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MEMORANDUM FOR: Malcolm R. Knapp, Section Leader
Hydrology Section
Geotechnical Branch
Division of Waste Management

FROM: Matthew Gordon
Geotechnical Branch
Division of Waste Management

Neil Coleman
Geotechnical Branch
Division of Waste Management

SUBJECT: TRIP REPORT FOR THE NRC HYDROGEOLOGIC DATA GATHERING SESSION, HANFORD RESERVATION (JAN. 9-16, 1984)

Attached please find a summary trip report for our recent data collection visit to the Hanford site.

"ORIGINAL SIGNED BY"

Matthew Gordon
Geotechnical Branch
Division of Waste Management

"ORIGINAL SIGNED BY"

Neil Coleman
Geotechnical Branch
Division of Waste Management

Attachment:
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TRIP REPORT
HYDROGEOLOGY DATA COLLECTION VISIT
HANFORD RESERVATION, WASHINGTON
JANUARY 9-16, 1984

The purpose of the NRC visit to the Hanford site was to obtain and review recent, unpublished hydrologic test results relevant to NRC's evaluation of BWIP's site hydrologic characterization efforts. The visit represents a follow-up to the previous NRC data review visit which formed part of the July 1982 Hydrology Workshop at the Hanford site. The data collection and review during the January visit consisted mainly of independent evaluations by NRC of raw data and data analysis files. The visit was augmented by an examination of core, drill rigs, packers, and a downhole pressure and temperature probe, and a guided reconnaissance field trip highlighting interesting hydrogeologic features on-and off-site. It was distinctly not the purpose of this visit for NRC to hold any substantive discussions with DOE/BWIP regarding NRC's official position regarding the conduct and merit of any facet of BWIP's current hydrologic characterization programs.

The NRC hydrogeology team present for the visit were:

Malcolm Knapp (WMGT, NRC)
Matthew Gordon (WMGT, NRC)
Neil Coleman (WMGT, NRC)
Roy Williams (Williams and Associates)
Dale Ralston (Williams and Associates)
Gerry Winter (Williams and Associates)
Jerry Rowe (Golder Associates)
Adrian Brown (Golder Associates)

Linda Lehman (Yakima Indian Nation) was also present for the first day of the visit.

The data collection activities took place at the Exploratory Shaft/RRL-2 site within the reference repository location. On Monday morning, January 9th, BWIP provided NRC with introductory review materials briefly describing the hydrologic characterization activities at the site since the last hydrology meeting (July, 1983). Bill Price, Steve Strait, and Greg McClellan provided a very brief (about 5 minutes each) update on the following topics, intended to aid us in our review of the hydrologic test data:

1) Changes in hydrologic test plan since 7/83 meeting (Strait)

   * In DC-19C, DC-20C, and DC-22C, six zones will be monitored rather than seven. A separate "D" hole at each of the

three clusters will be drilled to monitor the Mabton interbed.

* DC-18 will be drilled 1600' to the Mabton by FY86.

* The need for DC-23 (formerly called 5783) will be evaluated in April, 1984.

* Westbay piezometer/packer system will not be used. To the extent possible bridge plugs will be used instead of Baske system.

* Emphasis in 1984 will be establishment of baseline.

2) Core losses (McClellan):

* Triple core-barrel was used, which failed to work properly when stop ring and core spring dislodged. Used double tube assembly afterwards.

* Mechanical problems with double tube. Did not meet the vendor's specifications, causing core loss.

* Other core losses caused by unconsolidated sand washing away.

3) Discing (McClellan)

* Info in BWIP Data Package 035.

After the fifteen-minute orientation, the group commenced reviewing hydrologic test data. All data supporting planned or early draft "interval reports" for intervals (BWIP documents describing test results in series SD-BWI-TI within the Wanapum and Grande Ronde) were examined and reviewed. Data supporting recently published interval reports were not reviewed, as it was decided that the published reports could be efficiently reviewed offsite, and most of the data contained in the published reports had been reviewed during the previous workshop. The test data results and evaluations performed by the team were recorded on borehole review forms [now available in docket room]. Our comments on BWIP's data collection efforts are presently being prepared for transmittal to DOE.

