The Chairperson for this data qualification team will be F. Harvey Dove. Dr. Dove received a Ph.D. in Water Resource Administration from the University of Arizona in 1973 and has been certified as a Professional Hydrologist (Groundwater Specialty) by the American Institute of Hydrology since 1984. He has more than 25 years of technical and management experience in applied environmental sciences, including groundwater flow and contaminant transport modeling, human health and environmental risk assessment, performance assessment, soil and groundwater remediation, and quality assurance. Dr. Dove had no involvement with the collection or processing of this data.

Qualification team members are:

Paul Sanchez: Mr. Sanchez has a M.S. degree in geology from Northern Arizona University (1990). He has over 15 years experience in engineering geology, including

geologic and geotechnical site investigations, seismic hazard analyses, RCRA monitoring and permitting for mixed hazardous and radioactive waste, and performance assessment modeling for the Waste Isolation Pilot Plant (WIPP). Mr. Sanchez had no involvement with the collection or processing of this data.

Lawrence Saraka: Mr. Saraka has an MA degree in Geology from Temple University (1985). He has over 15 years of radioactive waste management program experience including responsibilities for regulatory program development and siting oversight. Mr. Saraka had no involvement with the collection or processing of this data.

4. EVALUATION RESULTS

Water levels from several Nye County wells were measured on May 17 and 18, 1999, using USGS QA-approved procedures (see Appendix C). These preliminary results have not been checked or submitted to the records processing center. The differences in depth to water measurements between USGS and Nye County field methods, as applied to the same well during May 17 and 18, 1999, was less than 0.1 meter as shown in Table 1.

Table 1. Comparison of USGS and Nye County Measurements

Nye County Well Number	USGS Depth to Water (m)	Nye County Depth to Water (m)	Difference (m)	Date of Measurement
NC-EWDP-1D (shallow)	17.06	16.98	0.08	5/17/99
NC-EWDP-1D (deep)	55.03	55.02	0.01	5/17/99
NC-EWDP-1S (deep)	16.69	16.67	0.02	5/17/99
NC-EWDP-3D (deep)	81.88	81.87	0.01	5/17/99
NC-EWDP-5S	117.48	117.47	0.01	5/18/99
NC-EWDP-Washburn-1x	109.55	109.54	0.01	5/18/99

It should be noted that the difference in water-levels between the shallow and deep zones of well NC-EWDP-1S was small (0.13 m in Appendix C). Although the Nye County data in Appendix D do not indicate the zone measured (shallow or deep) for well NC-EWDP-1S, mathematical differences between the USGS and Nye County water-level altitudes are expected to be significantly less than 1 meter.

The USGS data gathered on May 17 and 18, 1999, was reviewed in accordance with USGS procedure. Water-level altitudes were calculated and included in the USGS DTN GS990608312312.003. Nye County data (see Appendix D) in addition to water-level information found in DTN MO9909NYEEWDP0.000 was compared to the USGS data for the same wells on or near May 17 and 18, 1999; the difference in water-level altitudes was less than 1 meter as shown in Table 2.

It should be noted that the Nye County data reported for well NC-EWDP-3D on May 13, 1999, was higher than preceding or subsequent values (see Appendix D). A Nye County measurement for May 17 has not been reported. Measurements reported by the USGS on May 17, 1999, showed much less than 0.1 meter difference (see Appendix C). The

actual difference between USGS and Nye County water-level altitudes reported for the same date is expected to be significantly less than 1 meter.

Table 2. Comparison of USGS and Nye County Water-Level Altitudes

Nye County Well Number	USGS Water-Level Altitude (m)	Nye County Water-Level Altitude (m)	Difference (m)	Date
NC-EWDP-1D (shallow)	787.05	786.7	0.35	5/17/99
NC-EWDP-1D (deep)	748.95	748.6	0.35	5/17/99
NC-EWDP-1S (shallow)	787.29	787.2	0.09	Note[a]
NC-EWDP-1S (deep)	787.25	787.2	0.04	Note[a]
NC-EWDP-3D	717.50	718.3	0.80	Note[b]
NC-EWDP-Washburn-1x	714.58	714.6	0.02	5/18/99

Notes: [a] USGS measurement on 5/17/99, Nye County measurement on 5/18/99; USGS measurements show less than 0.13 meter difference between shallow and deep zones for well NC-EWDP-1S (see Appendix C).
[b] USGS measurement on 5/17/99, Nye County measurement on 5/13/99.

Nye County data from wells located south of Jackass Flats (i.e., NC-EWDP-3D, NC-EWDP-5S, and NC-EWDP-Washburn-1x) were consistent with expected water levels derived from the site-scale, potentiometric surface used in the Saturated Zone Model. Water levels in these Nye County wells ranged from about 715 to about 725 meters above mean sea level (msl). Nye County data from wells located south of Crater Flat (i.e., NC-EWDP-1S, NC-EWDP-1D, and NC-EWDP-9S) support the concept of a buried fault along US Route 95 that may act as a partial barrier to groundwater flow. Water-level altitudes reported for NC-EWDP-1S by the USGS (Appendix C) suggest a small vertical head gradient in the downward direction between the shallow and deep zones intercepted by this well (recharge area).

4.1 ASSESSMENT OF DATA QUALITY

Evaluation of USGS data contained in DTN GS990608312312.003 and the Nye County water-level data contained in DTN MO9909NYEEWDP0.000 augmented with new data presented in Appendix D has shown that the differences in water-level altitudes for the same wells are significantly less than 1 meter. This is an acceptable finding based on the recommendation criteria presented in Section 3.2; and manual, water-level measurements of the following Nye County Phase I wells are termed "qualified" based on corroboration with the equivalent USGS data:

1. NC-EWDP-1D (shallow)
2. NC-EWDP-1D (deep)
3. NC-EWDP-1S (shallow)
4. NC-EWDP-1S (deep)
5. NC-EWDP-3D
6. NC-EWDP-Washburn-1x

4.2 ADHERENCE TO EVALUATION CRITERIA

The evaluation criteria and recommendation criteria have been strictly applied to qualify Nye County measurements of water level in the wells identified in Section 4.1. However, the process of qualifying measured results by corroboration also builds confidence that Nye County method for measurement of water levels is adequate for the intended use of the data (which is regional modeling). Therefore, it is reasonable to extend the term of "qualified" to water-level measurements in the remaining Nye County Phase I wells on the basis that the method has been shown to produce adequate results for the intended purpose of supporting regional modeling activities for the YMP.

4.3 IMPACTS OF FINDINGS ON INTENDED USE

There are no impacts of technical findings from this evaluation on the intended use of water-level data. Regional groundwater modeling is the intended use of these data, and selected values were included in "Water Level and Data Reliability Analysis," ANL-NBS-000034. The recommendation criteria of less than a 1 meter difference for water levels measured at the same well was obtained through consideration of the 2-meter, acceptable uncertainty estimate that was provided by the regional groundwater modeler (Zyvoloski, 2000).

5. RECOMMENDATION FOR QUALIFICATION

The Data Qualification Team recommends the Nye County, water-level data contained in Appendix D of this report and itemized in Table 3 by DTN be designated as "qualified."

Table 3. Team Recommendation for Qualified Water-Level Status

Nye County Well Number	Data	Data Tracking Number	Status
NC-EWDP-1D	Water Level	MO0004NC99WL1D.000	Qualified
NC-EWDP-1S	Water Level	MO0004NC99WL1S.000	Qualified
NC-EWDP-2D	Water Level	MO0004NC99WL2D.000	Qualified
NC-EWDP-3D	Water Level	MO0004NC99WL3D.000	Qualified
NC-EWDP-3S	Water Level	MO0004NC99WL3S.000	Qualified
NC-EWDP-5S	Water Level	MO0004NC99WL5S.000	Qualified
NC-EWDP-9S	Water Level	MO0004NC99WL9S.000	Qualified
NC-EWDP-Washburn-1x	Water Level	MO0004NC99WL1X.000	Qualified

6. REFERENCES

Zyvoloski, G. A. 2000, Qualification of U.S. Geological Survey Water Level Altitudes for Use on the Yucca Mountain Project, Revision 0, Attachment 4, pages 88-90, MOL.20000303.1377.

APPENDIX A

YMP Review of Nye County QAP

Results of review Nye County Quality Assurance Program (per QARD)
Completed by: Hugh Lentz, John Doyle, and Rick Weeks
Date: January 26, 1999

This review evaluation was performed using a line item QARD matrix versus the Nye County Quality Assurance Program Plan and related quality assurance procedures as supplied by the Nye County Nuclear Waste Repository Project Office.

The Nye County Quality Assurance Program does not meet the detailed requirements of the QARD. A list of deficient QARD line item requirements by element is included below.

