



November 2015

CONDITIONAL USE LEVEL DESIGNATION FOR BASIC AND ENHANCED TREATMENT

For

LEAN Environment – Enpurion® Metals Treatment

Ecology's Decision:

Based on LEAN Environment's application submissions, Ecology hereby issues the following use level designations for the Enpurion® Metals Treatment system:

1. A Conditional Use Level Designation (CULD) for Basic (TSS) Treatment.
 - Using LEAN Environment's cellulose-based sorption/ion exchange media.
 - Sized at a hydraulic loading rate of no greater than 50 gallon per minute (gpm) per series of columns.
 - Each Enpurion® Metals Treatment system consists of one or more series of columns.
 - At a minimum, each series will contain three columns: two columns containing the cellulose-based media with a base of mineral media, and one column containing crushed gravel media.
 - Each column consists of two 275-gallon tanks.
 - System influent delivered by pump, with transfer pumps between each column.

2. A Conditional Use Level Designation (CULD) Enhanced (dissolved Cu and Zn).
 - Using LEAN Environment's cellulose-based sorption/ion exchange media.
 - Sized at a hydraulic loading rate of no greater than 50 gallon per minute (gpm) per series of columns.
 - Each Enpurion® Metals Treatment system consists of one or more series of columns.
 - At a minimum, each series will contain three columns: two columns containing the cellulose-based media with a base of mineral media; one column containing crushed gravel media.
 - Each column consists of two 275-gallon tanks.
 - System influent delivered by pump, with transfer pumps between each column.

3. Ecology approves the Enpuriion® Metals Treatment system for treatment at the above flow rate. The designer shall calculate the water quality design flow rates using the following procedures:
 - Western Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.
 - Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.
 - Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.
4. The Use Level Designation expires on July 15, 2018 unless extended by Ecology, and is subject to the conditions specified below.

Ecology's Conditions of Use:

The Enpuriion® Metals Treatment systems shall comply with these conditions:

1. Design, assemble, install, operate, and maintain the systems in accordance with LEAN Environment's applicable manuals and documents and the Ecology Decision.
2. Pump station and bypass design shall follow local guidelines and codes.
3. LEAN Environment commits to submitting a QAPP for BER review and Ecology approval by May 1, 2014 that meets the TAPE requirements for attaining a GULD for Basic and Enhanced Treatment. Ecology must review and approve any QAPPs for each additional field site in Washington State. The sites chosen should reflect the product's treatment intent.
4. LEAN Environment shall complete all required testing and submit a TER for Ecology review by October 19, 2017.
5. Maintenance: The required maintenance interval for stormwater treatment devices is often dependent upon the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a "one size fits all" maintenance cycle for a particular model/size of manufactured filter treatment device.
 - Enpuriion® Metals Treatment systems maintenance includes routine media maintenance, media replacement and cleaning. Maintenance frequency is site specific and for preventative maintenance purposes is estimated based on elapsed time and/or cumulative flow through the system. Maintenance includes the following:

- Weekly inspection of the system for system blockage, leaks, or damaged structural elements. Maintain pump, level switch and valve settings per manufacturer's specifications. Test system power and pump function by selecting manual override on first column for 10 seconds. Replace pre-filters when indicated.
- Monthly inspection of media condition in the first column in series to identify accumulation of excessive debris, accumulation of oils or other foreign materials that may impede flow.
- Periodic observation of system operation to ensure column cycle times are consistent and flow rates uniform throughout the transfer cycle.
- Indications of the need for maintenance include:
 - effluent flow rate decreasing to below the design flow rate, or
 - evidence of column overflow, or
 - retained stormwater in the bottom column, or
 - excessive cycling of transfer pumps.
- Owners /operators must inspect Enpurion® systems for a minimum of twelve months from the start of post-construction operation to determine site-specific maintenance schedules and requirements. Conduct inspections at least monthly during the wet season, and at least every other month during the dry season. (According to the SWMMWW, the wet season in western Washington is October 1 to April 30. According to SWMMEW, the wet season in eastern Washington is October 1 to June 30). After the first year of operation, owners/operators must conduct inspections based on the findings during the first year of inspections. Conduct more frequent inspections if recommended by the manufacturer.
- Conduct inspections by qualified personnel, follow manufacturer's guidelines, and use methods capable of determining either a decrease in treated effluent flow rate and/or a decrease in pollutant removal ability.
- When inspections are performed, the following findings typically serve as maintenance triggers:
 - Discoloration of the surface from accumulated sediment is visually more predominant than filtration media, or
 - Evidence of blockage or system overflows, or
 - Evidence of bypass or operating water levels more than one foot above the media surface, or
 - Presence of significant oil and grease films on the walls of the vessels of the second column, or
 - Standing water greater than 2" deep remains inside the filtration chamber between rain events, or
 - Treatment system performance has declined more than 10% for two or more samples, or

- Jar testing of media sample from the first column indicates accumulation of sediments in excess of 20% of the media volume.
6. LEAN Environment may request Ecology to grant deadline or expiration date extensions, upon showing cause for such extensions.
 7. Discharges from Enpurion® Metals Treatment systems shall not cause or contribute to water quality standards violations in receiving waters.

