March 12, 2015

Attn: Mr. David Selig
Director – Environmental, Health and Safety
Brunswick Corporation
1 North Field Court
Lake Forest, IL 60045-4810

Mr. Dale Myers
Site Manager
Washington State Department of Ecology
NWRO Toxics Cleanup Program
3190 160th Avenue SE
Bellevue, Washington 98008

Reference: **Technical Memorandum – Proposed Closure Strategy**

Former Bayliner Marine Facility
17825 59th Avenue NE
Arlington, Washington 98223

Facility/Site ID No. 51332889
VCP ID No. NW2270

Dear Mr. Selig and Mr. Myers:

Stantec Consulting Services, Inc. (Stantec) is pleased to present this Technical Memorandum presenting a proposed closure strategy for the above-referenced Site. This closure strategy is being proposed following the completion of the In Situ Chemical Oxidation (ISCO) and Groundwater Monitoring program at the Site. Stantec prepared a *Work Plan for In Situ Chemical Oxidation Program* on September 24, 2012 which was reviewed and approved for implementation by the Voluntary Cleanup Program (VCP) Site Manager, Mr. Dale Myers.

Stantec issued an *In Situ Chemical Oxidation and Groundwater Monitoring Report* on February, 2015 describing the results of the June 2013 ISCO injection and four rounds of groundwater monitoring. The report concluded that while PCE concentrations have remained on site and stable, ISCO injection in the presumed tetrachloroethene (PCE) source area did not result in reduced PCE concentrations within the plume area.

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The ISCO injection and groundwater monitoring program was selected and approved as the preferred remedial alternative for reducing PCE concentration in groundwater as presented in Stantec's 2011 *Remedial Investigation and Feasibility Study* (RI/FS) and *Cleanup Action Plan (CAP).* The remedial alternatives were evaluated based on several criteria including: protectiveness of human health and the environment, permanence, long-term effectiveness, technical implementability, administrative implementability, and cost. In the RI/FS, Stantec also included an evaluation of three passive remedial alternatives including: Monitored Natural Attenuation (MNA), Institutional Controls, and No Action as possible longer-term strategies for achieving the remedial objectives for the Site.

Based on the results of the ISCO and post-injection groundwater monitoring program, it is apparent that further active remedial actions are not likely to be effective in achieving the cleanup objectives within a reasonable restoration time frame. Stantec, therefore, proposes further action in the form of a combination of the implementation of a conditional point of compliance, performance of MNA, and the application of institutional controls. This strategy is the most suitable follow-up action to ensure continued protection of human health and the environment and to demonstrate compliance with cleanup standards. The objective of the proposed approach is a formal No Further Action (NFA) determination from the Washington State Department of Ecology (Ecology).

A more detailed discussion of the Natural Attenuation with Institutional Controls closure strategy is presented below.

Natural Attenuation

The term "natural attenuation" refers to the reduction in mass or concentration of a compound in groundwater over time due to naturally-occurring physical, chemical, and/or biological processes. Physical processes include dispersion, dilution, sorption and volatilization of dissolved compounds. Typical chemical mechanisms include ion-exchange reactions (e.g., oxidation, reduction), hydrolysis and abiotic transformations. Biological degradation and/or transformation may also occur, but the absence of degradation products in groundwater at the site suggests that this mechanism is not a major contributor to attenuation of this plume.

Monitored natural attenuation involves periodic groundwater sampling and analysis to verify that attenuation of the constituents is occurring. Washington Administrative Code (WAC) 173-340-370(7)) states that natural attenuation is an appropriate remedy at sites where:

- Source control has been conducted to the maximum extent practicable;
- The presence of residual contamination during the restoration time frame does not pose an unacceptable threat to human health or the environment;
- There is evidence that natural attenuation is occurring and will continue to occur; and,
- Appropriate performance monitoring is performed.

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All four of these conditions are applicable at the Site.

The United States Environmental Protection Agency (USEPA) OSWER directive regarding the use of MNA (OSWER Directive 9200.4-17P, April 21, 1999) directly addresses the suitability of MNA as a remedial alternative for chlorinated solvents such as PCE. In the OSWER directive, the USEPA states that the most important considerations regarding the suitability of MNA as a remedy include:

1) Whether the contaminants are likely to be effectively addressed by natural attenuation processes;

2) The stability of the groundwater contaminant plume and its potential for migration; and,

3) The potential for unacceptable risks to human health or environmental resources by the contamination. Sites where the contaminant plumes are no longer increasing in extent, or are shrinking, would be the most appropriate candidates for MNA.

