Technical Data Information Report

RID Number	Transmitter	Transmitter Organization	Receiver	Receiver Organization	Keyword 1
8272.00	Klenke	Nye County	QARC	Nye County	EWDP

Document Date	12/8/2021	General Document Type	QA Program Doc	Keyword 2	Water Level
Entry Date	11/29/2022	Detail Document Type	Data Packet	Keyword 3	Measurements

Document Title/Subject EWDP Manual Water Level Measurements from July 1, 2019 through June 30, 2020.

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Data Description EWDP Manual Water Level Measurements from July 1, 2019 through June 30, 2020. Data package includes Nye County's Regional Groundwater Elevation Database (RGED V. 6.0_063020.accdb containing Early Warning Drilling Program (EWDP) manual water level measurements, from July 1, 2019 through June 30, 2020, field forms, hydrographs (available on request) and exported data from database - posted to Nye County Website and NCWD website as rid8272.xlsx and meta8272.pdf.

Data Collection Method Manual water level measurement data collected using standardized electric water level sounders in accordance with NCWD Work Plan-10 Rev. 0 (3/16/15), Groundwater Level Monitoring and Evaluation, and NCWD Technical Procedure 9.9 Rev. 0 (3/16/15), Measurement of Groundwater Levels Using Electric Well Sounders.

Data Collection Location : EWDP Wells: 1DX Shallow, 2DB recompleted 7/08, 3D, 4PA, 4PB, 5SB, 7S, 12PA, 12PB, 12PC, 13P, 15P, 16P, 19P, 24P, 24PB, 27P, 28P, 29P, 32P Shallow, 32P Intermediate, 32P deep, 33P Shallow, 33P Intermediate, 33P Deep, Washburn Deep, 10P Deep, 10P Shallow, 18P, 22PA Deep, 22PA Shallow, 22PB Deep, 22PB Shallow, 22PC Deep, 22PC Shallow, 22S-Z2, 23P Deep, and 23P Shallow. Note: all EWDP well surveys were performed by the YMP Site Facilities Department /Field Engineering, Survey Section, with all elevations reported in NGVD-29. Therefore, all EWDP water levels in this submittal and all previous EWDP Water Data Submittals have been reported in NGVD-29.

Data Collection Period 7/1/19 – 6/30/20

Data Sources) Department of Energy (DOE) Management and Operating Contractor (M&O) derived latitude and longitude for well location and elevation data for well pad elevation; 2) Depth to groundwater measured with electric water level sounders as recorded either in the Scientific Notebook (SNB) dedicated to each well, EWDP Groundwater Level SNB #144, EWDP Westbay Instrumented Wells SNB #177, Site 22 Tracer Test SNBs #166 and #181, and/or on the NWRPO Water Level Measurement Field Form (Form TP-9.9-1 Rev 1 dated 7/21/09 ; 3) NWRPO approved Well Completion Diagrams for each EWDP well for casing type, diameter, and measuring point stickup (as established with engineers steel tape and recorded in Scientific Notebook).
Supporting Data: Supporting Data: NWRPO Water Level Measurement Field Forms (TP-9.9 Rev1-Rev3), field scientific notebooks, and metadata from prior submittals of manual water level measurements in EWDP wells (see Data Collection Location above).

Data Censoring No data were censored for the period of this submittal.

Data Processing Routinely, data processing consists of calculations made in the Access database (RGED V6.0 accdb) and exports made from the database to MS Excel. Additionally, data are evaluated through the use of hydrographs to determine whether anomalous data exist. Anomalous data are investigated (through scientific notebooks, earthquake records, etc.) to determine the source of the anomaly. If the anomaly cannot be explained, the data are censored.

Data Limitations The water level elevations presented must be considered approximate because of the potential error in the GPS-based elevation of the land surface at the well site which is believed to be on the order of +/- 1.75 ft. according to work performed by the Center for Nuclear Waste Regulatory Analyses. The potential

error in the GPS-based elevations does not affect the depth to water nor the absolute change in water levels over time that may be calculated using the elevation datum for land surface. The potential error may, however, result in limitations in the use of these data for the calculation of hydraulic gradients between wells with the error induced in such calculations being inversely proportional to the distance between the two wells being used to perform the calculation.