Applicant: LEAN Environment, Inc.

Applicant's Address: 4500A 15th Street East
Tacoma, WA, 98424

Application Documents:

- Technology Assessment Protocol – Application for Certification. LEAN Environment, Enpurion® Metals Treatment. February 6, 2013.
- Storm Water Media toxicity report. February 18, 2013. Submitted to Ecology on April 15, 2013.
- TSS/PHOS Treatment Data in support of TAPE Application for Enpurion Metals Treatment (EMT) Technology. June 26, 2013.

Applicant's Use Level Request:

- Conditional Use Level Designation as a Basic and Enhanced stormwater treatment device in accordance with Ecology's 2012 *Stormwater Management Manual for Western Washington*.

Applicant's Performance Claims:

- The Enpurion® Metals Treatment will provide statistically significant removal of TSS, dissolved copper, and dissolved zinc, and can meet or exceed Ecology's Basic and Enhanced treatment standards.

Ecology's Recommendations:

- Ecology should provide LEAN Environment with the opportunity to demonstrate, through field testing that follows an approved QAPP, whether the Enpurion® Metals Treatment system can attain Ecology's Basic and Enhanced treatment performance levels.

Findings of Fact:

- Based on paired grab sample data for TSS, from two sites, the Enpurion® Metals Treatment system achieved the following treatment levels for total suspended solids (TSS):
 - Average influent TSS of 162 mg/L; average effluent TSS of 7.2 mg/L (n=13).
 - Influent TSS concentrations ranged from 23 to 540 mg/L. All individual paired samples showed greater than 90 percent removal.
- Based on quarterly paired grab samples at an HVAC manufacturer the Enpurion® Metals Treatment system achieved the following treatment levels:
 - Total copper: Median percent removal was 96 percent, (n=4). Influent concentrations ranged from 34 to 129 ug/L total copper.
 - Total zinc: Median percent removal was 99 percent, (n=4). Influent concentrations ranged from 430 to 1020 ug/L total zinc.

Note: The above data are for total copper and zinc. Enhanced Treatment applies to dissolved copper and zinc. Field testing must include analysis for dissolved fractions in addition to total fractions.

Issues to be Addressed By the Company:

1. The Enpurion® Metals Treatment system must show that it can reliably attain the minimum percent removal criteria for Basic and Enhanced treatment for runoff found from local highways, parking lots, and other high-use areas at the design-operating rate in accordance with the Ecology TAPE protocols. LEAN Environment should test a variety of operating rates to establish conservative design rates.
2. Test the system under normal operating conditions, such that pollutants partially fill the system. Results obtained for “clean” systems may not be representative of typical performance.
3. LEAN Environment submitted extensive grab sample data from several sites operating in industrial treatment settings. Pollutant concentrations are both within and above the ranges required by TAPE. Testing to achieve a GULD under the TAPE program will need to focus on pollutant concentrations within the specified TAPE ranges, as well as using flow-weighted composite sampling (or other method approved in the QAPP) as opposed to grab sampling.
4. Calculation of treatment efficiency shall be in accordance with the 2011 Revision of the *Guidance for Evaluating Emerging Stormwater Treatment Technologies: Technology Assessment Protocol – Ecology (TAPE)*.
5. LEAN Environment shall include a discussion of treatment efficiency (percent removed) as flow rates change in the Technical Evaluation Report.
6. Conduct field-testing at sites that are indicative of the treatment goals.

7. Conduct testing to obtain information about maintenance requirements in order to come up with a maintenance cycle.
8. Conduct loading tests on the filter media to determine maximum treatment life of the system.

Technology Description: Available at: <http://enpurion.com/>

Contact Information:

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Revision History

Date	Revision
August 2013	Original use-level-designation document (CULD for Basic and Enhanced)
February 2014	Revised due dates for QAPP, TER, and Expiration of CULD
November 2015	Changed Contact address for Lean Environmental, revised TER due date and expiration date