MNA Approach

The proposed MNA approach for the Site includes regular sampling of a subset of the existing on-site monitoring well network of eight wells. Based on the sampling results obtained since December 2009, Stantec proposes a performance monitoring network of four wells: MW-2, MW-3, MW-4, and MW-5 (Refer to Figure 5). MW-2 is the closest, non-impacted downgradient well to the presumed source area, at MW-1, and is proposed as the Conditional Point of Compliance. MW-3 would serve as the upgradient well. MW-4 would serve as a sentinel well along the centerline and beyond the leading edge of the plume to monitor the potential for off-Site migration. MW-5 would provide lateral delineation of the plume.

Stantec proposes a semi-annual performance monitoring schedule of two years or four additional sampling events beginning in Summer 2015. Sampling events would coincide with the dry summer months and wetter winter months. Semi-annual sampling is appropriate since groundwater sampling conducted since late 2009 has demonstrated that the hydrologic, geochemical, and contaminant trends are stable. Monitoring for two additional years, as proposed, would extend the total monitoring period at the Site to seven years since the monitoring wells were installed.

Groundwater samples will be collected from the wells in the performance monitoring network and analyzed for VOCs and primary geochemical indicators including: specific conductivity, dissolved oxygen (DO), pH, oxidation-reduction potential (ORP), and temperature. Groundwater monitoring data will be evaluated after each sampling event to confirm containment of the PCE plume, track concentration trends, and evaluate the progress of MNA.

Stantec will evaluate the results of the MNA approach at the completion of the performance monitoring period. If, as anticipated, the monitoring demonstrates that the PCE plume is stable, there is no indication of off-site migration of PCE, and PCE concentrations are decreasing in the source area, Stantec will petition for site closure through the VCP.

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Institutional Controls (IC)

ICs are administrative and/or legal controls that prevent exposure to constituents by limiting land use. Institutional controls, such as restrictive covenants (deed restrictions), can be employed as part of remedial actions to prevent exposure to impacted media and thus ensure protectiveness of the remedy. Under Ecology's Model Toxics Control Act (MTCA), restrictive covenants cannot be utilized as the primary remedy for a site. Therefore, placement of a restrictive covenant on the property would be used in addition to the in situ chemical oxidation treatment that has already been completed and follow-up MNA approach. The IC would preclude consumption or other use of groundwater at the Site. In this manner, protectiveness of human health and the environment would be ensured through exposure prevention.

A restrictive covenant as applied to the Site would include the following elements:

- A restriction on installing drinking water wells in the plume area while PCE concentrations in groundwater exceed the Federal Safe Drinking Water Act Maximum Contaminant Level (MCL) and MTCA Method A Cleanup Level (CUL) of 5 µg/L;
- A restriction on construction or relocation of buildings at the Site that would prevent proper monitoring of groundwater concentrations; and,
- A requirement to limit property zoning and use to industrial activities consistent with the current zoning and uses.

Washington Administrative Code (WAC) 173-340-440(4)) identifies certain circumstances when Institutional Controls "shall be required to assure both the continued protection of human health and the environment, and the integrity of an interim action or cleanup action..." The cited circumstances include several that may be applicable to the former Bayliner Marine site:

- Sites where MTCA Method A or Method B Cleanup Levels (CULs) apply and where hazardous substances remain at the Site at concentrations that exceed the applicable CUL;
- Sites where a groundwater CUL is established that exceeds the drinking water CUL based on a site-specific risk assessment; and,
- Sites where Conditional Points of Compliance (POCs) are established. Stantec proposes establishment of a Conditional Point of Compliance at MW-2 as described above. The final POC(s) at the Site will be determined through consultation with the Ecology Site Manager.

It should be noted that while restrictive covenants have been used for many years, they have sometimes been rendered unenforceable under common law (e.g., waiver, abandonment, acquiescence, adverse possession, foreclosure of a tax lien, the rule against perpetuities, and requirements for privity or appurtenance, etc.). In 2007, however, Washington enacted the

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Uniform Environmental Covenants Act (UECA), which establishes environmental covenants for sites in Washington that are remediated under oversight of Ecology or USEPA. Ecology has updated the language in its Model Restrictive (Environmental) Covenant to be consistent with the UECA.

RATIONALE

The remedies implemented to date at the Site combined with the proposed MNA performance monitoring and institutional control represent a remedial approach that is protective of human health and the environment and meets the requirements of MTCA (Chapter 70.105D RCW) and its implementing regulations (WAC 173-340).