On January 10th, Coleman, Gordon, Brown, Rowe and Williams attended the morning session of the NRC/BWIP Geochemistry workshop, being held concurrently in Richland. At this session, a preliminary hydrochemical interpretation of the Hanford site hydrology was offered by Tom Early (BWIP). Our comments on this discussion will be documented in a memorandum to the Geochemistry section (WMGT).

On January 11th, during the a.m. hours, we examined all rock cores recovered from the Cohassett Basalt Flow, Borehole RRL-2. These cores are located in the 200 East Area Complex.

On January 12th, during the a.m. hours, we observed piezometer installation procedures at borehole DC-19C, cluster site DC-19. The work-over rig and crew were installing the first of six piezometers which will comprise this nested well. In the afternoon, we toured the exploratory shaft (ES) drilling rig complex. Drilling of the ES had previously terminated at a depth of 100 ft. Also, on the afternoon of January 12th, we received a presentation about the design and application of inflatable packers used to isolate hydrologic test intervals.

On January 13th, the NRC hydrogeology team held our own group discussion of hydrogeologic test procedures and preliminary evaluation of methodology. The purpose of the discussion was to ensure that all of our important observations would be recorded for future use. Later in the afternoon, we received a presentation and demonstration of the Seling Triple Sub-Surface Probe (TSSP) (multiport pressure and temperature probe) in the office complex near RRL-2.

On January 16th, an introductory geologic reconnaissance field trip of the Hanford Reservation and Sentinel Gap was led by Steve Reidel, a BWIP Geologist. The attendees for this field trip were:

N. Coleman (NRC)
M. Gordon (NRC)
P. Davis (Sandia Lab.)

Topics of discussion and presentation included:

- structural and stratigraphic features of Rattlesnake Mtn.
- geologic data collection field methods
- regional borehole exploration
- tectonic and flow top breccias
- pillowed basalt sequences
- basalt flow emplacement
- interflow geology
- historical facts about the Hanford region

This introductory reconnaissance trip was extremely informative, and future on-site training of this kind is highly recommended for NRC's BWIP and NTS site specialists.

The information that was collected during this visit is represented by the following materials, all of which are available from the Document Control Center (Nancy Still's office):

1. Borehole Review Forms (evaluations of unpublished hydrologic test data)

2. Review of BWIP's data analysis software

3. Water level data from RRL-14, RRL-2, DB-14, DC-1, and McGee

4. Notes on six test procedures

5. Published documents provided with introductory materials, listed on Attachment A.

Also obtained were the following items which can be viewed by interested parties upon request of M. Gordon or N. Coleman:

1. Borehole location map

2. Hourly barometric records from calendar year 1983

The following information has been requested and will be provided to NRC by BWIP:

Item requested	Status
1. Photocopies of hydrographs for all monitored zones in:	To be sent to RWright by early February
RRL-2	"
RRL-14	"
DB-14	"
DC-16B	"
DC-22B	"
DC-20B	"
McGee	"
DC-19C	No data available until piezometers are developed
DC-19D	"
DC-20A	"
DC-14	No data available for years of interest
2. Copy of hydrologic data summary	To be sent by end of Jan.
3. Compilation of weekly drilling reports	"
4. Water quality data	"
5. Listing of data analysis programs and user's guides	Undergoing QA check; will not be provided at this time.

6.	Thickness data, geophysical and geologic logs for cluster holes	To be sent by end of Jan.
7.	As-built locations, depth projections and borehole geometry for clusters	A downhole trace plot for each cluster will be provided by end of Jan.

Summary and Future Plans

The trip was highly productive in terms of hydrologic test data acquisition and qualification. In addition to the hydrologic test data, a substantial quantity of other hydrologically relevant material and information was collected which should prove useful to NRC's review of BWIP's hydrologic characterization program.