The Nye County Quality Assurance Program may address the applicable primary requirements of NQA-1 (we did not perform this review), but it does not address all the requirements of the NQA-1 Supplements. (Example: the Nye County QA Program does not address the detailed requirements of NQA-1 Supplement 2S-3, Qualification of Quality Assurance Audit Personnel.)

Nye County Quality Assurance Program Plan

QARD Requirement	
1.2.2:3sB	Does not address quality assurance position to be sufficiently independent from cost and schedule.
1.2.2:2sE	Does not address any other assigned responsibilities.

QARD Requirement	
2.2.5	Does not meet QARD planning elements.
2.2.6	Surveillances are mentioned in QAP 18.1 but there are no process steps included in procedure.
2.2.7	Management Assessments are not addressed.
2.2.8	Readiness Reviews are not addressed.
2.2.10:1s	Requirement to establish review criteria is not addressed.
2.2.10B	Availability of background information is not addressed.
2.2.10E	Scope of all aspects of document for review is not addressed.
2.2.11	The appraisal to Affected Organization of status, adequacy, and compliance aspects of quality assurance program is inadequate; addresses only deficiency, trends, and audit reports.
2.2.12A	Plan does not address the specific requirement for indoctrination and training.
2.2.12B	Plan does not address the specific requirement for ensuring qualification of personnel.

Nye County QAP 3.1, Procedures for Independent Review

QARD Requirement	
2.2.9A:2p2	Procedure does not require decisions or interpretations to be made.
2.2.9A:2p7	Procedure does not include when "Data adequacy is questionable" as a condition for considering a peer review.
2.2.9C	Procedure does not address responsibilities of management to ensure specific requirement for conducting a peer review is met.

2.2.9D.1	Procedure does not require that peer review individual have technical qualifications in the review area to be at least equivalent.
2.2.9E	Procedure does not establish the peer review criteria.
2.2.9F1	Procedure does not require each peer reviewer to sign the report.
2.2.F2	Procedure does not require the report to state issue and conclusions of review.

Nye County QAP-3.2 Procedure for Documentation of Scientific Investigations

QARD Requirement	
III.2.4	No mention on Data Reduction and Qualification status of existing data – peer reviews, Confirmatory Testing
III.2.6	Nothing on model development and validation.

Nye County QAP-5.1, Preparation of Quality Administration Procedures and QAP-5.2, Preparation of Work Plans and Technical Procedures

QARD Requirement	
5.2.2	Technical and regulatory requirements not required to be identified
5.2.2C:2s	Level of detail is not discussed in either procedure.
5.2.2.D-5.2.2G	None of the contents identified in these sections is addressed in either procedure.
5.2.3	Very few review criteria are specified in the procedures.
5.2.4A	Contradicts the QARD. QAP-5.1 allows implementation prior to approval. QAP-5.2 does not address this requirement at all.
5.2.4B	This requirement is not addressed in either procedure.

Nye County QAP-6.1, Procedures for Issuance and Control of Quality Assurance Documents

QARD Requirement	
6.2.3	Review criteria are not specified. The review process is described in QAPs 5.1 and 5.2. In both cases the review criteria are so limited that it is doubtful that the review would be very effective.
6.2.6A	Requirements identified in Section 2.2.10 except for resolution of mandatory comments (comments requiring major revisions) have not been addressed or required.
6.2.6D.:2s	This requirement not imposed. This requirement not imposed.
6.2.7-6.2.7B.3	There are no provisions for "Expedited Changes."
6.2.8A.2.-6.2.8A.4.	These specific activities other than grammar are not addressed.

Nye County QAP-7.1, Procedure for Control of Purchased Equipment and Services

QARD Requirement	
4.2.2	No technical Review of procurement documents after changes are made.
7.2.9 B	No inspection procedures procedures/plans referenced.
7.2.11B:ls	No use-as-is, etc., for items bought out of spec.
4.2	No control of purchase documents.

APPENDIX B

NRC Review of Nye County QAP
MOL19990609.0152
MOL19990609.0153

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 12, 1999

Mr. Les Bradshaw, Manager
Nye County Department of Natural Resources & Federal Facilities
Nuclear Waste Repository Project Office
1210 E. Basin Road, Suite #6
Pahrump, Nevada 89048

SUBJECT: REVIEW OF NYE COUNTY QUALITY ASSURANCE PROGRAM FOR THE EARLY WARNING DRILLING PROGRAM

Dear Mr. Bradshaw:

On November 12, 1998, the Nye County Nuclear Waste Repository Project Office (NWRPO) forwarded a draft of Revision 2 to the NWRPO Quality Assurance Program Plan (QAPP) for U.S. Nuclear Regulatory Commission (NRC) staff review and acceptance. This draft revision of the QAPP responded to the NRC comments provided by letter, dated October 15, 1998, and discussed during the November 4, 1998, meeting between the NRC On-site Representative (OR) and Nye County representatives.

The NRC staff's evaluation is contained in the enclosed Acceptance Evaluation (AE). As stated in the conclusion of the AE, NRC staff finds that the Nye County QAPP is in conformance with the relevant criteria of Title 10 of the Code of Federal Regulations (10 CFR) Part 60, Subpart G and 10 CFR Part 50, Appendix B. Accordingly, NRC staff finds the Nye County QAPP acceptable for the type of activities to be conducted for the early warning drilling program. As stated in our August 30, 1998, letter, NRC does not intend to perform inspections, audits, or observation audits for the implementation of the Nye County QA program.

Changes that may reduce or downgrade the effectiveness of the NWRPO QAPP should be submitted to NRC for review and acceptance to assure such changes are in conformance with NRC regulations. Changes (e.g., editorial, correct spelling, punctuation, etc.) that do not reduce the QAPP previously accepted by NRC, need not be submitted for review and acceptance.

We request that Nye County provide NRC staff with a finalized copy of the revised QAPP modified by the changes agreed to during the November 4, 1998, meeting between the NRC OR and Nye County representatives. Should you have any questions on our review, please contact Bill Belke, of my staff, at (702) 794-5047.

Sincerely,

C. William Reamer, Chief
High-Level Waste and Performance
Assessment Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated

cc: See attached distribution

Letter to L. Bradshaw from C. W. Reamer dated: April 12, 1999

cc: R. Loux, State of Nevada
S. Frishman, State of Nevada
L. Barrett, DOE/Wash, DC
A. Brownstein, DOE/Wash, DC
S. Hanauer, DOE/Wash, DC
C. Einberg, DOE/Wash, DC
S. Rousso, DOE/Wash, DC
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R. Dyer, YMPO
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J. Wallis, Mineral County, NV
M. Murphy, Nye County, NV
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W. Cameron, White Pine County, NV
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R. Arnold, Pahrump County, NV
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R. Anderson, NEI
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S. Kraft, NEI
J. Kessler, EPR

U.S. NUCLEAR REGULATORY COMMISSION
ACCEPTANCE EVALUATION
FOR
NYE COUNTY QUALITY ASSURANCE PROGRAM PLAN

Prepared by: 3/5/99

William Belke
Sr. On-Site Licensing Representative
QualityAssurance and Engineered Systems
High-Level Waste Projects & Quality Assurance Section
Division of Waste Management

Reviewed and Approved by: 3/8/99

Sandra Wastler
Acting Section Leader
Performance Assessment & High-Level Waste
Integration Section
Division of Waste Management

Enclosure

ACCEPTANCE EVALUATION

INTRODUCTION

The U.S. Department of Energy (DOE) established the Yucca Mountain Site Characterization Office to investigate whether Yucca Mountain is a suitable site for the high-level radioactive waste repository. Nye County has established the Nuclear Waste Repository Project Office (NWRPO) to investigate the potential impact a repository at Yucca Mountain may have on the health, safety, and environment of Nye County residents.

For this investigation, NWRPO has initiated a program of monitoring, oversight, independent scientific investigations, impact assessment, and impact mitigation. Specifically, NWRPO and its contractors:

1) monitor DOE activities;
2) review and analyze plans, reports, data, and analyses from DOE and other sources; and
3) conduct independent investigations, as necessary, to:
   a) evaluate and validate DOE data and designs; and
   b) establish a NWRPO database for potential licensing and impact mitigation hearings.

The Nye County Quality Assurance Program Plan (QAPP) was established to ensure that NWRPO's program of monitoring, oversight, independent scientific investigations, impact assessment, and impact mitigation is properly implemented using appropriate quality assurance (QA) controls that are in conformance with the relevant criteria of Appendix B to Title 10 of the Code of Federal Regulations (10 CFR), which is referenced by 10 CFR Part 60 Subpart G.