The Disproportionate Cost Analysis prepared as part of the RI/FS determined that Source ISCO with MNA and IC ranked as the highest of the five evaluated remedial alternatives for protectiveness, permanence, and consideration of public concerns. The costs of the other active remedial alternatives were deemed to be disproportionately high for the benefits likely to be achieved.

The ISCO program has been completed. Continuation of the MNA approach with application of the IC remains the preferred remedial alternative for the Site for the following reasons:

- PCE impacts in soil have been fully remediated.
- Sufficient data has been collected since 2009 to fully delineate the nature, degree, and extent of the PCE contaminant plume at the Site. The groundwater within the plume contains low concentrations of PCE which pose a very limited risk of on-site direct exposure or indoor air concerns.
- The Site lies within a fully developed industrial setting and the groundwater impacts present no threat of exposure to off-site receptors.
- There is evidence that PCE concentrations in the plume area have been declining as a result of natural attenuation processes.
- The primary potential route of exposure to receptors is through ingestion of contaminated groundwater. The on-site groundwater is not utilized as a source for irrigation, process, or drinking water. Furthermore, it is unlikely to be utilized for drinking water in the future. The property is currently served by municipal water supplies and Brunswick anticipates it will continue to be into the future. Placement of a restrictive covenant on the property will further ensure that groundwater will not be a source of exposure.
- The proposed MNA and restrictive covenant remedy would limit future use of the Site to industrial activities that are consistent with current and recent historic uses. This strategy would also prohibit the extraction and use of groundwater to maintain the current protectiveness into the future.

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Thank you for your consideration of this approach. Stantec and Brunswick Corporation look forward to working with Ecology to further develop and formalize the MNA and restrictive covenant closure strategy for the former Bayliner Marine Site. Please call either of the undersigned to discuss or if you have any questions.

Regards,

Stantec Consulting Services, Inc.

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Attachments:
Figure 5: PCE Concentrations in Groundwater

CAMBELL/NEILSON AUTO WRECKING

MW-7	PCE
9/16/14	ND

RESIN ROOM

AQUA WASH WASTE BLDG

UNDEVELOPED LAND

STELLA-JONES LUMBER YARD

180th STREET NE

ARLINGTON AIRPORT

59th AVENUE NE

MW-5

MW-5	PCE
9/16/14	ND

MW-4

MW-4	PCE
9/16/14	3.92

BUILDING 1

BUILDING 2

BUILDING 3

BUILDING 4

MW-6	PCE
9/16/14	ND

MW-6

EMPLOYEE PARKING

BOAT STORAGE

OFFICE BLDG. 6

OFFICE BLDG. 5

BUILDING 7

BUILDING 8

FORMER SEPTIC LEACH FIELD

OFFICE BLDG. 9

BUILDING 12A

MW-8	PCE
9/16/14	42.4

MW-8

MW-2

BUILDING 10

MW-11	PCE
9/16/14	36.5

BUILDING 11

DISPENSER ISLAND

WATER RETENTION POND #2

WATER RETENTION POND #3

MW-1

MW-2	PCE
9/16/14	ND

FORMER SEPTIC LEACH FIELD

BUILDING 12

EMPLOYEE PARKING

BUILDING 16

BUILDING 17

BUILDING 14

FENCE

GATE

COOK INVESTMENTS

MW-3

WATER RETENTION POND #1

MW-3	PCE
9/16/14	ND

UNDEVELOPED LAND

ANCHOR SELF STORAGE

JET CITY EQUIPMENT RENTAL

N

0 140 280

APPROXIMATE SCALE (FEET)

LEGEND

- SUBJECT PROPERTY BOUNDARY
- MONITORING WELL LOCATION
- 10,000-GALLON RESIN AST
- 10,000-GALLON DIESEL AST
- 5,000-GALLON GASOLINE AST
- AQUA WASH WASTE AST
- PROPANE TANK
- AST — ABOVE GROUND STORAGE TANK
- CATCH BASIN
- DR — DRAIN LINE
- PCE — TETRACHLOROETHENE
- ND — NON-DETECT
- ESTIMATED CONCENTRATION OF PCE PLUME (5µg/L)
- ESTIMATED CONCENTRATION OF PCE PLUME (40µg/L)

ALL CONCENTRATIONS ARE REPORTED IN MICROGRAMS PER LITER (µg/L)

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FOR:
FORMER BAYLINER MARINE FACILITY
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ARLINGTON, WASHINGTON

PCE CONCENTRATION IN GROUNDWATER (µg/L) (SEPTEMBER 16, 2014)

FIGURE: 5

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
182602648	ARA	GMC	MS	11/5/14

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