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Distribution:
 WM's/f: 3101
 WMRP r/f MFliegel
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 PPrestholt
 TVerma
 JGiarratana

Mr. O. L. Olson
 Director
 Basalt Waste Isolation Division
 U. S. Department of Energy
 Richland Operations Office
 P. O. Box 550
 Richland, WA 99342

Dear Mr. Olson:

Enclosed for your information please find the Nuclear Regulatory Commission (NRC) staff review of document RHO-SD-BWI-TI-227, "McGee Well Report." Because this well is one of the few sources of geohydrologic data west of the Cold Creek Hydrologic Anomaly, the NRC staff requests that hydrochemical and hydraulic head data collected from this well in the future be forwarded to the NRC for staff review. This request is made in accordance with Section 3.C of the Site-Specific Procedural Agreement.

Should you have any questions concerning this request or the attached document review, please contact Paul Hildenbrand of my staff at FTS 427-4672 or Michael Weber of the Geotechnical Branch at FTS 427-4746.

Sincerely,

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John J. Linehan, Acting Branch Chief
 Repository Projects Branch
 Division of Waste Management
 Office of Nuclear Material Safety
 and Safeguards

Enclosure:
 NRC Staff Review

WM Record File 101.2

WM Project 10
 Docket No. _____
 PDR
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Distribution: _____

 (Return to WM, 623-SS)

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 NAME : PHildenbrand:JLinehan : _____ : _____ : _____ : _____ :
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WMGT DOCUMENT REVIEW SHEET

FILE #: 101.0

ROCKWELL HANFORD OPERATIONS #: SD-BWI-TI-227

DOCUMENT TITLE: McGee Well Report

REVIEWER: Neil M. Coleman

DATE REVIEW COMPLETED: April 18, 1986

SUMMARY OF DOCUMENT: The BWIP supporting document describes the history of drilling, logging, hydrochemical sampling, and hydrologic testing at the McGee well for the period from June 1982 to October 1983. The McGee well is part of the Hanford Site Monitoring Network and is the deepest existing well in the upper Cold Creek valley. Data from this well, including cores, geophysical logs, and hydrochemical data, provide the most comprehensive information about hydrogeologic conditions northwest of the Reference Repository Location (RRL).

Hydraulic heads measured in the Wanapum Basalts ranged from 960 to 911 ft msl. Grande Ronde composite heads varied from approximately 611 to 590 ft msl. This significant head drop between the Wanapum and Grande Ronde demonstrates a strong downward (negative) gradient that is probably indicative of local recharge conditions.

The Cohasset flow top had a reported transmissivity range of $8 \times 10^1 - 3 \times 10^2$ ft²/day and the Cohasset flow bottom (now known as the Grande Ronde #5 flow top) had a range of $6 \times 10^1 - 2 \times 10^0$ ft²/day. These values were obtained using a variety of single-well hydrologic tests (constant discharge, slug, constant head injection, and step drawdown).

Hydrochemical analyses were performed on collected groundwater samples and the results were compared with other hydrochemical data from Hanford. The analyses showed that the Wanapum ground water in the McGee well resembles average Saddle Mtns. ground water, and the Grande Ronde ground water is hydrochemically more like the average Wanapum ground water. This supports the hypothesis that downward recharge may be occurring in the vicinity of the McGee well.

SIGNIFICANCE TO NRC WASTE MANAGEMENT PROGRAMS: Current and future data from the McGee well should be useful in the evaluation of alternative hydrogeologic conceptual models of the region northwest of the RRL. This region is located west of the Cold Creek Hydrologic Anomaly in an area influenced by extensive groundwater withdrawals associated with the St. Michel vineyards. Also, with respect to the evaluation of BWIP hydrologic baseline, the McGee well is one of the few sources of geohydrologic data west of the Cold Creek Hydrologic Anomaly.