1. BACKGROUND

The Nye County QAPP was formally transmitted to the U.S. Nuclear Regulatory Commission (NRC) in a letter from L. Bradshaw to J. Greeves, dated September 8, 1998. The Nye County QAPP consists of three sections; namely, a Policy Statement, Introduction, and QA Program Plan. NRC staff reviewed the QAPP to determine whether it contained adequate requirements and planned and systematic controls to address the relevant criteria of Appendix B to 10 CFR Part 50 as they pertain to the Nye County activities affecting quality. Staff also reviewed selected implementing procedures that had been prepared to execute the requirements of the QAPP. These procedures were reviewed on a sample basis for the NRC staff to gain confidence that the QAPP requirements were being adequately translated into the implementing procedures.

On September 30, 1998, the OR and an NRC technical member from the Division of Waste Management's Geosciences/Hydrology Section visited the Yucca Mountain Project with particular attention focused on the Nye County drilling and monitoring activities. This visit was predicated on the Nye County proposed drilling program

providing valuable data for the alluvial aquifer south of the proposed repository where compliance with the Environmental Protection standard may ultimately need to be demonstrated. The details of this visit are documented in Section 3.0 of the 1998, September-October OR Report. Two technical clarifications regarding packer verification and approved laboratories surfaced and were satisfactorily responded to.

As a result of the review of the QAPP, NRC staff generated a Request for Information that consisted of 25 comments which were forwarded to NWRPO in a letter from M. Bell to L. Bradshaw, dated October 15, 1998. The NWRPO revised the QAPP in response to the 25 comments and submitted a draft of the proposed revisions to the NRC OR QA representative on October 20, 1998. The proposed revisions were discussed at a November 4, 1998, meeting/telecon in the NRC OR office between the NRC OR and Nye County representatives. Five minor clarifications were needed in regard to commitments to ASME/NQA-1-1986 and NRC NUREGs 0856, 1298, and 4640. NWRPO resubmitted the audit of Revision 2 to the QAPP for NRC staff review and acceptance in the November 12, 1998, letter from D. Davidson to W. Belke.

2. STAFF EVALUATION

The NRC staff evaluation of the QAPP for each of the 18 criteria of Appendix B to 10 CFR Part 50 is provided below. Each section identifies the areas of the QAPP reviewed by NRC staff, summarizes the QA measures that may pertain (from the criteria listed above) and the content of the QAPP, and where necessary, provides the NRC staff justifications in conformance with Appendix B to 10 CFR Part 50. NRC staff emphasizes that due to the nature of the quality-affecting activities associated with the Nye County Early Warning Drilling Program, not all of the guidance and commitments delineated in the NRC Review Plan For High-Level Waste Repository Quality Assurance Program Descriptions, Revision 2, dated March 1989 (RP), need to be considered, since this would be excessive and unnecessary. NRC staff fully recognizes that Nye County is collecting scientific data and not constructing a potential waste repository and, therefore, has considered this in its review approach for the QAPP.

3.1 CRITERION 1 - ORGANIZATION

The enclosed Figure 1 provides the organization of the Nye County NWRPO. The County Board of Commissioners has ultimate authority for the QAPP and has authorized the County Manager to implement the Nye County Nuclear Waste Project by staffing the Project Manager position to manage the NWRPO and implement the QAPP. The On-Site Representative Geotechnical Representative is responsible for technical performance and staffing. The QA Officer reports to the On-Site Representative administratively and directly to the Project Manager for quality-affecting functions to assure independence for this position. The various Principal Investigators and contractors report to the On-Site Technical Representative and are responsible for planning, coordinating, performing, and documenting NWRPO work requirements in accordance with the QAPP. The QA Officer verifies through audits and surveillances that all aspects of the QAPP are being effectively implemented.

3.2 CRITERION 2 - QUALITY ASSURANCE PROGRAM

The QAPP requirements are implemented through a series of Quality Administrative Procedures reviewed and approved by the Project Manger and QA Officer. All NWRPO and contractor personnel performing or managing quality-affecting functions are required to work to the QAPP requirements and implementing procedures.

The QAPP is based on the relevant portions of the following as they pertain to the NWRPO scope of work:

1) Title 10 of the Code of Federal Regulations (10 CFR), Part 60, Subpart G which references 10 CFR Part 50, Appendix B;
2) ANSI/ASME NQA-1-1986;
3) NUREG-0856, "Final Technical Position on Documentation of Computer Codes for High-Level Waste Isolation;"
4) NUREG/CR-4640, "Handbook of Software Quality Assurance Techniques Applicable to the Nuclear Industry;" and
5) NUREG-1297, "Peer Review for High-Level Waste Repositories."

The QAPP does not address the controls of NUREG-1298, "Generic Technical Position of Qualification of Existing Data for High-Level Nuclear Waste Repositories," since all data collected under the QAPP is considered qualified. NWRPO does not intend to quality data obtained from sources outside of the NWRPO QAPP, and such data will be considered not to be qualified. The controls of NUREG-1318, "Technical Position of Items and Activities in the High-Level Waste Geologic Repository Program Subject to Quality Assurance Requirements," are also not addressed. NUREG-1318 controls apply to the determination of activities subject to QA based upon their importance to safety as they apply to the actual construction of a geologic repository. NWRPO does not have responsibility for any aspects of geologic repository construction.

All NWRPO and contractor personnel will have experience and training commensurate with the scope, complexity, or special nature of the activities they perform. The effectiveness of the QA program implementation for personnel qualifications is monitored and verified by the QA Officer. The QA Officer also assures that an appropriate QA program is established, and independently verifies that activities have been correctly performed.

3.3 CRITERION 3 - DESIGN CONTROL

In concert with the scope of the NWRPO program, the design aspect is within the scope of activities performed by NWRPO, as opposed to designing the repository, which is within DOE's scope. Consequently, NWRPO design work is limited to data acquisition and analysis of existing data, monitoring DOE activities, and executing a program of independent scientific investigation. Therefore, design for NWRPO is limited to independent review and analysis of the products of its monitoring/scientific investigations and of its QA Program.

The QA Officer performs an independent review of completed work plans, scientific notebooks, technical reports, and progress reports, to verify appropriate quality

standards have been incorporated and specified. The QA Officer's review also ensures that plans for data collection and analysis are completed before the actual collection and analysis activities. Peer reviews are conducted in those situations where uncertainties that exist in geotechnical/geological data, methodologies, interpretations, or conclusions cannot be resolved.

3.4 CRITERION 4 - PROCUREMENT DOCUMENT CONTROL

Since NWRPO or its contractors do not design repository facilities, there are no procurement activities directed towards aspects of design bases. The NWRPO QA Program does contain provisions to control procurement of services, equipment, and materials for NWRPO and its contractors. Prior to issuance, the QA Officer reviews all quality-affecting procurement documents to assure conformance to procurement requirements. Procurement documents contain acceptance and rejection criteria and the right of NWRPO access to the contractor or vendor facilities.

3.5 CRITERION 5 - INSTRUCTIONS, PROCEDURES, AND DRAWINGS

All NWRPO and contractor quality-related activities are conducted in accordance with applicable NWRPO Quality Administrative Procedures, Technical Procedures, and Work Plans. The review, approval, and issuance of these documents are controlled to ensure technical and quality requirements are included prior to issuance. As relevant, these documents include the appropriate qualitative or quantitative acceptance criteria to determine activities have been satisfactorily accomplished.

3.6 CRITERION 6 - DOCUMENT CONTROL

The issuance and distribution of controlled documents for quality-related activities is the responsibility of the QA Officer. Superseded or canceled documents are required to be removed and replaced by applicable documents at the appropriate work areas. A master list of controlled documents is maintained identifying the current list of documents and to whom it is assigned.

3.7 CRITERION 7 - CONTROL OF PURCHASED ITEMS AND SERVICES

Source evaluation of objective evidence furnished by the supplier, source inspection, audits, or receipt inspection is performed on purchased material by the QA staff and technical specialists, if necessary, to assure conformance to procurement document requirements. Suppliers are required to furnish documentation that identifies the specific procurements that have not been met, along with any nonconformance resulting from not meeting the procurement requirements.

3.8 CRITERION 8 - IDENTIFICATION AND CONTROL OF ITEMS

NWRPO procedures require that geologic and hydrologic samples are adequately identified and controlled, and how their use is controlled. Correct identification of items or samples are verified and documented prior to release for use or analysis. The identification and control process is verified through audits and surveillances.

3.9 CRITERION 9 - CONTROL OF PROCESSES

NWRPO performs no special processes for the design or construction of the repository or for site characterization. Therefore, there are no special process activities within the scope of this definition.

