

Fact Sheet Addendum

for the

Irrigation System Aquatic Weed Control
National Pollutant Discharge Elimination System (NPDES)
and State Waste Discharge General Permit
Permit Modification

(Permit Number WAG – 991000)

State of Washington
Department of Ecology
Olympia, Washington 98504-7600

March 17, 2010

PERMIT MODIFICATION

Background

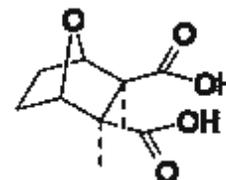
The Department of Ecology (Ecology) is modifying the Irrigation System Aquatic Weed Control National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit. This permit covers entities that use pesticides to control aquatic weeds in irrigation systems. Ecology originally issued the general permit in 2008. It will expire in February 2013. This addendum supplements the February 20, 2008 Fact Sheet available at http://www.ecy.wa.gov/programs/wq/pesticides/irrigation/fs-irrig_district-final.pdf.

The permit covers irrigation districts and irrigation water suppliers who apply aquatic herbicides and algaecides in irrigation canals and ditches. Currently, 16 irrigation districts are covered by the permit. The modification to the permit allows the use of the pesticide endothall. Endothall is an alternative to acrolein, the herbicide that irrigation districts historically used but is being phased out.

Endothall

Extensive information on endothall is available in Ecology's *Herbicide Risk Assessment for the Aquatic Plant Management Final Supplemental Environmental Impact Statement*. This document is available online at <http://www.ecy.wa.gov/pubs/0010044.pdf>.

Endothall (7-oxabicyclo [2,2,1] heptane-2,3-dicarboxylic acid) is the active component in aquatic herbicides and algaecides used in static and flowing water to control aquatic weeds and algae. Endothall is a contact herbicide that disrupts solute transport processes in plant cells. The mode of action of endothall is not fully understood, however, there are several hypotheses to explain endothall's activity. All of the hypotheses indicate that endothall disrupts biochemical processes at the cellular level, such as interfering with protein synthesis by affecting dipeptidase and proteinase enzymes. These enzymes are needed to support the production of proteins used by the plant for growth. There is also indication that endothall interferes with lipid synthesis and metabolism in the cells. Lipids are incorporated, along with proteins, as structural components in the plant cells. Additionally, it has been suggested that endothall may interfere with the transport of nutrients and cellular materials across the cell membranes. This would suggest a weakening or disruption of the cell wall and is likely related to the structural components discussed above.



Endothall is formulated in two active ingredient forms: Cascade (dipotassium salt of endothall; formerly called Aquathol K) and Teton (mono (N,N-dimethyl alkylamine) salt of endothall; formerly called Hydrothol 191). Teton is more toxic¹. Cascade is used for plant control while Teton is used for algae control.

¹Teton is significantly more toxic to aquatic biota in hard water.

Cascade is applied at 0.5 ppm (48 hours) to 5.0 ppm (5 hours). Initial studies show the low-concentration long-duration applications are more effective. Teton has been applied at 0.15 ppm (8 hours) combined with Cascade at 0.85 ppm.

Endothall does not break down quickly. In systems without long-term (seasonal) storage, only the addition of non-treated dilution water will reduce the concentration at the point of compliance from the original concentration at the application site. By itself, short-term storage (days to weeks) is not an effective strategy to reduce endothall concentrations.

Effluent Limits

Effluent limits are based on the more restrictive of what is technically feasible and what is needed to protect water quality. Extensive toxicity information is available in Ecology’s *Herbicide Risk Assessment for the Aquatic Plant Management Final Supplemental Environmental Impact Statement*. Summary toxicity information is provided below.

Endpoint	Exposure	Cascade / Aquathol K	Teton / Hydrothol 191
LC50 ² (most sensitive fish)	Acute	11 mg a.e./L ^{3,4} for walleye (23 mg a.e./L for Chinook)	0.079 mg a.e./L ⁵ for cutthroat trout
No Observed Effects Concentration (NOEC) ⁶	Chronic	1.7 mg a.e./L for walleye (3.6 mg a.e./L for Chinook)	0.012 mg a.e./L for mayfly (0.022 for fathead minnow)
Interfere with parr to smolt metamorphosis		1.5-3.5 mg a.e./L for coho and Chinook	0.2-mg a.e./L for Chinook
MCL ⁷	NA	0.1 mg/L	
Proposed Effluent Limit	NA ⁸	1.0 mg/l (acid equivalent) from March 1 to July 15	0.050 mg a.e./L
		2.5 mg/l (acid equivalent) from July 16 to February 29	

² LC50 is the lethal concentration that kills 50% of the tested organisms.

³ FEIS Section 4 page 6.

