FACT SHEET
And
NPDES WASTEWATER DISCHARGE PERMIT EVALUATION

PROPOSED ACTION: Issuance of a new National Pollutant Discharge Elimination System General Permit (NPDES) discharge permit

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PERMIT CATEGORY: 2000-J General Permit

ACTIVITIES COVERED UNDER THIS PERMIT:
This permit covers the application of acrolein, copper, and xylene-based aquatic pesticides into irrigation systems operated by districts formed under ORS 545 or by districts or entities previously covered by an individual permit for the application of aquatic pesticides.

ACTIVITIES NOT COVERED UNDER THE PERMIT:
A separate general permit is being developed to cover other types of pesticide applications.

SOURCE LOCATION: Statewide

COVERAGE AND ELIGIBILITY
The effective date of the permit is June 1, 2011. The permit is a general permit that is issued in accordance with OAR 340-045-0033 where activities involve similar types of operations, similar types of wastes and similar monitoring conditions. The permit covers pesticide applications to irrigation ditches or canals. The wastes are pesticide residuals that are applied from a point source. The permit considers that all pesticide applications will leave a residual and constitute the discharge of a pollutant once the product has performed its intended purpose. The pesticide applications covered under this permit include the application of acrolein, copper, and xylene-based aquatic pesticides to control aquatic weeds in irrigation systems that are considered waters of the state.

The general permit does not cover the discharge to a water body that has been identified as water quality limited on the 303(d) list for acrolein, copper or a xylene-based pesticide. A discharge to water quality limited water body may require an individual permit with more detailed site specific evaluation that results in additional technology-based and/or water quality-based effluent limitations. DEQ's website provides tools to identify 303(d)-listed water body segments.

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WHAT IS BEING PROPOSED

DEQ is proposing to issue an NPDES general permit that allows for the application of acrolein, copper, and xylene-based aquatic pesticides to control aquatic weeds in irrigation systems that are considered waters of the state.

The use of other aquatic pesticides is not allowed under this permit. Regarding endothall, if additional information is submitted during the public comment period, DEQ will consider this information in deciding whether to develop limits for endothall-based products. If DEQ elects to develop such limits, the use of endothall will be allowed under the permit.

REGULATORY CONTEXT

In 1977, the Clean Water Act (CWA) was amended to specifically exempt irrigation return flows from permitting. The modifications were as follows:

1. The following language was added to § 402(l)(1): "The Administrator shall not require a permit under this section for discharges composed entirely of return flows from irrigated agriculture".
2. The following language was added to § 502(14) that exempted irrigation return flows from the definition of a point source: "This term does not include return flows from irrigated agriculture".

These amendments were subsequently incorporated into the Code of Federal Regulations as 40 CFR §122.2 and 40 CFR §122.3(f). Because of this language, EPA's position prior to 2001 on the use of pesticides in irrigation districts was that as long as the application of an aquatic pesticide was consistent with the FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) label to ensure the passage of irrigation return flow, the discharge was not subject to NPDES permit requirements under the CWA. Consistent with this position, DEQ did not issue permits for the use of pesticides.

In 2001, a lawsuit brought against an irrigation district for causing a fish kill in a nearby creek resulted in a decision by the Ninth Circuit U.S. Court of Appeals which concluded that compliance with Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) registration and labeling requirements does not absolve one from the Clean Water Act requirement of obtaining a National Pollutant Discharge Elimination System (NPDES) permit [*Headwaters, Inc. v. Talent Irrigation District*, 243 F3d 526 (9th Cir , 2001)]. As a result, the Oregon Department of Environmental Quality was required to start issuing NPDES permits to irrigation districts for the use of aquatic pesticides.

There have been several court cases since the 2001 Talent case relating to the use of pesticides, and in 2006, EPA issued a rule (hereinafter called "the 2006 NPDES Pesticide Rule") that attempted to define circumstances in which NPDES permits would not be required for the application of pesticides to or around water. In 2009, the Sixth Circuit Court of appeals vacated EPA's 2006 NPDES Pesticides Rule under a plain language reading of the CWA (National Cotton Council v. EPA, 553 F3d 297 (6th Cir, 2009)). A discussion of this decision may be found in the Federal Register (see volume 75, page 31775 dated June 4, 2010).

As a result of this decision, EPA was given two years to develop a general permit for pesticide applications. As of this writing, this permit is due to be issued on April 9th, 2011. DEQ is working to develop a general permit for pesticide applications in Oregon that will be issued at the same time as the EPA general permit.