3.10 CRITERION 10 - INSPECTION

When conformance of an item or activity is required, the QA Officer will ensure that this conformance will be accomplished by qualified personnel other than those that performed or directly supervised the work.

3.11 CRITERION 11 - TEST CONTROL

Test procedures will contain or reference test objectives and provisions for assuring that prerequisites for a particular test have been achieved. Test procedures or instructions will provide requirements and acceptance limits; instructions for performing the test; calibrated instrumentation; adequate test equipment and instrumentation; suitable and controlled environmental conditions; mandatory hold points; acceptance and rejection criteria; methods for documenting and recording test results; and provisions for assuring test prerequisites have been met. Test items will be identified, controlled, and dispositioned. Samples will be archived as required by the test procedures.

3.12 CRITERION 12 - CONTROL OF MEASURING AND TEST EQUIPMENT

Measures are established to assure that measuring and test equipment used in activities affecting quality are properly identified, controlled, calibrated at specified intervals, and adjusted to maintain accuracy within specified limits. If any equipment is found to be out of calibration, a documented evaluation shall be made of the previous data and acceptability of the items previously accepted. Out of calibration equipment shall be tagged or segregated.

3.13 CRITERION 13 - HANDLING, STORAGE, AND SHIPPING

The NWRPO activities that apply to this criterion are geoscience cores, cuttings, fluids, and other physical samples collected for testing, and evaluation. The NWRPO Principal Investigator and QA Officer are responsible for specifying special handling, shipping, storage, preservation, and packaging requirements, and incorporation into the applicable procedures.

3.14 CRITERION 14 - INSPECTION, TEST, AND OPERATING STATUS

Status indicators, such as tags and labels, are utilized to indicate the appropriate status for tests, inspections, segregation, and operating status of applicable NWRPO activities. The status of these activities will be indicated on the item or in documents traceable to the item to assure that an item that has not passed a required test or inspection is not inadvertently installed, used, or operated. Any alteration of the sequence of the required test or inspection will be documented and controlled. Modifications to tests or inspections will be subject to the same review and approval as the original.

3.15 CRITERION 15 - CONTROL OF NONCONFORMING ITEMS

Nonconforming items, activities, and services are required to be documented on a nonconformance report and reported to the QA Officer and area supervisor within two days for further action. Nonconforming items are identified, tagged, and segregated when practical, to prevent inadvertent use.

3.16 CRITERION 16 - CORRECTIVE ACTION

Nonconformance reports shall be reviewed and evaluated by the QA Officer for problem trends, resulting from failures, or deviations from requirements. Corrective action requests are issued to the area involved and describe the cause of the condition and the measures to prevent recurrence. Corrective action will consider the effect on past work, data, and experiments resulting from the deficiency. Audits or surveillances will be conducted to verify implementation of the corrective action.

3.17 CRITERION 17 - QUALITY ASSURANCE RECORDS

Records are required to be prepared and retained to furnish documentary evidence of items and activities affecting quality. Records are stored in fire resistant metal fire cabinets protected from excessive heat, moisture or pressure. Records are required to be complete and legible. The QA Officer is responsible for reviewing, monitoring, and auditing NWRPO project records to assure that they meet QA requirements.

3.18 CRITERION 18 - AUDITS

The QA Officer is responsible for scheduling audits and surveillance to verify compliance with all aspects of the NWRPO QA Program to determine its effectiveness. Audits are conducted in accordance with pre-established procedures and conducted by personnel having no direct responsibilities in the areas being audited. Audit results are documented and reported to management responsible for the areas audited for review and necessary corrective action. Audit results are documented and trended to determine whether repetitive conditions exist.

CONCLUSION

Based on its evaluation and audit of the plan, NRC staff concluded Revision 2 of the QAPP is in conformance with the relevant provisions of 10 CFR Part 60, Subpart G and Appendix B to 10 CFR Part 50, as set forth in the NRC RP. Therefore, NRC staff concludes that the QAPP, as it applies to the activities for the Early Warning Drilling Program, contains sufficient requirements and planned and systematic controls to address each of the relevant criteria of Appendix B to 10 CFR Part 50 in an acceptable manner. NRC requests that Nye County provide a finalized copy of Revision 2 of the NWRPO QAPP.

APPENDIX C

USGS E-mail of Water-Level Measurements

Al Eddebbarh
03/30/2000 03:10 PM

To: Harvey Dove/YD/RWDOE@CRWMS
cc:

Subject: Nye County Water Levels

---------- Forwarded by Al Eddebbarh/YM/RWDOE on 03/30/2000 03:10 PM ----------

Pat Tucci <ptucci@usgs.gov> on 05/20/99 12:11:44 PM

To: Claudia Faunt <ccfaunt@usgs.gov>, Al Eddebbarh/YM/RWDOE, George Zyvoloski <gaz@vega.lanl.gov>, Bill Arnold <bwarnol@sandia.gov>
cc: Michael Chornack/YM/RWDOE, Pat Tucci <ptucci@usgs.gov>, Nick Stellavato <StellaNick@aol.com>

Subject: Nye County Water Levels

This week I obtained water levels from several Nye County wells, using USGS QA-approved procedures. The following are the water-level altitudes that I calculated, using measuring points and elevations provided in the Nye Co. data report. These data have not been reviewed yet, but my plan is to get them reviewed and submitted as a data package as soon as possible.

1S, "deep" zone (210-270'): 787.17 m (above sea level), 5/17/99
1S, "shallow" zone (160-180'): 787.30 m, 5/17/99
1D, "deep" zone (2160-2240'): 748.96 m, 5/17/99
1D, "shallow" zone (50-70'): 787.06 m, 5/17/99
3D (550-2500'): 717.51 m, 5/17/99
Washburn (420-480'): 715.24 m, 5/18/99

I also measured the water level in 5S, but it was 10' lower than the previous levels. The Nye County rep with me thought that the well was still recovering from developing operations done during the previous week or so. The difference in levels between the shallow and deep zones in 1D is a bit puzzling, although there are a lot of fine-grained sediments at that site.

Chuck Savard will continue to obtain water levels from the other wells prior to pumping/sampling, so we should have a complete set soon.

During the week, we compared water levels obtained with the Nye Co. electric tape with those that we got with our steel tapes. Here's how they compared:

DEPTH BELOW MEASURING POINT (feet)

WELL	NYE	USGS	DIFF
1D (sh)	55.7	55.97	0.27'
1D (dp)	180.5	180.54	0.04'

1S (dp)	54.7	54.77	0.07'
3D (dp)	268.6	268.63	0.03'
5S	385.41	385.43	0.02'
Washburn	359.45	359.43	0.02'

As you can see, these measurements are all less than 0.1 meter different, which is more than close enough for modeling. I would think that, with proper review, water-levels obtained with Nye County's electric tape would be acceptable to use for modeling.

I'll let you know when all of this has been checked and approved. If you have any questions, give me a call or e-mail.

--
Pat Tucci
USGS, WRD, YMPB
Box 25046, MS-421
Denver Federal Center, Bldg. 53
Lakewood, CO 80225
(303) 236-5050, ext. 230
(303) 236-5047 (fax)

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APPENDIX D

Nye County Manual Water-Level Measurements

Muirclaire@aol.com on 04/13/2000 04:25:05 PM

To: Harvey Dove/YD/RWDOE
cc:
Subject: Manual water levels from Nye County EWDP Phase I wells

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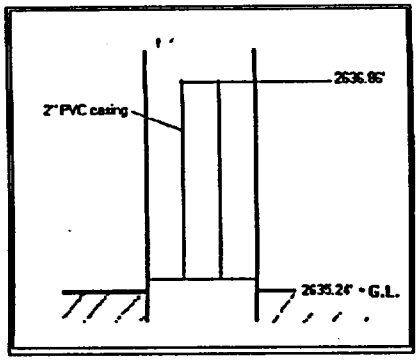
Harvey,

Please find attached a spreadsheet containing Nye County manual water level data for Phase I wells. We plan to add additional data to these spreadsheets in the near future and will notify you when this occurs.

Claire Muirhead

- Phase I waterlevel revision1.xls



WATER LEVEL DATA **WELL: NC-EWDP-1D shallow**

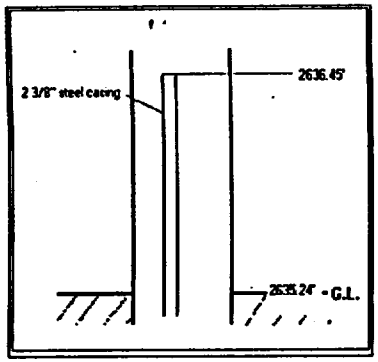
Location:

Latitude	Longitude
36°42'33.526"N	116°35'18.003"W

Access: From Lathrop Well (Junction of Highway 95 and SR 373) west 11.0 miles to gate on north side of Highway. Take gravel road 0.2 miles to turnaround on white colored spring deposits.