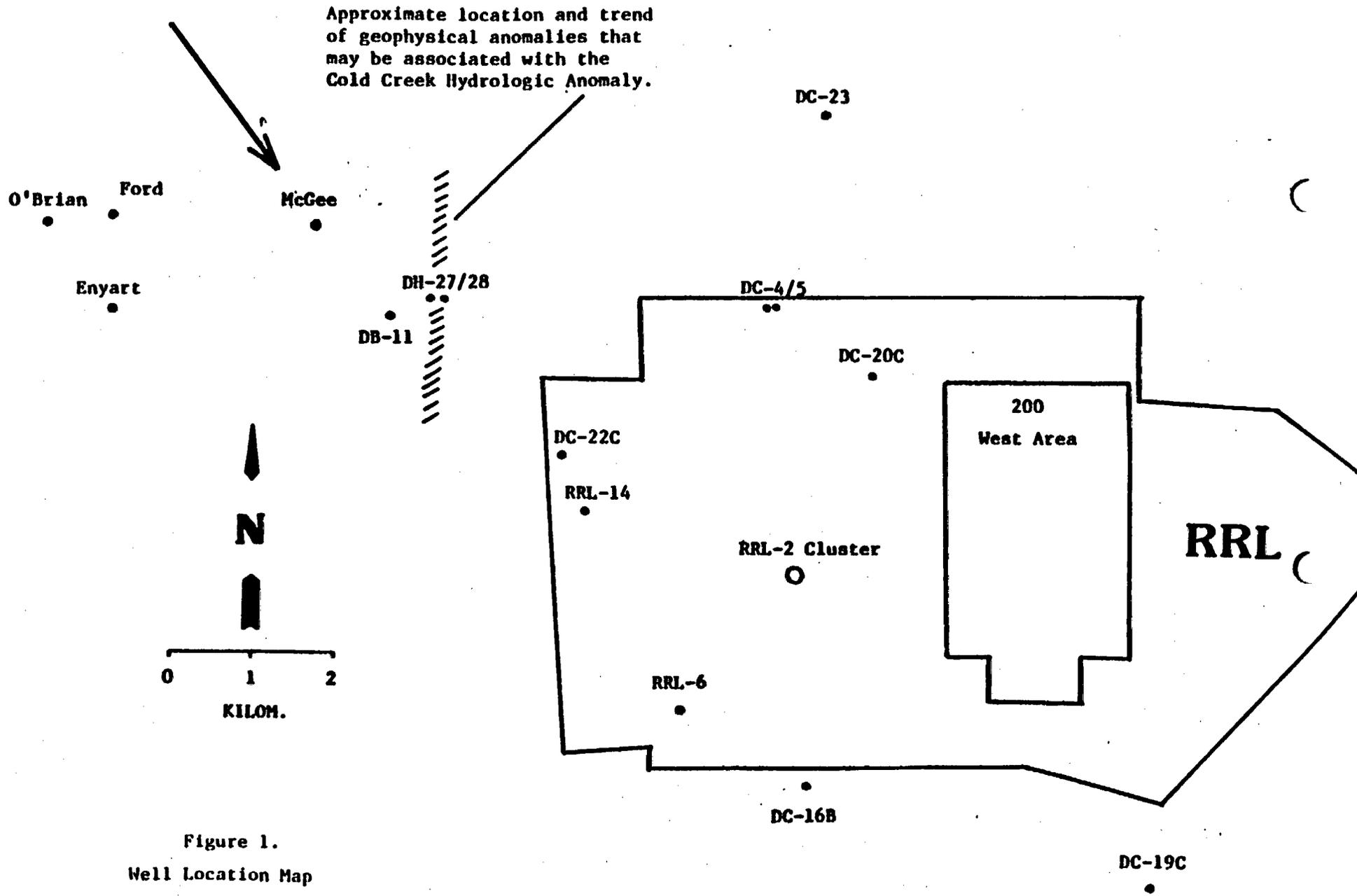


Figure 1.
Well Location Map

(based on a draft DOE base map 100/1)

Rattlesnake Spring

PROBLEMS, DEFICIENCIES, OR LIMITATIONS OF REPORT: The section on hydrologic testing is rather sketchy. No information is provided to identify DOE files that contain the original raw data from the field tests. It is also not clear how many tests of each type (i. e., pulse, constant discharge, etc.) were conducted in each of the identified test intervals.

ACTION TAKEN: A telecon was previously arranged with DOE to discuss the Cold Creek Hydrologic Anomaly (barrier) and vicinity. The flowing artesian conditions that have been reported in the McGee well are likely a result of the presence of the "barrier". In addition, a status report on the Cold Creek Hydrologic Anomaly was previously released (Coleman, 1985).

RECOMMENDED FOLLOW-UP ACTIVITY: NRC staff and contractors should monitor any future work involving the McGee well due to its strategic location west of the Cold Creek Hydrologic Anomaly. Data of interest would include hydraulic heads, head changes through time, and hydrochemical data. The McGee well is in an area likely to be affected by groundwater withdrawals outside the Hanford Reservation. Particular attention should be given to any hydrologic perturbations in the McGee well, especially those that may be related to testing within the RRL.

ATTACHMENT: Well specifications and summary of relevant geohydrologic data.

REFERENCE: Coleman, 1985. Memorandum to Fliegel and Linehan (November 27) re: "Status Report on the Cold Creek Hydrologic Anomaly", Division of Waste Management, Office of NMSS, Nuclear Regulatory Commission, Washington, D. C.

WELL DATA ATTACHMENT

Name: McGee Well

Hanford Well #: 699-53-103

Location: 4 km W-NW of RRL

Wash. State Coordinates 457,783 ft N
2,191,784 ft E

Ground Surface Elevation: 254.72 m

Well Casing Elevation: 255.20 m

Originally drilled by cable tool techniques in 1927 to TD of 298.1 m. Deepened by DOE in 1983 to TD of 951.9 m using mud-rotary coring techniques. Continuously cored between depths of 298.1 to 951.9 m (core recovery reported at 98%; 3.6 m lost from Cohasset flow). Well is uncased from 591.9 to 951.9 m and has a 7.62 cm inside diameter at the depth of the Grande Ronde. Well terminated in unnamed GR-12 flow unit (below Umtanum flow).

Geohydrologic information: Flowing artesian well.

Water levels can be monitored in three stratigraphic zones. Uncased monitoring intervals for these zones are shown below:

Composite Grande Ronde (591.9 - 951.9 m)

Composite Roza/Frenchman Springs (298.1 - 591.9 m)

Composite Priest Rapids/Roza (204.5 - 298.1 m)

Flowing artesian conditions originate from high heads in Wanapum basalts.

Heads measured in Wanapum ranged from 277.7 to 292.6 m msl and Grande Ronde heads varied from about 179.8 to 186.2 m msl (thus, vertical hydraulic gradient is downward, or negative, possibly indicating downward recharge in vicinity of well).

Available geophysical logs: neutron-epithermal neutron, gamma-gamma, natural gamma, sonic, fluid temperature, caliper, spontaneous potential, resistivity, magnetics, and flowmeter.

(Current note: As part of the Hanford site groundwater monitoring network, and in preparation for large-scale hydrologic testing, this well is currently configured to monitor heads within the Rocky Coulee flow top)