NYE County NWRPO -Technical Data Report

RID No.	Transmitter	Org.	Receiver	Org.	Key word1	Title/Description
7264.01	Kryder	NWRPO	QARC	Nye	24PB	NC-EWDP-24PB Alluvium and Non-Alluvium Drill Cuttings Logging Forms

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Entry Date 12/30/2008 **Detailed Doc. Type** Alluvium/Non-Alluvium Logging **Keyword3** log

Data Originator Preparer Contract Geologic Staff

Title of Data NC-EWDP-24PB Alluvium and Non-Alluvium Drill Cuttings Logging Forms

Description of Data Drill cuttings logging reports exported from drilling database (NC Drilling v3.6.mdb) in .pdf format (Alluvium Drill Cuttings Logging Form and Non-Alluvium Drill Cuttings Logging Form from 1/29/06 to 2/22/06.

Data Collection Method Drill cuttings samples described on the geologic field logging forms during drilling of borehole.

Data Location(s) NC-EWDP-24PB

Data Collection Period(s) 1/29/06 to 2/22/06

Data Source(s) Geologic logging of drill cuttings.

Field Scientific Notebooks # 171, Pages 18 to 25 (RID 7099) and # 172, Pages 1 to 47 (RID 7005) describe general drilling conditions; original field drill cuttings logging forms (RID 7264); and archived drilling database (RID 7561).

Data Censoring Density data recorded on the Alluvium Drill Cuttings Logging Forms.

Data Processing Data from field logging forms were entered into the drilling database, reviewed, and database reports were transmitted to the QARC.

Data Limitations Data Censoring and Data Limitations (as described) have changed from the original field forms (RID 7264).

Originally collared at the location of NC-EWDP-24PA, the borehole was plugged and abandoned due to casing separation problems. Another collar location was established for a new borehole designated NC-EWDP-24PB.

NC-EWDP-24PB was drilled and sampled by dual-wall reverse circulation with a 6 ¾ in. rotary bit to a depth of 500 ft. At 500 ft the drill string was removed and the Symmetrix Casing Advance System was used to set 10 ¾ in casing to a depth of 467.3 ft, at which point the 6 ¾ in. bit was run back in to advance the borehole from 500 ft to a total depth of 1,395 ft.

Samples collected from alluvium at NC-EWDP-24PB by reverse circulation air drilling methods are not entirely representative of in situ conditions due to several drilling related factors. The alluvial drill cuttings samples from 0 to 105 ft are impacted as a result of hole erosion and related sample contamination resulting from the drilling of loose unconsolidated sediments. Small amounts of injection water were necessary to stabilize these unconsolidated sediments and repeated clean-out was required to advance the borehole. Installation of 57 ft of surface casing eliminated the near surface hole erosion problems. Samples from 215 to 222.5 ft and from 267.5 to 270 ft were impacted by polymer that was added to the drilling fluid in order to stabilize loose, unconsolidated sediments above the sampling points. From ground surface to a depth of approximately 405 ft, winnowing of fines at the air cyclone separator occurred during dry drilling of the unsaturated alluvium and could account for as much as a 50% loss of fines. The ideal sample volume for a 6 3/4- inch borehole is 4.3 gallons and sample yield was as low as 1 gallon in the unsaturated sediments. Sample size is reduced in the interval from 905 to 910 ft due to drilling return water washing away the weakly cemented sandstone matrix of a conglomeratic unit. Evidence from other boreholes in alluvial sediments indicates that the mechanical action of the rotary bit results in sample degradation and particle size distribution bias (see discussion in the report for the Early Warning Drilling Program Phase III boreholes, Section 2.1.2, RID 5579). In general, the mechanical action of the bit reduces large-size particles to smaller-size particles effectively decreasing the gravel-size component and effectively increasing the sand and "fines"-size component. This is a relatively minor problem in unsaturated alluvium and in the upper part of saturated alluvium

where water production is low. In underlying saturated alluvium this drilling impact renders particle size distribution data useless.

The Alluvium Logging Form includes preliminary field estimates of grain size distribution for the 405 ft of alluvium penetrated. The estimates are made on every 2.5 foot sample interval and used for preliminary layering information and general planning of wells prior to receipt of laboratory data. These field estimates of grain size distribution as well as USCS group symbol data should be considered reasonably representative of geologic samples and have not been censored. Grain size distribution data determined by laboratory analysis on every second 2.5 foot sample interval are considered representative of the geologic samples.

In addition, some sample handling disturbance may have been introduced into samples by: 1) material accumulating on wet drill pipe and rotating splitter during wet drilling; 2) unsaturated zone sample homogenization process and sample splitting.

Sample weights in sample density data do not include material that is lost to winnowing of unsaturated fines (dust) or material that was "cleaned out" of the borehole after each 20 ft drill run. Therefore unsaturated zone sample weight data is not representative of the volume of the borehole drilled, should not be used in density calculations, and has been censored.

In the upper section of the saturated zone from 417.5 to 478 ft, the water production data was estimated. Injection water was required to lift the sample and maintain a clean drill string as the drilling air was suppressing water flow from the formation. Beginning at 478 ft, timed volume water tests were conducted generally at 40 to 60 foot intervals to measure the production of water.

Evaluations of cementation and structure as recorded on the logging forms are difficult to accurately determine because intact pieces of in-situ material are not available in cuttings.

In summary, laboratory measurements of grain size distribution of alluvium drill cuttings in this borehole are considered to be modified to some extent from in situ conditions due to a number of drilling related factors. However, for the most part these factors were unavoidable. Disturbance from sample handling related factors is considered minimal. Except for censored data mentioned above, geologic drill cutting samples from NC-EWDP-24PB are considered approximately representative of in situ conditions. The geologic data recorded in these geologic logs are used to produce a Summary Lithologic Log.

Governing QA Docs. TP-8.0 Rev. 5, TP-7.0 Rev. 3

Frequency of Transmittal Once per borehole/well

Direct Questions About Data to -

NWRPO QA Records Center