Note: All 1D shallow measurements taken at top of PVC casing
Location and elevation from M&O GPS survey March 1999

Date	Zone Measured	Measuring Point Elevation (ft)	Depth to Water (ft)	Depth to Water (m)	Elevation of groundwater (msl) (ft)	Elevation of groundwater (msl) (m)	Method	Personnel	Comments
17-May-99	shallow	2636.9	55.7	17.0	2581.2	786.7	NWRPO 500'	JSW	
17-May-99	shallow	2636.9	56.0	17.1	2580.9	786.7	SGS steel tap	P. Tucci	
20-Aug-99	shallow	2636.9	55.5	16.9	2581.4	786.8	NWRPO 500'	JSW	
27-Aug-99	shallow	2636.9	53.3	16.2	2583.6	787.5	NWRPO 500'	JSW	
29-Oct-99	shallow	2636.9	55.7	17.0	2581.2	786.8	NWRPO 500'	JSW	
05-Nov-99	shallow	2636.9	55.6	17.0	2581.3	786.8	NWRPO 500'	WJS	
16-Nov-99	shallow	2636.9	55.6	16.9	2581.3	786.8	NWRPO 500'	AJM	
30-Nov-99	shallow	2636.9	55.6	16.9	2581.3	786.8	NWRPO 500'	AJM	
05-Jan-00	shallow	2636.9	55.6	17.0	2581.3	786.8	NWRPO 500'	AJM	
14-Jan-00	shallow	2636.9	55.6	16.9	2581.3	786.8	NWRPO 500'	AJM	
26-Jan-00	shallow	2636.9	55.6	16.9	2581.3	786.8	NWRPO 500'	AJM	
02-Feb-00	shallow	2636.9	55.6	16.9	2581.3	786.8	NWRPO 500'	BEA	
11-Feb-00	shallow	2636.9	55.6	16.9	2581.3	786.8	NWRPO 500'	BEA	
18-Feb-00	shallow	2636.9	55.6	16.9	2581.3	786.8	NWRPO 500'	AJM	
29-Feb-00	shallow	2636.9	55.6	16.9	2581.3	786.8	NWRPO 500'	AJM	



WATER LEVEL DATA **WELL: NC-EWDP-1D Deep**

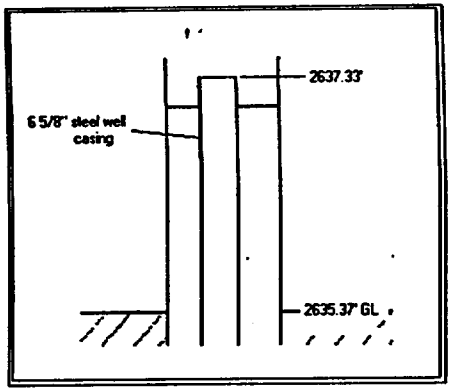
Location:

Latitude	Longitude
36°42'33.526"N	116°35'18.003"W

Access: From Lathrop Well (Junction of Highway 95 and SR 373) west 11.0 miles to gate on north side of Highway. Take gravel road 0.2 miles to turnaround on white colored spring deposits.

Note: All 1D deep measurements taken at top of 2 3/8" steel casing
Location and elevation from M&O GPS survey March 1999

Date	Zone Measured	Measuring Point Elevation (ft)	Depth to Water (ft)	Depth to Water (m)	Elevation of groundwater (msl) (ft)	Elevation of groundwater (msl) (m)	Method	Personnel	Comments
17-May-99	Deep	2636.5	180.5	55.0	2456.0	748.6	NWRPO 500'	JSW	0930
17-May-99	Deep	2636.5	180.5	55.0	2456.0	748.6	SGS steel tap	P. Tucci	0930
24-May-99	Deep	2636.5	183.0	55.8	2453.5	747.8	NWRPO 500'	MCC	water level measurement collected during sampling event
20-Aug-99	Deep	2636.5	179.4	54.7	2457.1	748.9	NWRPO 500'	JSW	
27-Aug-99	Deep	2636.5	179.7	54.8	2456.8	748.8	NWRPO 500'	JSW	
29-Oct-99	Deep	2636.5	179.8	54.8	2456.7	748.8	NWRPO 500'	AJM	
05-Nov-99	Deep	2636.5	179.6	54.7	2457.0	748.9	NWRPO 500'	WJS	
16-Nov-99	Deep	2636.5	179.6	54.7	2456.9	748.9	NWRPO 500'	AJM	
30-Nov-99	Deep	2636.5	179.8	54.8	2456.7	748.8	NWRPO 500'	AJM	
05-Jan-00	Deep	2636.5	180.0	54.9	2456.5	748.8	NWRPO 500'	AJM	
14-Jan-00	Deep	2636.5	180.0	54.9	2456.5	748.8	NWRPO 500'	AJM	
26-Jan-00	Deep	2636.5	179.8	54.8	2456.7	748.8	NWRPO 500'	AJM	
02-Feb-00	Deep	2636.5	180.0	54.9	2456.5	748.7	NWRPO 500'	BEA	
11-Feb-00	Deep	2636.5	179.8	54.8	2456.7	748.8	NWRPO 500'	BEA	
18-Feb-00	Deep	2636.5	179.8	54.8	2456.7	748.8	NWRPO 500'	AJM	
29-Feb-00	Deep	2636.5	179.8	54.8	2456.7	748.8	NWRPO 500'	AJM	



WATER LEVEL DATA **WELL: NC-EWDP-1S**

Location:

Latitude	Longitude
36°42'33.385"N	116°35'17.880"W

Access: From Lathrop Well (Junction of Highway 95 and SR 373) west 11.0 miles to gate on north side of Highway. Take gravel road 0.2 miles to turnaround on white colored spring deposits.

Note: Westbay Multiport installation precludes further manual water level measurements. Location and elevation from M&O GPS survey March 1999

Date	Zone Measured	Measuring Point Elevation (ft)	Depth to Water (ft)	Depth to Water (m)	Elevation of groundwater (msl) (ft)	Elevation of groundwater (msl) (m)	Method	Personnel	Comments
27-Jan-99	n/a	2637.3	102.0	31.1	2535.3	772.8	NWRPO Powers	KDD	1620; 42 minutes after hitting water @ ~ 127'
27-Jan-99	n/a	2637.3	85.5	26.1	2551.8	777.8	NWRPO Powers	KDD	
27-Jan-99	n/a	2637.3	73.8	22.5	2563.5	781.4	NWRPO Powers	KDD	
27-Jan-99	n/a	2637.3	69.3	21.1	2568.0	782.7	NWRPO Powers	JSW	
27-Jan-99	n/a	2637.3	64.2	19.6	2573.1	784.3	NWRPO Powers	JSW	
27-Jan-99	n/a	2637.3	60.5	18.4	2576.8	785.4	NWRPO Powers	JSW	
27-Jan-99	n/a	2637.3	59.0	18.0	2578.3	785.9	NWRPO Powers	JSW	
27-Jan-99	n/a	2637.3	57.2	17.4	2580.1	786.4	NWRPO Powers	JSW	
27-Jan-99	n/a	2637.3	54.1	16.5	2583.2	787.4	NWRPO Powers	JSW	
28-Jan-99	n/a	2637.3	52.7	16.1	2584.6	787.8	NWRPO Powers	KDD	
28-Jan-99	n/a	2637.3	157.2	47.9	2480.1	755.9	NWRPO Powers	KDD	1341 with 159.3' of 11" DWDP in hole, sealing aquifer
02-Feb-99	n/a	2637.3	130.6	39.8	2506.7	764.1	NWRPO Powers	KDD	0618 with 159.3' of 11' DWDP in hole; sealing aquifer
03-Feb-99	n/a	2637.3	52.5	16.0	2584.8	787.9	NWRPO Powers	KDD	0755, 1 hr after drilling
05-Feb-99	n/a	2637.3	52.3	15.9	2585.0	787.9	NWRPO Powers	KDD	0704 after hole stabilized ~ 36 hours
18-May-99	n/a	2637.3	54.7	16.7	2582.7	787.2	NWRPO 500'	JSW	

WATER LEVEL DATA **WELL: NC-EWDP-2D**

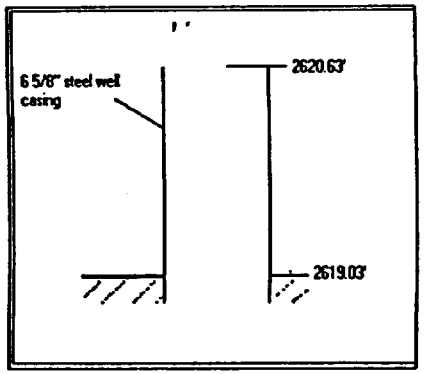
Location:

Latitude	Longitude
36°39'38.521"N	116°27'56.834"W

Access: From Lathrop Well (Junction of Highway 95 and SR 373) west 4.1 miles to gate on north side of Highway. Take gravel road 0.1 miles east.

