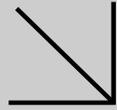




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WORK ORDER NUMBER: 15-02-0865

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Analytical Report For

Client: Brock International

Client Project Name: POWERBASE / SP ANALYTICAL TESTING

Attention: Richard Runkles
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Approved for release on 02/24/2015 by:
Don Burley
Project Manager

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MEMORANDUM

To: Steve Sawyer, Brock International
From: Nicole Peacock, Dudek
Subject: Revised Evaluation of Turf Laboratory Analytical Data – Brock International
Date: April 9, 2015
cc:

Dudek evaluated the laboratory analytical results of samples of the Performance Shock Pad - Expanded EPP composite (SP) and the Power Base - Expanded EPP (POWERBASE) from Brock International. These materials are associated with Brock International's synthetic turf product line. The samples were analyzed for constituents that could potentially be used in their manufacture and that may impact water quality or human health.

The Powerbase sample and Shock Pad sample were received by Eurofins-CalScience Laboratory on February 12, 2015. The samples were analyzed for total metals by EPA method 6010B/7471A, volatile organic compounds (VOCs) by EPA method 8260B, and semi-volatile organic compounds (SVOCs) by EPA method 8270C. Leachable concentrations of these constituents were also evaluated following extraction using the Synthetic Precipitation Leaching Procedure (SPLP). Metals, VOCs, and SVOCs may impact stormwater quality, groundwater quality, and/or human health through leaching, direct contact with the synthetic turf, or erosion and release of the infill materials.

The sample results were compared to regulatory thresholds as described below:

- For human health standards – Comparison of solids analyses to EPA Regional Screening Levels (RSLs) and California Human Health Screening Levels (CHHSLs).
- For groundwater quality – Comparison of SPLP extract concentrations to maximum contaminant levels (MCLs).
- For surface water quality – Comparison of SPLP extract concentrations to RWQCB Environmental Screening Levels (ESLs) for surface water (fresh water aquatic habitat).

Comparison to Human Health Standards

The concentrations of metals and VOCs detected in the two samples were below the applicable thresholds for human health standards (Table 1). Additionally, no SVOCs were detected above the laboratory reporting limits.

It should be noted that the original reporting limits for VOCs were elevated due to matrix interference. Matrix interference occurs during laboratory analysis when compounds in the sample that are not target VOCs interfere with the ability to determine the concentrations of the target VOCs below a certain level. Due to the elevated reporting limits in the original laboratory report, Dudek requested that the laboratory report VOC concentrations down to the method detection limit. The resultant laboratory report for VOCs (Appendix B) compares the VOC concentrations to the method detection limit (MDL), which is generally similar to typical, unelevated reporting limits and are as much as 130 times lower than the elevated reporting limits of the original laboratory report. Only one VOC (chloromethane) was detected at a concentration greater than the MDL in both samples (chloromethane was also detected in the method blank, indicating that the detected concentrations could be biased high).

In an abundance of caution, Dudek compared the MDLs for the non-detected VOCs to the human health standards (RSLs) and found that two VOCs have exceptionally low RSLs, such that the MDL is greater than the RSL. These two VOCs are 1,2-dibromo-3-chloropropane and 1,2,3-trichloropropane (Table 1). 1,2-dibromo-3-chloropropane is a soil fumigant and is, therefore, unlikely to be present. Both 1,2-dibromo-3-chloropropane and 1,2,3-trichloropropane break down in the atmosphere when exposed to sunlight. Based on the EPA-reported half-lives of 12 to 15 days for these chemicals and conservatively assuming that the turf material contains these two compounds at concentrations just below the MDL, the concentrations would be less than the RSL within 1 to 2 months. As the RSLs are based on exposure to the VOCs over a period of 25 years, a possible exceedance of the RSLs for 1 to 2 months is not significant.

Therefore, based on comparison of the data to the human health thresholds, the two turf samples are not likely to impact human health.

Table 1 – Product Testing Results

Analyte	POWERBASE	SP	RSL Standard - Commercial	CHHSL Standard - Commercial
	units - mg/kg			
Cobalt	<0.244	0.273	350	3,200
Copper	1.46	2.56	47,000	38,000
Zinc	8.94	22.0	350,000	100,000
Chloromethane	0.24	0.20	0.46	N/A
1,2-dibromo-3-chloropropane	<0.87	<0.89	0.064	N/A
1,2,3-trichloropropane	<0.42	<0.42	0.11	N/A

Abbreviations:

CHHSL = California Human Health Screening Level

mg/kg = milligrams per kilogram

N/A = not applicable

RSL = EPA Regional Screening Level

Notes:

1. Detected analytes (and 2 non-detected VOCs) are listed in Table 1. Non-detected analytes are shown in Appendices A and B.
2. Samples were analyzed for Volatile Organic Compounds by EPA Method 8260B, Semivolatile Organic Compounds by EPA Method 8270C, and metals by EPA Methods 6010B and 7471A.

Comparison to Surface Water and Groundwater Standards

No VOCs or SVOCs were detected in the sample SPLP extracts at concentrations above the laboratory reporting limits. Only one metal, zinc, was detected in the sample extracts at concentrations above the laboratory reporting limits (Table 2).

The concentrations of zinc detected in the extract sample were less than the drinking water MCL, indicating that the samples are not likely to impact groundwater quality.

Potential impacts to surface water quality are evaluated by comparison to the RWQCB ESLs for fresh water habitat. The concentrations of zinc detected in the sample extracts were less than the ESL threshold for fresh water habitat. Implementation of best management practices (BMPs) and project design can reduce the potential surface water impacts in these areas.

Memorandum

Subject: Evaluation of Turf Laboratory Analytical Data

Table 2 – Product Leachability Results

Analyte	POWERBASE	SP	ESL Standard – Fresh Water	MCL Standard
	units - mg/L			
Zinc	0.0816	0.117	0.12	5

Abbreviations:

ESL = Environmental Screening Level

MCL = Maximum Contaminant Level

mg/L = milligrams per liter

Notes:

1. Detected analytes are listed in Table 2. Non-detected analytes are shown in Appendix A – Laboratory Reports.
2. Samples were analyzed for Volatile Organic Compounds by EPA Method 8260B, Semivolatile Organic Compounds by EPA Method 8270C, and metals by EPA Methods 6010B and 7470A, following SPLP extraction.
3. The MCL listed for zinc is the secondary MCL.

References:

California Code of Regulations, Title 22, Division 4, Chapter 15, Article 16, Secondary Water Standards, Section 64449, Secondary Maximum Contaminant Levels, 2006.

Office of Environmental Health Hazard Assessment Soil Screening Numbers (CHHSLs) – Updated Table (OEHHA, 2010)

San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (ESLs; RWQCB, 2013)

U.S. EPA Maximum Contaminant Levels (MCLs) – National Primary Drinking Water Regulations (U.S. EPA 2009)

U.S. EPA Regional Screening Level (“RSL”) Summary Table (TR=1E-6, THQ=1) May 2014 (U.S. EPA, 2014)

APPENDIX A

Laboratory Report