Irrigation districts that were issued individual permits as a consequence of the 2001 Talent decision will still need to be covered by a permit; however they will not be allowed to obtain coverage under the general pesticide permit being issued by DEQ. Allowing the districts to seek coverage under the general pesticide permit would violate anti-backsliding provisions of the CWA. These provisions generally prohibit the relaxation (or elimination) of effluent limits in permits. The permits issued to irrigation districts in Oregon after the Talent decision all contain permit limits, and the general pesticide permit to be issued by DEQ does not. Allowing irrigation districts to obtain coverage under the general permit would therefore represent a relaxation of permit limits.

PERMIT HISTORY

Following the 2001 decision involving the Talent Irrigation District, DEQ issued individual NPDES permits to the following irrigation districts in 2002:

- Hermiston Irrigation District
- Klamath Irrigation District
- North Unit Irrigation District
- Ochoco Irrigation District
- Owyhee Ditch Company
- Owyhee Irrigation district
- Stanfield Irrigation District
- Vale Oregon Irrigation District
- West Extension Irrigation District
- Westland Irrigation District

All of these permits are now expired. Since all of these permit holders have submitted renewal applications in a timely fashion, they have been administratively extended.

In the course of working to renew these permits, DEQ has decided that because of the similarity of the activities covered by these 10 individual permits, DEQ will replace these permits with what is referred to as a general permit. General permits are typically developed for similar activities with comparable discharges that can be adequately controlled with a standard set of requirements. DEQ believes that an NPDES general permit is an appropriate tool for regulating aquatic pesticide applications in irrigation districts.

DEQ anticipates that all of the entities that are currently covered under individual permits will seek coverage under the proposed general permit. Other entities wishing to use the aquatic pesticides listed in this permit are expected to apply for coverage as well. Entities wishing to use pesticides other than those listed on the face page may not seek coverage under this permit and must obtain an individual permit.

DEQ'S DECISION REGARDING THE USE OF ENDOTHALL

DEQ's decision to develop this general permit at this time was the result of a request from irrigation districts currently covered by individual permits, to expand coverage to include the use of endothall-based products. This request was based on the following:

- The supplier of the acrolein-based product Magnacide H, which is the product most commonly used by irrigation districts in Oregon, announced they were phasing out the product and recommended that users switch to endothall-based products such as Cascade.
- The irrigation districts wished to be allowed to use endothall-based products because endothall-based products are safer.
- Permit limits for endothall-based products could be developed using work done by the Washington Department of Ecology (WA DOE) when WA DOE developed Washington's permit for the use of aquatic pesticides by irrigation districts.

Since the DEQ decided to develop this permit, circumstances have changed. Acrolein-based products are available through new suppliers. Furthermore, some irrigation districts have taken exception to the permit limits for endothall-based products developed by WA DOE. A data collection effort is underway that may result in different limits for the state of Washington, though it is too early to say.

Given the continuing availability of acrolein and the fact that some irrigation districts say they cannot effectively control aquatic weeds with the limits developed by WA DOE, DEQ has decided to develop a general permit that does not contain limits for endothall-based products. DEQ will modify the permit to include limits for endothall-based products if provided with adequate information to do so. At this time, DEQ does not have information sufficient to demonstrate that permit limits for Oregon should be less stringent than those developed by WA DOE.

For informational purposes, the WA DOE limits for endothall are reproduced below.

<table>
<tr><td>Product Names:</td><td>Cascade/Aquathol K</td><td>Teton/Hydrothol 191</td></tr>
<tr><td rowspan="2">Proposed Effluent Limits:</td><td>1.0 mg/L a.e.
from March 1 to July 15</td><td rowspan="2">0.050 mg/L a.e.</td></tr>
<tr><td>2.5 mg/L a.e.
from July 16 to February 29</td></tr>
</table>

The term "mg a.e./L" means milligrams of acid equivalent per liter. Conversion factors for two widely available formulations of endothall are as follows:

Cascade conversions:

1 mg acid equivalent equals 1.43 mg active ingredient, or 3.50 mg product (product is 40.3% dipotassium salt of endothall and 28.6% acid equivalent).

Teton conversions:

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

The above information is taken from WA DOE's Final Fact Sheet Addendum. This document may be found on WA DOE's webpage entitled "Irrigation System Aquatic Weed Control NPDES General Permit" at:
http://www.ecy.wa.gov/programs/wq/pesticides/irrigation/irrigation_index.html

As noted in the Fact Sheet Addendum, extensive toxicity information is available in Ecology's *Herbicide Risk Assessment for the Aquatic Plant Management Final Supplemental Environmental Impact Statement.* This document may be found at:
http://www.ecy.wa.gov/pubs/0010044.pdf

If additional information is submitted during the public comment period, DEQ will consider this information in deciding whether to develop limits for endothall-based products.