Note: All measurements taken at ground level
No further soundings to be taken due to unstable ground
Location and elevation from M&O GPS survey March 1999

Date	Zone Measured	Measuring Point Elevation (ft)	Depth to Water (ft)	Depth to Water (m)	Elevation of groundwater (msl) (ft)	Elevation of groundwater (msl) (m)	Method	Personnel	Comments
14-Jan-99	n/a	2628.7	312.1	95.1	2316.6	706.1	NWRPO 500'	KDD	1502; after stopping for "first water" for 30 min., bit @ 347'
15-Jan-99	n/a	2628.7	311.6	95.0	2317.1	706.2	NWRPO 500'	KDD	0620, hole stablilized for 16 hrs.
04-Mar-99	n/a					0.0	NWRPO 500'	JSW	unable to sound below 440'
10-Mar-99	n/a					0.0	NWRPO 500'	KDD	unable to sound below 80'



WATER LEVEL DATA **WELL: NC-EWDP-3S**

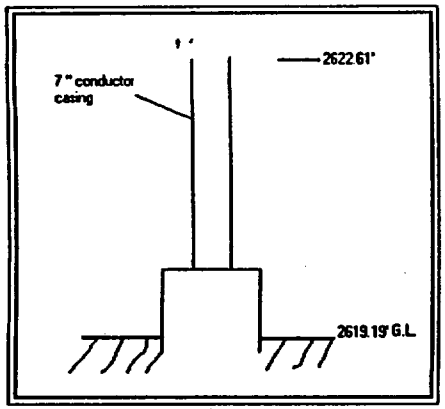
Location:

Latitude	Longitude
36°40'53.614"N	116°32'17.180"W

Access: From Lathrop Well (Junction of Highway 95 and SR 373) west 7.5 miles on north side of Highway. Take gravel road 0.15 miles east and follow tire tracks.

Note: February measurement taken at ground level
Measurements taken at top of casing thereafter
Westbay Multiport installation precludes further manual water level measurements.
Location and elevation from M&O GPS survey March 1999

Date	Zone Measured	Measuring Point Elevation (ft)	Depth to Water (ft)	Depth to Water (m)	Elevation of groundwater (msl) (ft)	Elevation of groundwater (msl) (m)	Method	Personnel	Comments
08-Feb-99	n/a	2619.0	280.3	85.4	2338.7	712.8	NWRPO 500'	KDD	0837 after leaving hole overnight(measured prior to casing)
06-Mar-99	n/a	2620.6	259.7	79.2	2360.9	719.6	Buqo 500'	TSB	
10-Mar-99	n/a	2620.6	259.7	79.2	2360.9	719.6	NWRPO 500'	KDD	
12-Mar-99	n/a	2620.6	259.6	79.1	2361.0	719.6	NWRPO 500'	KDD	
21-May-99	n/a	2620.6	261.5	79.7	2359.1	719.0	NWRPO 500'	CEM	



WATER LEVEL DATA **WELL: NC-EWDP-3D**

Location:

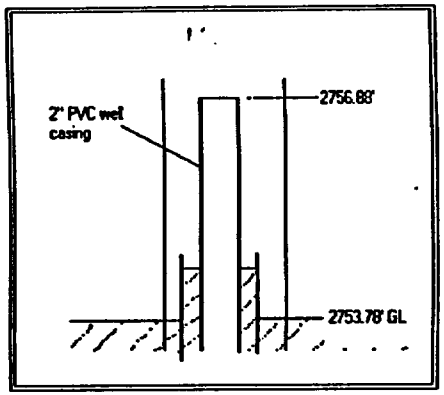
Latitude	Longitude
36°40'53.597"N	116°32'17.049"W

Access: From Lathrop Well (Junction of Highway 95 and SR 373) west 7.5 miles on north side of Highway. Take gravel road 0.15 miles east and follow tire tracks.

Note: January measurement taken at ground level
Measurements taken @ top of casing thereafter
Location and elevation from M&O GPS survey March 1999

Date	Zone Measured	Measuring Point Elevation (ft)	Depth to Water (ft)	Depth to Water (m)	Elevation of groundwater (msl) (ft)	Elevation of groundwater (msl) (m)	Method	Personnel	Comments
20-Jan-99	n/a	2619.2	155.0	47.2	2464.2	751.1	NWRPO Powers	BEA	0925; 90 minutes after hitting at water @ 240'; bit @ 240'
06-Mar-99	n/a	2622.6	265.5	80.9	2357.1	718.4	Buqo 500'	TSB	
10-Mar-99	n/a	2622.6	259.7	79.2	2362.9	720.2	NWRPO 500'	MCC	
12-Mar-99	n/a	2622.6	259.6	79.1	2363.0	720.2	NWRPO 500'	MCC	
16-Mar-99	n/a	2622.6	264.8	80.7	2357.8	718.7	NWRPO 500'	MCC	
17-Mar-99	n/a	2622.6	264.8	80.7	2357.8	718.7	NWRPO 500'	MCC	
18-Mar-99	n/a	2622.6	264.8	80.7	2357.8	718.7	NWRPO 500'	MCC	
19-Mar-99	n/a	2622.6	264.8	80.7	2357.8	718.7	NWRPO 500'	MCC	
20-Mar-99	n/a	2622.6	264.5	80.6	2358.1	718.7	NWRPO 500'	MCC	
22-Mar-99	n/a	2622.6	264.5	80.6	2358.1	718.7	NWRPO 500'	MCC	
23-Mar-99	n/a	2622.6	264.5	80.6	2358.1	718.7	NWRPO 500'	MCC	
24-Mar-99	n/a	2622.6	264.5	80.6	2358.1	718.8	NWRPO 500'	MCC	
25-Mar-99	n/a	2622.6	264.5	80.6	2358.1	718.7	NWRPO 500'	MCC	
26-Mar-99	n/a	2622.6	264.5	80.6	2358.1	718.7	NWRPO 500'	MCC	
29-Mar-99	n/a	2622.6	264.5	80.6	2358.1	718.7	NWRPO 500'	MCC	
30-Mar-99	n/a	2622.6	246.5	75.1	2376.1	724.2	NWRPO 500'	MCC	
31-Mar-99	n/a	2622.6	264.5	80.6	2358.1	718.7	NWRPO 500'	MCC	
01-Apr-99	n/a	2622.6	262.8	80.1	2359.8	719.3	NWRPO 500'	MCC	
12-Apr-99	n/a	2622.6	267.4	81.5	2355.2	717.9	NWRPO 500'	MCC	
13-Apr-99	n/a	2622.6	267.5	81.5	2355.1	717.8	NWRPO 500'	MCC	
14-Apr-99	n/a	2622.6	267.5	81.5	2355.1	717.8	NWRPO 500'	MCC	
15-Apr-99	n/a	2622.6	267.5	81.5	2355.1	717.8	NWRPO 500'	MCC	
16-Apr-99	n/a	2622.6	267.3	81.5	2355.3	717.9	NWRPO 500'	MCC	
19-Apr-99	n/a	2622.6	267.0	81.4	2355.6	718.0	NWRPO 500'	MCC	
20-Apr-99	n/a	2622.6	267.0	81.4	2355.6	718.0	NWRPO 500'	MCC	
21-Apr-99	n/a	2622.6	267.0	81.4	2355.6	718.0	NWRPO 500'	MCC	
23-Apr-99	n/a	2622.6	267.0	81.4	2355.6	718.0	NWRPO 500'	MCC	
24-Apr-99	n/a	2622.6	267.0	81.4	2355.6	718.0	NWRPO 500'	MCC	

25-Apr-99	n/a	2622.6	267.0	81.4	2355.6	718.0	NWRPO 500'	MCC
26-Apr-99	n/a	2622.6	267.0	81.4	2355.6	718.0	NWRPO 500'	MCC
27-Apr-99	n/a	2622.6	267.0	81.4	2355.6	718.0	NWRPO 500'	MCC
28-Apr-99	n/a	2622.6	267.0	81.4	2355.6	718.0	NWRPO 500'	MCC
13-May-99	n/a	2622.6	266.0	81.1	2356.6	718.3	NWRPO 500'	JSW
20-Aug-99	n/a	2622.6	269.0	82.0	2353.6	717.4	NWRPO 500'	JSW
27-Aug-99	n/a	2622.6	269.1	82.0	2353.5	717.4	NWRPO 500'	JSW



WATER LEVEL DATA **WELL: NC-EWDP-5S**

Location:

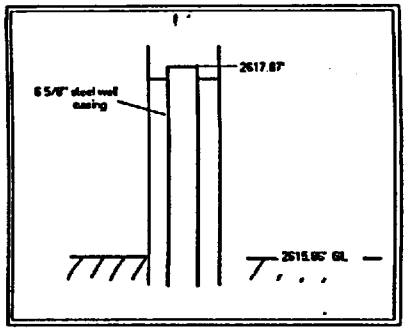
Latitude	Longitude
36°40'11.529"N	116°22'37.071"W

Access: Highway 95 to NTS Gate 510 access road; turn north.
Go north about 1.8 miles to gravel road just south of NTS boundary; turn east and go 1.4 miles.

