Stantec

August 19, 2014

Attention: Mr. Dale Myers, VCP Site Manager
State of Washington Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Reference: Status Update for Former US Marine Bayliner Facility
17825 59th Avenue NE
Arlington, Washington
VCP No. NW2270

Dear Mr. Myers,

Stantec Consulting Services Inc. (Stantec) is pleased to submit this Status Update letter for the above-referenced Former Bayliner Marine facility in Arlington, Washington (the "Site"). This Status Update letter was prepared in response to the Washington State Department of Ecology's (Ecology) *Request for Information on Status of VCP Project* letter dated July 21, 2014. Stantec is Brunswick's environmental consultant for this location conducting an In Situ Chemical Oxidation (ISCO) program in accordance with a Work Plan approved by Ecology in a letter dated September 25, 2012.

In Situ Chemical Oxidation

On June 3rd through June 6th 2013, Stantec oversaw injection of RemOx® reagent at the Site using a truck-mounted direct-push probe rig. RemOx® is a pre-mixed $NaMnO_4$ (permanganate) liquid solution, containing 40 percent $NaMnO_4$ by weight. RemOx® is manufactured specifically for environmental applications such as remediation of groundwater and contains very low quantities of impurities relative to $NaMnO_4$.

Stantec oversaw installation of 12 temporary injection wells in the former septic drain field located at the southeast corner of Building 11. The bottom of the well screens were set approximately 10 feet below the top of the groundwater level to a maximum depth of 22 feet and the screens were extended to approximately 5 feet above the top of the groundwater level. The RemOx® solution was mixed on-site to the desired concentration and injected directly into the well using a positive displacement pump. Oxidant injection rates for the individual well head ranged from approximately 2 to 4 gallons per minute (gpm).

At injection locations where nearby monitoring wells screened in the same flow zone are present, depth-to-water and color was periodically checked during the injection process to assess the distance and direction of oxidant flow. Depth-to-water was measured using an electronic water-level indicator. Color change in the water was periodically assessed by lowering a clear bailer to the base of the screened interval, retrieving the bailer, and visually inspecting water color.

PERFORMANCE MONITORING

Baseline and post-treatment monitoring were performed to evaluate the effectiveness of the ISCO injection. When collecting groundwater samples for chemical analysis, well purging and sampling was conducted in accordance with the low-flow purging and sampling procedures previously used to conduct groundwater monitoring at the Site.

Baseline monitoring of all existing wells (MW-1 through MW-8) was completed in September 2011 to determine the baseline condition of groundwater quality prior to implementing the remedial action.

Following completion of the ISCO injection in June 2013, post-injection monitoring was conducted for a period of 12 months as specified in the Work Plan. The objectives of the post-injection monitoring were: 1) to evaluate the persistence and fate of the permanganate in the subsurface and 2) evaluate PCE and TCE concentration trends in groundwater at and downgradient from the treatment areas.

Monthly Monitoring Events

The permanganate solution has a distinct purple color, which is easily identified when present in groundwater. Accordingly, during post-injection monitoring, wells exhibiting purple color were not analyzed for VOCs until after the solution had dissipated and was no longer visibly present.

Monthly monitoring events were conducted for the first three months following the ISCO event. During these monthly events, groundwater samples were collected for visual color observation only to assess oxidant distribution and persistence in MW-1, MW-2, and MW-8. These wells were chosen because of their proximity to the injection area. The other wells in the network are located either up-gradient, cross gradient or too far down-gradient to be influenced by the injection event within three months and were not monitored.

Groundwater Sampling Events

During the 3-month, 6-month, and 12-month sampling events, groundwater samples were collected from the full network of wells (MW-1 through MW-8) and submitted for VOC analysis (by EPA Method 8260B). The 3-Month sampling event was conducted on September 6, 2013, the 6-Month sampling event was conducted on November 26, 2013, and the 12-Month sampling event was conducted on June 7, 2014.

In addition to the VOC analysis, the wells were also monitored during each sampling event for the following field parameters to determine the influence of the permanganate injection on groundwater conditions:

- pH;
- ORP;
- Temperature;

- DO;
- Turbidity; and,
- Conductivity

Based the results of the post-injection groundwater monitoring to date, at least one additional groundwater sampling event is planned at the Site.

Next Steps

Stantec plans to conduct at least one additional groundwater sampling event of all eight of the on-site monitoring wells to address post-injection PCE concentrations in the injection area.

Stantec anticipates conducting the next monitoring event in early September 2014 with possibly another event in early December 2014 to further document PCE reductions. At the conclusion of the post-injection monitoring program, Stantec will evaluate the groundwater monitoring data and determine a closure strategy for the Site through the VCP.

If you have any questions regarding the remedial actions conducted at the Site or the on-going groundwater monitoring program, please not hesitate to contact me at (425) 869-9448, Ext. 167.

Regards,

Stantec Consulting Services, Inc.

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cc. Mr. Dave Selig, Brunswick Corporation