Water level readings in the export file containing the phrase “erratic readings” in the comment section, refers to inconsistencies in consecutive depth to water readings from a specific well. When this occurs, the reading occurring most often, or the reading that repeatedly occurs after the water level has stabilized is the reading recorded as the “actual” water level. Erratic readings, in our view, are usually the result of a tape sticking to the side of the casing, well obstructions, or readings being taken in a small diameter PVC casing (2” or less) during or immediately following large atmospheric pressure changes.

2DB recompleted 7/08 – Water level measurements may not represent water levels of the Paleozoic carbonate aquifer completion as expected. Problems encountered after the completion of the piezometer in the Paleozoic carbonate, primarily clay swelling and/or caving of the open hole completion, likely have isolated the production casing from the aquifer. See RID 7559 for more details.

32P Shallow – Water level measurements in well 32P shallow piezometer may be impacted by the presence of polymer-based drilling fluids. These drilling fluids were used in the drilling of the now abandoned USW VA-3 borehole, which was situated approximately 50 feet south of 32P. The borehole was drilled by a Department of Energy contractor, under the Probabilistic Volcanic Hazard Analysis program for the Yucca Mountain project, on magnetic anomaly “g”, with a modified conventional circulation system utilizing Baroid EZ Mud polymer.

32P Deep – Data from well 32P deep has not been censored but the water levels have noted to be increasing since the 7/8/14 measurement. The increase may indicate that the cement slurry seal between the deep and shallow string has failed allowing higher pressure shallow zone aquifer waters from 32P shallow to leak down the wellbore and raise water levels in the deep zone. However, water levels in 32P deep were noted to be higher (approx 1 foot) than those in 32P intermediate during the 11/26/14 readings and increased to “stabilized” levels in July 2015 (approx 4 ft higher than in the intermediate zone and 1.5 ft higher than in the shallow zone). The reason for the water level rise in 32P deep has not yet been determined, but may be due to either cross communication between the two zones, or may be a result of real increases in the formation pressure of the deep zone. For more information see: RID 7008 – Well Completion, 7282 – Lithologic logs , 7374 –Geotechnical Lab data, 7265.01-Alluvial logging forms, and 6901 / 6902 / 7161/7188/7194 – Geophysical data at: http://www.nyecounty.com/ewdp_pages/Phase5/32p_main.htm

33P Shallow– Water level measurements in well 33P shallow piezometer may be impacted by the presence of polymer-based drilling fluids. The initial borehole for well NC-EWDP-33P was drilled by Department of Energy contractors as borehole USW VA-5, and used a modified conventional circulation system utilizing Baroid EZ Mud polymer. Details of the completion can be found in RID 7009, “NC-EWDP-33P Field “As-Built” Well Completion and Wellhead Protection Diagrams.” Water levels have been steadily declining in this piezometer since it was developed by airlifting (7/17/07 to 9/20/07), and appear to indicate disequilibrium with the conterminous potentiometric surface. A replacement well, GWE-33PA, was drilled in 2010 to supersede this zone in well EWDP-33P, and is located approximately 74 feet to the NW.

The following 10 EWDP wells/piezometer strings apparently experienced sudden changes in water levels between the July 2019 and October 2019 water level readings. These changes are believed to be responses to seismic events and presumably the Ridgecrest earthquake sequence of July 4th and 5th, 2019.

12PA– The water level in this well rose 0.68 feet between the7/3/19 reading (2369.82 ft), and the 10/3/19 reading (2370.50 ft), and dropped -0.34 ft to an intermediate elevation for the 6/10/20 reading (2370.16 ft). This well is 389.5 ft deep and screened from 324.7 ft to 384.4 ft BGL, across mudflow tuffs and fine tuffaceous sandstone sediments. These water level changes may possibly be the result of seismic events.

12PB– The water level in this well rose 0.68 feet between the 7/3/19 reading (2370.22 ft), and the 10/3/19 reading (2370.90 ft), and dropped -0.34 ft to an intermediate elevation for the 6/10/20 reading (2370.56 ft). This well is 399.75 ft deep and screened from 325.0 ft to 384.7 ft BGL, across fine grained tuffaceous sandstone, conglomerate, and coarse grained pyroclastic flow sediments. Theses water level changes may possibly be the result of seismic events.