Note: February measurements taken at ground level
Measurements taken at top of casing thereafter
Location and elevation from M&O GPS survey March 1999

Date	Zone Measured	Measuring Point Elevation (ft)	Depth to Water (ft)	Depth to Water (m)	Elevation of groundwater (msl) (ft)	Elevation of groundwater (msl) (m)	Method	Personnel	Comments
08-Feb-99	n/a	2753.8	377.5	115.1	2376.3	724.3	NWRPO 500'	BEA	
04-Mar-99	n/a	2756.9	374.7	114.2	2382.2	726.1	NWRPO 500'	JSB	
07-Mar-99	n/a	2756.9	375.4	114.4	2381.5	725.9	Buqo 500'	TSB	
08-Mar-99	n/a	2756.9	375.1	114.3	2381.8	726.0	NWRPO 500'	KDD	
09-Mar-99	n/a	2756.9	375.1	114.3	2381.8	726.0	NWRPO 500'	KDD	
10-Mar-99	n/a	2756.9	375.0	114.3	2381.9	726.0	NWRPO 500'	KDD	
11-Mar-99	n/a	2756.9	375.0	114.3	2381.9	726.0	NWRPO 500'	KDD	
12-Mar-99	n/a	2756.9	375.1	114.3	2381.8	726.0	NWRPO 500'	KDD	
16-Mar-99	n/a	2756.9	375.1	114.3	2381.8	726.0	NWRPO 500'	MCC	
17-Mar-99	n/a	2756.9	375.3	114.4	2381.6	725.9	NWRPO 500'	MCC	
18-Mar-99	n/a	2756.9	375.2	114.4	2381.7	725.9	NWRPO 500'	MCC	
19-Mar-99	n/a	2756.9	375.2	114.4	2381.7	725.9	NWRPO 500'	MCC	
22-Mar-99	n/a	2756.9	375.2	114.4	2381.7	725.9	NWRPO 500'	MCC	
23-Mar-99	n/a	2756.9	375.1	114.3	2381.8	726.0	NWRPO 500'	MCC	
24-Mar-99	n/a	2756.9	375.2	114.4	2381.7	725.9	NWRPO 500'	MCC	
25-Mar-99	n/a	2756.9	375.2	114.4	2381.7	725.9	NWRPO 500'	MCC	
26-Mar-99	n/a	2756.9	375.2	114.4	2381.7	725.9	NWRPO 500'	MCC	
29-Mar-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	
30-Mar-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	
31-Mar-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	
01-Apr-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	
02-Apr-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	
07-Apr-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	
08-Apr-99	n/a	2756.9	375.8	114.5	2381.2	725.8	NWRPO 500'	MCC	
09-Apr-99	n/a	2756.9	375.8	114.5	2381.2	725.8	NWRPO 500'	MCC	
12-Apr-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	
13-Apr-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	
14-Apr-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	

15-Apr-99	n/a	2756.9	375.8	114.5	2381.1	725.8	NWRPO 500'	MCC	
16-Apr-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	
19-Apr-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	
20-Apr-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	
21-Apr-99	n/a	2756.9	375.4	114.4	2381.5	725.9	NWRPO 500'	MCC	
23-Apr-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	
24-Apr-99	n/a	2756.9	375.6	114.5	2381.3	725.8	NWRPO 500'	MCC	
25-Apr-99	n/a	2756.9	375.7	114.5	2381.2	725.8	NWRPO 500'	MCC	
26-Apr-99	n/a	2756.9	375.6	114.5	2381.3	725.8	NWRPO 500'	MCC	
27-Apr-99	n/a	2756.9	375.6	114.5	2381.3	725.8	NWRPO 500'	MCC	
28-Apr-99	n/a	2756.9	375.6	114.5	2381.3	725.8	NWRPO 500'	MCC	
03-May-99	n/a	2756.9	383.0	116.7	2379.9	723.6	NWRPO 500'	MCC	5 days after swabbing
04-May-99	n/a	2756.9	382.0	116.4	2374.9	723.9	NWRPO 500'	MCC	
05-May-99	n/a	2756.9	380.0	115.8	2376.9	724.5	NWRPO 500'	MCC	
18-May-99	n/a	2756.9	385.4	117.5	2371.5	722.8	NWRPO 500'	JSW	Nye County sounder within 0.02' of QA method
18-May-99	n/a	2756.9	385.7	117.6	2371.2	722.7	USGS Sounder	P. Tucci	Sounder # w-46311-Sample Pro 6000
18-May-99	n/a	2756.9	385.4	117.5	2371.5	722.8	USGS Tape	P. Tucci	Steel tape with chalk meathod-QA Method
18-May-99	n/a	2756.9	385.4	117.5	2371.5	722.8	USGS Tape	P. Tucci	Steel tape with chalk meathod-QA Method
07-Jun-99	n/a	2756.9	384.8	117.3	2372.1	723.0	NWRPO 500'	JSW	
08-Aug-99	n/a	2756.9	384.6	117.2	2372.3	723.1	NWRPO 500'	AJM	
20-Jul-99	n/a	2756.9	384.1	117.1	2372.8	723.2	Buqo 500'	JSW	
27-Aug-99	n/a	2756.9	384.1	117.1	2372.8	723.2	Buqo 500'	JSW	



WATER LEVEL DATA **WELL: NC-EWDP-8S**

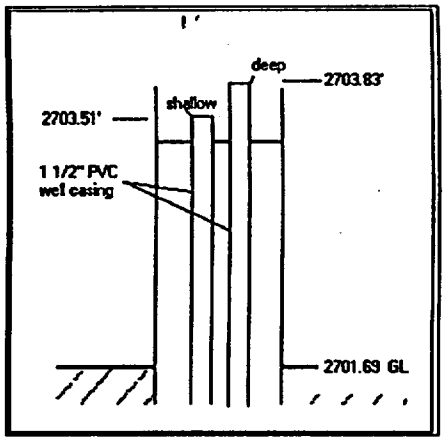
Location:

Latitude	Longitude
36°41'44.566"N	116°33'46.769"W

Access: From Lathrop Wells (Junction of highway 95 and SR 373) west 9.4 miles to gate on north side of Highway. Take gravel 0.3 miles; turn east and follow tracks to a clearing on white colored spring deposits.

Note: December 1998 measurement taken at ground level
Measurements taken at top of casing thereafter
Location and elevation from M&O GPS survey March 1999

