

June 26, 2019
PGL File: 5588-01.01

Via E-mail: jbower@lowrysales.com

Ship-2-Shore
109 - 7337 North Fraser Way
Burnaby, BC
V5J 0G7

Attention: John Bower

RE: SHIP-2-SHORE ANTI-CORROSION PRODUCT TESTING

PGL Environmental Consultants (PGL) has prepared this letter for Ship-2-Shore (S2S) for recent testing of their anti-corrosion products: Float-Coat and Chain-Coat/PLID Industrial Thick.

Based on the results of field scale testing and chemical analysis, the discharge water in contact with these products meets Canadian Federal and British Columbia Provincial Marine Water Quality Guidelines for petroleum hydrocarbons and metals. The discharge water quality also meets the California Environmental Protection Agency Ocean Marine Water Quality Objectives. Freshwater environments have lower guidelines than marine environments for some constituents of the discharge water. Discharge to a freshwater environment is not recommended without further review.

CONTEXT

S2S has two products used to prevent corrosion and fouling in marine vessel applications. Float-Coat is applied as a lining to void spaces, and Chain-Coat or PLID Industrial Thick (same product, different trade names) is applied to anchor chains. The products are applied using a flotation method where the product "floats" on a water surface as it drains a space or chamber and "coats" the surface. The water that drains out of the space is discharged to the ambient water where the process takes place.

ASSIGNMENT

A test procedure was set-up by S2S at their Burnaby location where a shipping container was filled with municipally supplied tap water. In separate tests, each product was added to the shipping container water in the specified application amount for each product. The water was allowed to drain from the container, simulating the coating process. A sample of the drainage water for each product was collected by PGL for analysis. Prior to the product tests, PGL collected a control sample of tap water drained from the container.

The tap water control, Float-Coat and Chain-Coat/PLID Industrial Thick discharge samples were collected and submitted to Caro Analytical Laboratory for analysis of:

- Light and heavy extractable petroleum hydrocarbons (LEPH/HEPH);
- Petroleum hydrocarbon fractions F1 to F4 (F1 – F4);
- Volatile hydrocarbons and volatile petroleum hydrocarbons (VH/VPH);
- Benzene, ethylbenzene, toluene, styrene, and xylenes (BTEX); and
- Total metals.

We compared the chemical analysis results to Canadian Federal and Provincial Surface Water Quality Guidelines for protection of marine aquatic life. Summary Tables 1 and 2 are attached to this letter.

All chemical analysis results meet the Canadian Federal and Provincial Surface Water Quality Guidelines for protection of marine aquatic life except for cadmium and copper in the tap water control sample and copper in the product discharge samples. We attribute the copper in the discharge samples to the tap water.

We also compared the analytical results to the California Environmental Protection Agency, State Water Control Board, 2012 California Ocean Plan, Table 1 Objectives for protection of marine aquatic life. The results also meet these standards. California State water regulations may vary depending on regional water control board authority. We recommend contacting a regulator in the region where the product is used for further clarification of applicable regulations.

LIMITATIONS

This report is accurate at a high level for reasonably foreseeable conditions. The limitations of the work are not always obvious, and the best way to understand them is discussion with the authors in the context of your intended use. This work is a snapshot in time, so any use must consider that conclusions may change materially because of changes in site condition or regulatory context.

Only the addressee, our client, and their agents may rely on this report for the stated purpose. We warrant only that the work was done as described and is similar to the work that would be done by other qualified consultants in this area. Our contract includes limitations on liability related to professional errors and omissions.

CLOSING

We trust that this meets your needs. If you have any questions or require clarification, please contact Dave Bell or Tom Berger at 604-895-7635 and 604-895-7605, respectively.

PGL ENVIRONMENTAL CONSULTANTS

Per:



Dave Bell, P.Ag., LEED AP®
Environmental Consultant



Tom Berger, B.Sc., P.Geo.
Senior Environmental Consultant

DWB/TEB/slr/mtl

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Attachments: Tables 1 and 2
Laboratory Certificates