⁴ mg a.e./L is milligrams of acid equivalent per liter. Cascade conversions:

- 1 mg acid equivalent equals 1.43 mg active ingredient.
- 1 mg acid equivalent equals 3.50 mg product (product is 40.3% dipotassium salt of endothall and 28.6% acid equivalent).
- 1 gallon of product contains 4.23 pounds of active ingredient (dipotassium salt of endothall).

⁵ mg a.e./L is milligrams of acid equivalent per liter. Teton conversions:

- 1 mg acid equivalent equals 2.27 mg active ingredient.
- 1 mg acid equivalent equals 4.28 mg product (product is 53.0% amine salt of endothall and 23.36% acid equivalent).

⁶ FEIS Section 1 Page 6 and Section 4 pages 10-11.

⁷ MCL is the Maximum Contaminant Level for drinking water from the Safe Drinking Water Act.

⁸ Measured as the maximum instantaneous concentration.

Cascade: The lowest aquatic life threshold is 1.5 mg a.e./L. At two-thirds of that threshold, 1.0 mg a.e./L, no fish toxicity impacts would be expected. This corresponds to 1.4 mg a.i./L, above the lower application rates. (In other words, any treatment at 0.5-1.3 mg a.i./L would start below the effluent limit. More concentrated treatments could occur if dilution water was available.) A concentration of 1.0 mg a.e./L would be above the drinking water MCL of 0.1 mg/L. Dilution and/or treatment by a water treatment plant would be necessary before the MCL is met. The March 1 to July 15 window was chosen based on information provided by WDFW in their comments on the draft permit.

The 2.5 mg a.e./L limit is two-thirds of the Chinook NOEC and well below the LC50 thresholds. It is above the 1.7 mg/L NOEC for walleye and well above the 0.1 mg/L MCL. Dilution and/or treatment by a water treatment plant would be necessary before the MCL is met. A 2.5 mg a.e./L limit corresponds to 3.6 mg a.i./L, well into the labeled application rates. Ecology believes that permittees can use Cascade to its maximum herbicidal potential with this effluent limit.

Teton: The acute LC50 threshold is 0.079 mg/L. At an effluent limit of two-thirds of that threshold, 0.05 mg a.e./L, only limited fish toxicity impacts would be expected. This is below the previously-used application rate of 0.15 mg a.e./L. Dilution would be necessary to meet the chronic NOEC of 0.022 mg a.e./L.

Endothall may be used year-round. The requirements for non-irrigation season use are the same as the requirements during irrigation season use.

Condition S6.B5 allows reduced monitoring when endothall is applied at concentrations below the effluent limits. Endothall may be applied at higher concentrations (limited by the requirements on the label) as long as the effluent limits are met. Since endothall does not break down, dilution water would be necessary.

Reduced monitoring is allowed when endothall is applied at a concentration below the effluent limit. The federal NPDES rules have requirements to report monitoring results with a frequency dependent on the nature and effect of the discharge, but in no case less than once a year (40 CFR 122.44[i]).

Other requirements are included in the permit. These requirements mirror the requirements for other aquatic pesticide use.

Public Opportunity to Comment

A Public Notice of Draft was published in the State Register on January 6, 2010. A public hearing on the draft modification of the general permit was held at:

February 9, 2010 at 6:00 p.m. in Yakima, Washington
Department of Ecology, Central Regional Office
15 West Yakima Ave -- Suite 200
Yakima, WA 98902-3452

A short workshop to explain proposed changes and answer questions was held immediately preceding the hearings.

Interested persons were invited to submit comments regarding the proposed modification of the permit by Friday, February 19, 2010.

The proposed general permit, fact sheet, application form, and other related documents were on file and could be inspected and copied between the hours of 8:00 a.m. and 4:30 p.m., weekdays at the following Ecology locations:

Washington State Department of Ecology
Central Regional Office
15 West Yakima Avenue, Suite 200
Yakima, WA 98902
(509) 454-7298
TDD (509) 454-7673
FAX (509) 575-2809

Washington State Department of Ecology
Eastern Regional Office
North 4601 Monroe, Suite 202
Spokane, WA 99205
(509) 456-2874
TDD (509) 458-2055
FAX (509) 456-6175

Washington State Department of Ecology
Northwest Regional Office
3190 - 160th Ave. SE
Bellevue, WA 98008-5452
(425) 649-7133
TDD (435) 649-4259
FAX (425)649-7098

Washington State Department of Ecology
Southwest Regional Office
300 Desmond Dr.
Lacey, WA 98503
(360) 407-6300
TDD (360) 407-6306
FAX (360) 407-6305

Response to Comments

Ecology made numerous changes to improve clarity and readability of the permit. Ecology made two significant changes to the permit based on public comments:

- Changed the effluent limitations in Condition S5.B4.
- Clarified the scope of the endofall plan in Condition S5.B10

See the "Response to Comments" document available at http://www.ecy.wa.gov/programs/wq/pesticides/irrigation/irrigation_index.html for Ecology's complete response to comments.