Date	Zone Measured	Measuring Point Elevation (ft)	Depth to Water (ft)	Depth to Water (m)	Elevation of groundwater (msl) (ft)	Elevation of groundwater (msl) (m)	Method	Personnel	Comments
09-Dec-98	n/a	2615.9	193.4	58.9	2422.5	738.4	NWRPO 500'	KDD	1123 (in casing while drilling)
09-Dec-98	n/a	2615.9	177.7	54.2	2438.2	743.2	NWRPO 500'	KDD	1201 (in casing while drilling)
09-Dec-98	n/a	2615.9	160.8	49.0	2455.1	748.3	NWRPO 500'	KDD	1235 (in casing while drilling)
09-Dec-98	n/a	2615.9	149.9	45.7	2466.0	751.6	NWRPO 500'	KDD	1303 (in casing while drilling)
09-Dec-98	n/a	2615.9	134.8	41.1	2481.1	756.2	NWRPO 500'	KDD	1355 (in casing while drilling)
09-Dec-98	n/a	2615.9	112.3	34.2	2503.6	763.1	NWRPO 500'	KDD	1542 (in casing while drilling)
10-Dec-98	n/a	2615.9	98.5	30.0	2517.4	767.3	NWRPO 500'	KDD	0645 (in casing (240') before drilling
12-Dec-98	n/a	2615.9	146.5	44.7	2469.4	752.7	NWRPO 500'	KDD	0637 (in casing (390') before drilling
12-Dec-98	n/a	2615.9	308.3	94.0	2307.6	703.4	NWRPO 500'	KDD	1038 (in casing (400') while drilling
12-Dec-98	n/a	2615.9	98.8	30.1	2517.1	767.2	NWRPO 500'	KDD	1333 (in casing (400') while drilling
12-Dec-98	n/a	2615.9	98.9	30.1	2517.0	767.2	NWRPO 500'	KDD	1603 (in casing (400') 5 hrs. after drilling
13-Dec-98	n/a	2615.9	99.1	30.2	2516.8	767.1	NWRPO 500'	KDD	1603 (in casing (400') 21 hrs after drilling
14-Jan-99	n/a	2617.9	100.8	30.7	2517.1	767.2	NWRPO 500'	TSB	
15-Jan-99	n/a	2617.9	100.7	30.7	2517.2	767.2	NWRPO 500'	JSW	Before 48 hr pump test
17-Jan-99	n/a	2617.9	100.8	30.7	2517.1	767.2	NWRPO 500'	TSB	10 min after 48 hr.pump test
19-Jan-99	n/a	2617.9	100.6	30.7	2517.3	767.3	NWRPO 500'	TSB	
21-Jan-99	n/a	2617.9	100.6	30.7	2517.3	767.3		MCC	
11-Feb-99	n/a	2617.9	100.7	30.7	2517.2	767.2	NWRPO 500'	JSW	
18-May-99	n/a	2617.9	100.9	30.8	2517.0	767.2	USGS	JSW	
18-May-99	n/a	2617.9	100.9	30.8	2517.0	767.2	NWRPO 500'	JSW	
19-May-99	n/a	2617.9	101.1	30.8	2516.8	767.1	NWRPO 500'	JSW	
19-May-99	n/a	2617.9	103.5	31.5	2514.4	766.4	NWRPO 500'	JSW	



WATER LEVEL DATA **WELL: NC-Washburn-1x**

Location:

Latitude	Longitude
36°39'50.772"N	116°25'26.835"W

Access: From Lathrop Wells (Junction of highway 95 and SR 373) west 2.2 miles, north on gravel road 1.0 miles; site is located on west side of road

Note: December 1998 measurements taken at ground level
Deep zone measurements taken at top of PVC casing 2703.83'
Shallow zone measurements taken at top of PVC casing 2703.51'
Location and elevation from M&O GPS survey March 1999

Date	Zone Measured	Measuring Point Elevation (ft)	Depth to Water (ft)	Depth to Water (m)	Elevation of groundwater (msl) (ft)	Elevation of groundwater (msl) (m)	Method	Personnel	Comments
03-Dec-98	n/a	2701.7	401.5	122.4	2300.2	701.1	NWRPO 2000'	BEA	First Water; bit at 404', 1730, water dried up by 1740
05-Dec-98	n/a	2701.7	600.0	182.9	2101.7	640.6	NWRPO 2000'	KDD	1222, Bit at 638'
05-Dec-98	n/a	2701.7	327.4	99.8	2374.3	723.7	NWRPO 2000'	KDD	1629, I hr 30 min after air lifting
04-Mar-99	deep	2703.8	359.2	109.5	2344.6	714.6	NWRPO 500'	HSW	
10-Mar-99	deep	2703.8	359.2	109.5	2344.6	714.6	NWRPO 500'	KDD	
11-Mar-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	KDD	
12-Mar-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	MCC	
16-Mar-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	MCC	
17-Mar-99	deep	2703.8	359.2	109.5	2344.6	714.6	NWRPO 500'	MCC	
18-Mar-99	deep	2703.8	359.5	109.6	2344.3	714.6	NWRPO 500'	MCC	
19-Mar-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	MCC	
20-Mar-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	MCC	
22-Mar-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	MCC	
23-Mar-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	MCC	
24-Mar-99	deep	2703.8	359.2	109.5	2344.6	714.6	NWRPO 500'	MCC	
25-Mar-99	deep	2703.8	359.2	109.5	2344.6	714.6	NWRPO 500'	MCC	
26-Mar-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	MCC	
04-Mar-99	shallow	2703.2	dry	~	~	~		JSW	bottoms at ~500'
10-Mar-99	shallow	2703.2	dry	~	~	~	NWRPO 500'	KDD	
29-Mar-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 2000'		
30-Mar-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 2000'	BEA	
31-Mar-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	KDD	

01-Apr-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	KDD	
02-Apr-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	JSW	
07-Apr-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	KDD	
08-Apr-99	deep	2703.8	360.1	109.8	2343.7	714.4	NWRPO 500'	KDD	
09-Apr-99	deep	2703.8	360.1	109.8	2343.7	714.4	NWRPO 500'	MCC	
12-Apr-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	MCC	
13-Apr-99	deep	2703.8	359.8	109.7	2344.0	714.5	NWRPO 500'	MCC	
14-Apr-99	deep	2703.8	359.1	109.5	2344.7	714.7	NWRPO 500'	MCC	
15-Apr-99	deep	2703.8	359.2	109.5	2344.6	714.6	NWRPO 500'	MCC	
16-Jan-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	MCC	Shallow well is dry
19-Apr-99	deep	2703.8	359.5	109.6	2344.3	714.6	NWRPO 500'	MCC	
20-Apr-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	MCC	
23-Apr-99	deep	2703.8	360.0	109.7	2343.8	714.4	NWRPO 500'	MCC	
24-Apr-99	deep	2703.8	359.5	109.6	2344.3	714.6	NWRPO 500'	MCC	
25-Apr-99	deep	2703.8	359.6	109.6	2344.2	714.5	NWRPO 500'	MCC	
26-Apr-99	deep	2703.8	359.0	109.4	2344.8	714.7	NWRPO 500'	MCC	
27-Apr-99	deep	2703.8	359.2	109.5	2344.6	714.6	NWRPO 500'	MCC	
28-Apr-99	deep	2703.8	359.0	109.4	2344.8	714.7	NWRPO 500'	MCC	
29-Apr-99	deep	2703.8	359.0	109.4	2344.8	714.7	NWRPO 500'	MCC	
30-Apr-99	deep	2703.8	359.0	109.4	2344.8	714.7	NWRPO 500'	MCC	
03-May-99	deep	2703.8	359.0	109.4	2344.8	714.7	NWRPO 500'	MCC	
04-May-99	deep	2703.8	359.0	109.4	2344.8	714.7	NWRPO 500'	MCC	
05-May-99	deep	2703.8	359.0	109.4	2344.8	714.7	NWRPO 500'	JSW	
18-May-99	deep	2703.8	359.5	109.6	2344.3	714.6	NWRPO 500'	P. Tucci	USGS steel chain and chalk method
18-May-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	P. Tucci	USGS steel chain and chalk method
18-May-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	JSW	More water level data from Jackass Aeropark well test
08-Jun-99	deep	2703.8	359.5	109.6	2344.3	714.6	NWRPO 500'	JSW	
20-Aug-99	deep	2703.8	359.7	109.6	2344.1	714.5	NWRPO 500'	JSW	
27-Aug-99	deep	2703.8	359.7	109.6	2344.1	714.5	NWRPO 500'	JSW	
19-Oct-99	deep	2703.8	359.8	109.7	2344.0	714.5	NWRPO 500'	WJS	
05-Nov-99	deep	2703.8	359.7	109.6	2344.1	714.5	NWRPO 500'	AJM	
16-Nov-99	deep	2703.8	359.4	109.5	2344.4	714.6	NWRPO 500'	AJM	
30-Nov-99	deep	2703.8	359.5	109.6	2344.3	714.6	NWRPO 500'	WJS	
15-Dec-99	deep	2703.8	359.6	109.6	2344.2	714.5	NWRPO 500'	AJM	
05-Jan-00	deep	2703.8	359.6	109.6	2344.2	714.5	NWRPO 500'	AJM	
14-Jan-00	deep	2703.8	359.7	109.6	2344.1	714.5	NWRPO 500'	AJM	
26-Jan-00	deep	2703.8	359.8	109.7	2344.0	714.5	NWRPO 500'	BEA	
02-Feb-00	deep	2703.8	359.7	109.6	2344.1	714.5	NWRPO 500'	BEA	
11-Feb-00	deep	2703.8	359.8	109.7	2344.0	714.5	NWRPO 500'	AJM	
18-Feb-00	deep	2703.8	359.8	109.7	2344.0	714.5	NWRPO 500'	AJM	
25-Feb-00	deep	2703.8	359.9	109.7	2343.9	714.4	NWRPO 500'	AJM	