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MEMORANDUM

DEPT. OF ECOLOGY

Anchorage

DATE: November 17, 1999

TO: Norm Peck, Washington State Department of Ecology
Al Jacobson, A&B Jacobson LLC

Boston

FROM: Jeremy Porter and Doug Hillman, Hart Crowser

RE: Proposed Groundwater Monitoring, Market Street Site Iron Wall
J-4063-10

Chicago

CC: Keith Moxon, Buck & Gordon

Denver

This memorandum updates the groundwater monitoring plan for the zero-valent iron wall outlined in the Market Street Property Cleanup Action Plan (Hart Crowser, June 22, 1999). Changes to the monitoring plan are based on the as-built configuration of the wall and the loss of several wells due to abandonment during construction. As-built funnel and gate locations and proposed locations of new monitoring wells are shown on Figure 1. The revised groundwater monitoring plan is outlined below for review and comment before drilling and installation of the new monitoring wells. Drilling is scheduled to begin in early December 1999.

Fairbanks

Jersey City

Hydraulic Monitoring

Groundwater elevation at the monitoring wells highlighted in blue and orange on Figure 1 will be measured monthly. This will provide the following information:

Juneau

- ▶ Capture zones for groundwater passing through the reactive gates in the shallow and intermediate water-bearing zones;
- ▶ Vertical gradients between the shallow, intermediate, and deep water-bearing zones, that may result from groundwater mounding behind the funnel sections; and
- ▶ Groundwater flowrates through the reactive gates.

Long Beach

Chemical Monitoring

Portland

Monitoring wells highlighted in orange on Figure 1 will be sampled and analyzed quarterly for volatile organic compounds (VOCs, using EPA method 8010). Groundwater monitoring

Seattle



will also be conducted for several inorganic parameters to provide evidence that the decline in VOC concentrations is the result of the dechlorination process and to assess the effect of the wall on water quality. Inorganic parameters will consist of total iron, chloride, pH, redox potential, and dissolved oxygen. Wells will be monitored in the following locations to evaluate wall performance:

- ▶ Immediately upgradient, within, and immediately downgradient of the reactive gates in the shallow and intermediate water-bearing zones, to measure the reduction in groundwater VOC concentrations passing through the gates;
- ▶ At the ends of the wall, in the shallow and intermediate water-bearing zones, to verify contaminated groundwater is not flowing around the wall;
- ▶ Downgradient of the two longest funnel sections, in the deep water-bearing zone, to verify contaminated groundwater is not flowing under the funnel sections;
- ▶ Downgradient of the middle funnel section, in the shallow water-bearing zone, to verify that the sanitary sewer line passing through the wall does not provide a preferential flowpath for contaminated groundwater;
- ▶ At wells JT-3, JT-7, JT-6, and HC-MW-3, to monitor the plume further downgradient of the wall; and
- ▶ At MW-15I, to monitor the vinyl chloride hot spot.