The information collected is now being reviewed by the members of the NRC hydrogeology review team for the BWIP site. We expect to compile our observations and comments on the data in a letter to be sent to DOE by March, 1984.

Subsequent use of the data is presently under discussion. Among the most likely possibilities are:

1. Development of NRC position on quality of past testing activities, to be discussed at upcoming May 1984 BWIP/NRC hydrogeology workshop;

2. Development of NRC recommendations on conduct of future testing activities to be discussed at upcoming May 1984 hydrology workshop; and

3. Development of revised conceptual model for use in Environmental Assessment review (and to better our understanding of system).

Other projects (e.g., sensitivity studies, hydrochemical analysis) may be performed as agreed to between the members of the NRC Hanford site hydrogeology review team, the NRC BWIP Project Section Leader, and NRC management.

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

Dr. Robert J. Wright
Senior Technical Advisor
High-Level Waste Technical
Development Branch
Division of Waste Management
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Dr. Wright:

BWIP HYDROLOGIC DATA

The following documents were provided to you and your consultants during the hydrologic data review sessions held at Richland the week of January 9, 1984:

- Basalt Operating Procedure, RHO-BWI-MA-4 (selected sections)
- Deep Borehole Stratigraphic Correlation Charts and Structure Cross Sections, SD-BWI-DP-035
- Results and Evaluation of Experimental Vertical Hydraulic Conductivity Testing at Boreholes DC-4 and DC-5, SD-BWI-TI-136
- Preliminary Results of Hydrologic Testing the Umtanum Basalt Fracture Zone at Borehole RRL-2 (3,781 - 3,867 ft.), SD-BWI-TI-089
- Preliminary Results of Hydrologic Testing the Middle Sentinel Bluffs Vesicular Zone at Borehole RRL-2 (3,057 - 3,172 ft.), SD-BWI-TI-090
- Preliminary Results of Hydrologic Testing the Composite Middle Sentinel Bluffs Basalt Flow Bottom at Borehole RRL-2 (3,247 - 3,344 ft.), SD-BWI-TI-095.
- Preliminary Results of Hydrologic Testing the Middle Sentinel Bluffs Flow at Borehole RRL-2 (2,981 - 3,020 ft.), SD-BWI-TI-102
- Preliminary Results of Hydrologic Testing the Composite Umtanum Basalt Flow Top at Borehole RRL-2 (3,568 - 3,781 ft.), SD-BWI-TI-105

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- Preliminary Results of Hydrologic Testing the Umtanum Basalt Entablature at Borehole RRL-2 (3,762 - 3,805 ft.), SD-BWI-TI-107
- Preliminary Results of Hydraulic Testing the Middle Sentinel Bluffs Basalt Colonade/Entablature (3,175 - 3,244 ft.) at Borehole RRL-2, SD-BWI-TI-109
- Hydrologic Test Results for the Rattlesnake Ridge Interbed and Pomona Basalt Flow Top at Borehole DB-15, SD-BWI-TI-130
- Hydrologic Test Results for the Selah Interbed at Borehole DB-15, SD-BWI-TI-131
- Hydrologic Test Results of the Cold Creek Interbed and Asotin Basalt Flow Top at Borehole DB-15, SD-BWI-TI-142
- Results of Hydrologic Testing of the Cold Creek Interbed and Umatilla Basalt Flow Top at Borehole DC-15, SD-BWI-TI-150
- Drilling, Piezometer Design, and Testing Specifications for the DC-19, DC-20, and DC-22 Borehole Clusters and RRL-2B, SD-BWI-TC-016

The additional hydrologic data requested by your consultants will be forwarded in February 1984. If you have any questions covering this material, please contact A. G. Lassila of my staff, telephone FTS 444-6158.

Very truly yours,

O. L. Olson

O. L. Olson, Project Manager
Basalt Waste Isolation Project Office

BWI:AGL

cc: M. W. Frei, DOE-HQ