GW - 72

WORK PLANS

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September 20, 2000

BROWN AND CALDWELL
Environmental Engineering & Consulting

Mr. Wayne Price
Environmental Bureau
New Mexico Energy, Minerals & Natural Resources Department
Oil Conservation Division
2040 South Pacheco Street
Santa Fe, New Mexico 87006

Subject: **Work Plan for Delineation of Chloride Plume**
BJ Services Company U.S.A. – Hobbs Facility: GW-072
2708 West County Road
Hobbs, New Mexico

Dear Mr. Price:

Attached please find a work plan for further delineation of a chloride plume at the BJ Services Company, U.S.A. Hobbs, New Mexico facility as requested in your July 31, 2000 correspondence to Ms. Jo Ann Cobb of BJ Services, and as we discussed by telephone on September 8, 2000 following our August 28, 2000 letter to the NMOCD.

If you have any questions regarding the information presented herein, please feel free to contact Mr. Robert Jennings (713) 759-0999 or Ms. Jo Ann Cobb at (281) 357-2572.

Sincerely,

BROWN AND CALDWELL

Robert N. Jennings
Vice President

RNJ/RLR:uak

cc: NMOCD – Hobbs, New Mexico Office
Jo Ann Cobb, BJ Services Company, U.S.A.

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Work Plan for Chloride Plume Delineation at BJ Services Facility, Hobbs, New Mexico

I. Technical Understanding

Former Underground Field Waste Tanks Area

The New Mexico Oil Conservation Division (NMOCD) desires further delineation of the extent of a chloride plume in groundwater in the area of the former underground field waste tanks. Specifically, the NMOCD requires additional groundwater monitoring wells east and south of the existing monitoring well network.

Groundwater flow in this area is in a generally eastward direction. Groundwater is first encountered in this area at a depth of approximately 55 feet below grade.

II. Monitoring Well Installation Locations

A. Former Underground Field Waste Tanks Area

BJ Services proposes to install two new monitoring wells. Monitoring well MW-14 will be installed to delineate the eastern boundary of the chloride plume. Monitoring well MW-15 will be installed to delineate the southern chloride plume boundary. Monitoring well locations are depicted in the attached Figure 1. Details pertaining to well installation and construction activities for this and other proposed monitoring wells are presented in Section III.

III. Monitoring Well Installation Activities

The monitoring wells described in Section II will be installed by a driller who is licensed in the State of New Mexico, under the supervision of Brown and Caldwell. Drilling techniques will be used as appropriate to the subsurface conditions encountered. The boreholes will be logged and classified in accordance with the Unified Soil Classification System (USCS). The occurrence of the approximate top of the saturated zone will be noted during drilling activities.

The boreholes will be advanced to a depth sufficient to allow for installation of approximately 10 feet of well screen below the top of the saturated zone. The depth to water will be verified after reaching the proposed total depth of the boring, prior to commencement of monitoring well construction activities. The wells will be constructed using a total of 15 feet of well screen. The well screen will extend approximately 5 feet above the top of the saturated zone in order to account for seasonal fluctuations of the water table.

The monitoring wells will be constructed of 2-inch diameter Schedule 40 PVC. The monitoring wells will be equipped with a sealing bottom cap, an approximate 2-foot sediment sump, and 15 feet of machine-slotted 0.010-inch slot well screen placed as described in the preceding paragraph. Sufficient riser pipe will be added to extend the wells to approximately 6 inches below ground surface, where the wells will be completed as a flush-mount completion. The annular area surrounding the wells will be backfilled as follows:

- A 20-40 graded filter sand will be installed from the total depth of the boring to approximately 2 feet above the top of the well screen;
- Approximately 2 feet of hydrated bentonite shall be installed atop the sand filter;
- The remainder of the annular area will be backfilled with cement/bentonite grout installed using a tremie pipe.

The depth of the filter pack and bentonite seal will be verified using a weighted tape measure or other appropriate measuring device. The wells will be equipped with locking caps and will be equipped with traffic-rated protective covers.

The monitoring wells will be developed using a surge block and submersible pump or other appropriate methodology for a period of time not to exceed 1 hour per well or until water recovered from the wells is essentially free of suspended sediment.

Downhole equipment (e.g., augers, bits, drill rods, etc.) will be decontaminated prior to usage and after usage at each borehole location using a hot water pressure washer. Soil cuttings and development water will be stored in clean 55-gallon drums pending evaluation of disposal options. Drums will be labeled as to contents, source, and date of filling and will be moved to a designated storage location at the facility until analysis of waste characterization samples has been completed. A composite soil sample from the drummed soils will be analyzed for gasoline- and diesel-range petroleum hydrocarbons (TPH-G and TPH-D) by Method 8015 and total RCRA metals using the SW3050B/6010B/7000 Series methodology. Disposal options for investigation-derived wastes will be evaluated after review of the analytical results.

IV. Groundwater Elevation Measurement and Sampling

Groundwater samples will be collected from the monitoring wells at the time of the next quarterly sampling event at the facility in December 2000. The static depth to groundwater in each new and existing well at the facility and the adjacent property will be measured prior to commencement of groundwater sampling operations. The elevation of the top of casing for the new monitoring wells utilized during these sampling activities will be field surveyed by Brown and Caldwell personnel relative to a previously surveyed elevation of one or more of the existing monitoring wells. The horizontal locations of the wells relative to one another and to points of fixed reference will be determined using a measuring tape. This data will be used in mapping of

groundwater flow direction, calculating groundwater gradient, and determining purge volumes to be removed prior to sampling.

Groundwater samples collected from the new wells will be analyzed for chloride to delineate the chloride plume eastern and southern boundaries in the area of the former underground field waste tanks.

Well purging will be performed using a submersible pump. The following parameters will be measured upon removal of each well volume:

- pH,
- Conductivity, and
- Temperature.

Well purging will continue until a minimum of 3 well volumes have been removed and until measurements for the parameters listed above have stabilized, with stabilization being defined as consecutive readings within 10 percent of one another.

Additional parameters will be measured in the field during well purging operations to evaluate the potential for natural attenuation of hydrocarbons. These parameters are as follows:

- Dissolved oxygen,
- Oxidation-reduction potential,
- Ferrous iron, and
- Alkalinity.

Samples to be submitted for laboratory analysis will be placed in laboratory-supplied clean sample containers, labeled appropriately, placed on ice in sample containment cooler with adequate cushioning material, and forwarded to an analytical laboratory using strict chain-of-custody procedures.

V. Notification and Reporting

Brown and Caldwell will notify the central and district offices of the NMOCD a minimum of 48 hours prior to initiation of the monitor well installation activities described herein. The results of these activities and groundwater sampling will be reported to NMOCD in the December 2000 quarterly sampling report.