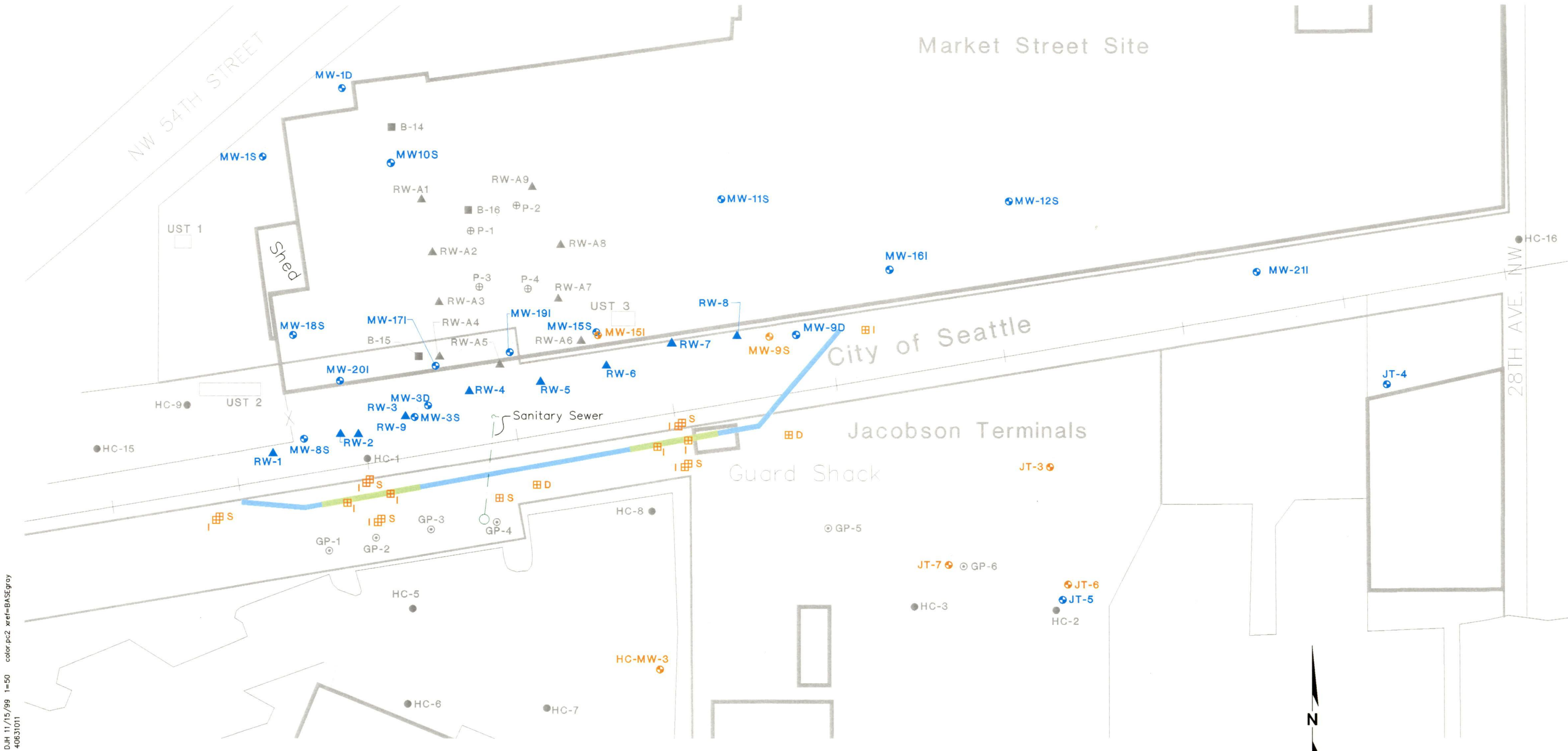
Schedule

We will perform monthly hydraulic monitoring and quarterly chemical monitoring for one year following installation of the new monitoring wells. After one year of monitoring, the monitoring program will be re-evaluated.

References

Hart Crower, June 22, 1999. Cleanup Action Plan, Market Street Property, Seattle, Washington. J-4063-10.

Proposed Monitoring Locations for Source Containment Treatment Wall



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Exploration Location and Number

- | | | | |
|-----------|----------------------------------|--------|---|
| ■ B-14 | Soil Boring
(EMCON, 1990) | ▲ RW-1 | Recovery Well |
| ● HC-MW-1 | Monitoring Well | ⊕ P-1 | Piezometer |
| ⊙ GP-1 | GeoProbe Boring
(EMCON, 1996) | UST 8 | Location and Number of Former
Underground Storage Tank (UST)
Closed/Removed |
| ● HC-4 | Strataprobe Boring | | |

- Cement-Bentonite Funnel
- Reactive Gate
- S Proposed Monitoring Well Location
S = Shallow I = Intermediate D = Deep
- JT-1 Wells Monitored Monthly for Groundwater Elevations
- JT-3 Wells Sampled Quarterly for VOCs and Monthly for Groundwater Elevations

Notes: 1. Base map prepared from 1977 aerial photograph by Walker and Associates and figure prepared by EMCON entitled "Northwest Market Street Site", dated June 1995 and from the Department of the Army entitled "Land Management Map," dated February 18, 1998.
2. Building locations and dimensions are approximate.