15P– The water level in this well rose 1.07 feet between the 7/2/19 reading (2369.41 ft), and the 10/3/19 reading (2370.48 ft), and dropped -0.36 ft to an intermediate elevation for the 6/8/20 reading (2370.12 ft). This well is 270.0 ft deep and screened from 200.1 ft to 259.9 ft BGL, across sandy gravel and clayey sand and gravel. These water level changes may possibly be the result of seismic events.

29P– The water level in this well rose 0.09 feet between the 7/3/19 reading (2378.22 ft), and the 10/3/19 reading (2378.31 ft), and dropped -0.01 ft to an intermediate elevation for the 6/11/20 reading (2378.30 ft). This well is 395.0 ft deep and screened from 340.0 ft to 390.0 ft BGL, across a densely to moderately welded and slightly weathered tuff, and an ash-fall tuff. These water level changes may possibly be the result of seismic events.

2DB recompleted 7/08 – The water level in this well dropped -1.89 feet between the 7/3/19 reading (2333.61 ft), and the 10/3/19 reading (2331.72 ft), and dropped an additional -0.73 ft for the 6/11/20 reading (2330.99 ft). This borehole is 3175 ft deep and cased with 5 1/2” in steel production casing to 2962.6

feet. The borehole TD's in Paleozoic carbonates but encountered swelling clays which may have sealed off some or the entire lower uncased portion of the borehole (2692.6 ft to 3175 ft). These water level changes may possibly be the result of seismic events.

32P Deep – The water level in this well dropped -0.49 feet between the 7/3/19 reading (2299.73 ft), and the 10/3/19 reading (2299.24 ft), and dropped an additional -0.17 ft for the 6/10/20 reading (2299.07 ft). The deep piezometer in this well is 913.0 ft deep and screened from 697.9 ft to 737.0 ft BGL, across well graded sand with gravel. These water level changes may possibly be the result of seismic events.

33P Deep –The water level in this well rose 1.01 feet between the 7/3/19 reading (2367.77 ft), and the 10/3/19 reading (2368.78 ft), and dropped -0.24 ft to an intermediate elevation for the 6/11/20 reading (2368.54 ft). The deep piezometer in this well is 650.2 ft deep and screened from 600.9 ft to 640.0 ft BGL, across a pyroclastic flow deposit of nonwelded zeolitic pumice, containing volcanic lithic clasts. These water level changes may possibly be the result of seismic events.
33P Intermediate – The water level in this well rose 1.04 feet between the 7/3/19 reading (2367.94 ft), and the 10/3/19 reading (2368.98 ft), and dropped -0.27 ft to an intermediate elevation for the 6/11/20 reading (2368.71 ft). The intermediate piezometer in this well is 533.8 ft deep and screened from 484.5 ft to 523.6 ft BGL, across a conglomerate of reworked tuff with matrix containing fine to medium sand sized particles. These water level changes may possibly be the result of seismic events.

3D– The water level in this well rose 0.04 feet between the 7/3/19 reading (2359.89 ft), and the 10/3/19 reading (2360.29 ft), and rose an additional 0.16 ft for the 6/11/20 reading (2360.45 ft). This borehole is 2500 ft deep and cased with 6 1/4" ID casing, but never completed as a well. The borehole lithology is of tertiary sediments and volcanic sequences, and TD's in tertiary sediments. These water level changes may possibly be the result of seismic events.

7S– The water level in this well dropped -0.33 feet between the 7/2/19 reading (2724.8 ft), and the 10/3/19 reading (2724.47 ft), and dropped an additional -0.04 ft for the 6/10/20 reading (2724.43 ft). This well is 45.7 ft deep and screened from 28.0 ft to 40.0 ft BGL, across silt and sand. These water level changes may possibly be the result of seismic events.

Governing QA Docs: : NCWD WP-10 Rev. 0, and NCWD TP-9.9 Rev. 0

Frequency of Transmittal: Biannually or as required by PI

Direct Questions About Data To: QA Records Center