



**December 3, 2003
(Updated December 2006)**

**GENERAL USE LEVEL DESIGNATION FOR PRETREATMENT (TSS)
For
AquaShield™, Inc.'s Aqua-Swirl™ Concentrator**

Ecology's Decision:

Based on AquaShield™, Inc. application submissions and recommendations by the Technical Review Committee (TRC), Ecology hereby issues the following use level designation:

- 1. General Use Level Designation (GULD) for the Aqua-Swirl™ Concentrator for pretreatment use (a) ahead of infiltration treatment, or (b) to protect and extend the maintenance cycle of a Basic or Enhanced Treatment device (e.g., sand or media filter). This GULD applies to Aqua-Swirl™ units sized at an operating rate of no more than 23 GPM/sf at the Water Quality design flow rate as determined using the Western Washington Hydrology Model (WWHM).**
- 2. Ecology finds that the Aqua-Swirl™ Concentrator, sized at an operating rate of no more than 23 GPM/sf, could also provide:**
 - Water quality benefits in retrofit situations.**
 - The first component in a treatment train.**
 - Effective removal of deicing grit/sand.**

This designation has no expiration date but it may be amended or revoked by Ecology and is subject to the conditions specified below.

Ecology's Conditions of Use:

- 1. Aqua-Swirl™ Concentrators must be designed, assembled, installed, operated, and maintained in accordance with AquaShield™, Inc.'s applicable manuals and documents and the Ecology Decision.**
- 2. Discharges from the Aqua-Swirl™ Concentrator shall not cause or contribute to water quality standards violations in receiving waters.**

Applicant: AquaShield™, Inc.

Applicant's Address: 2733 Kanasita Drive, Suite B
Chattanooga, TN 37343

Application Documents:

Aqua-Filter™ Stormwater Treatment System, Application for Stormwater Quality Treatment Pilot Use Designation (Short-Term) for Basic, Enhanced, Oil, and Treatment Train Treatment in Western Washington submitted to Stan Ciuba, Washington State Department of Ecology (August 21, 2003)

NJCAT Technology Verification: Aqua-Swirl™ Concentrator and Aqua-Filter™ Stormwater Treatment System (September 2005)

Applicant's Use Level Request:

Pilot Use Designation as a Basic, Enhanced, Oil, and Treatment Train Treatment device in accordance with Ecology's 2001 Western Washington Stormwater Manual.

Applicant's Performance Claims:

Based on laboratory studies, the Aqua-Swirl™ Concentrator, Model AS-3, has been shown to have a total suspended solids removal efficiency (measured as suspended sediment concentration) of 60% when operated at 60% of its water quality treatment flow using OK-110 silica with a d₅₀ particle size of 110 microns, and average influent of 320 mg/L and zero initial sediment loading.

Technical Review Committee's Recommendations:

The TRC finds that:

- The Aqua-Swirl™ Concentrator, sized at no more than 23 GPM/sf, should provide equivalent performance to a presettling basin as defined in the most recent version of *Stormwater Management Manual for Western Washington, Volume V, Chapter 6*.

Findings of Fact:

1. Laboratory testing was completed by Tennessee Tech University for US Silica OK-110 silica using an Aqua-Swirl™ Concentrator Model AS-3. Laboratory results for this 50 to 125-

micron silica showed 80% removal at about 23 GPM/sf operating rate. Estimated annual TSS removal efficiency, based on Portland, ME rainfall, is 91%.

2. Field studies are underway in Washington. No results are available.
3. The system is maintained using a vacuum truck.

Other Aqua-Swirl Related Issues to be Addressed By the Company:

1. Resuspension. Swirl concentrators are prone to resuspension, especially when sumps are partially filled with sediments and at greater than design flow rates. To prevent resuspension AquaShield™, Inc. should evaluate whether a deeper sump should be standard on local systems and the use of diverters for higher than design flow rates.
2. Determine whether the system removes used motor oil adsorbed to fine particles, rather than free product/clean motor oil.
3. The system should be tested under normal operating conditions, such that the swirl concentrator is partially filled with pollutants. Results obtained for “clean” systems may not be representative of typical performance.

Technology Description: Download at <http://www.aquashieldinc.com>

Contact Information:

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Applicant website: <http://www.aquashieldinc.com>

Ecology web link: <http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html>

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