COMPLIANCE HISTORY FOR EXISTING IRRIGATION PERMITS

The individual permits issued by DEQ to irrigation districts require permit holders to make various submittals to DEQ. These submittals include annual reports that list the chemicals and amounts of those chemicals used over the course of the year, monitoring data and various other plans and evaluations.

Tables 1 through 6 summarize information received by DEQ since the individual permits were issued, and are titled as follows:

Table 1: Annual Reports Received by DEQ
Table 2: Chemicals Reported as Used
Tables 3 through 5: Quantities of Various Chemicals Used
Table 6: Water Quality Monitoring Reports Received

With respect to the monitoring data summarized in Table 6, the permits contain the following language in Schedule B, Minimum Monitoring and Reporting Requirements.

Under Section 1.a) Monitoring Requirements:

> Monitoring must be conducted on the first aquatic pesticide application of the month during which an application occurs. Separate samples must be taken for each type of pesticide used. Monitoring may be reduced to the first application of the irrigation season for future years provided discharge limitations are met for the previous full calendar year of monitoring. Monitoring must be performed on the discharge from the reopened gate that is nearest to natural waters within 30 minutes of opening the gate.

Under Section 2.a) Reporting Requirements:

> Monthly monitoring reports are not required if the irrigation system is operated such there is no discharge to natural waters. If application of aquatic herbicides results in a discharge to natural waters, a monthly monitoring report for that particular month must be submitted.

Because of the language in Section 2.a), the absence of monitoring data cannot be interpreted as a failure to monitor or to submit monitoring results. Reporting requirements have been revised in the proposed permit, and now require districts to state in their annual permits when discharges

took place. This will enable DEQ to determine the months for which monitoring data is required.

Table 1: Annual Reports Received by DEQ

Name of Entity	2003	2004	2005	2006	2007	2008	2009	2010
Hermiston ID	x	x	x	x	x	x	x	x
Klamath ID	x	x	x	x	x	x	x	x
North Unit ID	x	x	x	x	x	x	x	x
Ochoco ID	x	x	x	x	x	x	x	x
Owyhee Ditch ID	Nothing provided to DEQ.							
Owyhee ID	x	x	x	x	x	x	x	x
Stanfield ID				x	x	x		x
Vale Oregon ID	Application logs only, with no quantities given.							
West Extension ID	x	x	x	x	x	x	x	x
Westland ID	x	x	x	x	x	x		

Table 2: Chemicals Reported as Used

Name of Entity	Acrolein	Xylene-based chemicals		Copper-based chemicals		Endothall-based Chemicals*
	Magnacide H	Xylene	T-Chem	Copper Sulfate Crystals	Nautique or Captain	Cascade or Teton
Hermiston ID	x				x	x
Klamath ID	x					
North Unit ID	x	x		x	x	x
Ochoco ID	x		x			x
Owyhee Ditch ID	No annual reports submitted. Renewal application states that acrolein and xylene are used.					
Owyhee ID	x	x				
Stanfield ID	x			x	x	
Vale Oregon ID	No annual reports submitted. Renewal application states that acrolein is used.					
West Extension ID	x			x		
Westland ID	x					

*In 2009, districts were allowed to use Endothall-based products on an emergency basis.

Table 3: Quantities of Acrolein Used by Year (as Magnacide H, units in gallons)

Name of Entity	2003	2004	2005	2006	2007	2008	2009	2010
Hermiston ID	263	249	276	304	220	214	314	See note 1.
Klamath ID	618	565	430	999	963	680	725	338
North Unit ID	157	342	349	687	785	776	778	2450 See note 2.
Ochoco ID	195	288	157	203	210	210	210	See note 3.
Owyhee Ditch ID	No annual reports submitted. Renewal application dated June 13, 2007 states that "347 gallons of Acrolein and 330 gallons xylene are used and do not expect an increase or decrease."							
Owyhee ID	2036	3154	3046	2875	3349	2974	2686	354
Stanfield ID				105	159	74		
Vale Oregon ID	No annual reports submitted. Renewal app. says average use is 600 gal/year.							
West Extension ID	393	393	522	265	284	268	419	236
Westland ID	579	670	695	677	681	734		

Notes:

1. Endothall used instead of acrolein under special permission from DEQ. Amount: 281 gallons.
2. Endothall used also, under special permission from DEQ. Amount: 500 gal. of Cascade, 500 gal. of Teton.
3. Endothall used instead of acrolein under special permission from DEQ. Amount: 228 gallons as Cascade.

Table 4: Quantities of Copper Used per Year (districts that do not have copper limits are not listed)

	Copper as Copper Sulfate Crystals (lbs) or Nautique (gals) or other as listed							
Name of Entity	2003	2004	2005	2006	2007	2008	2009	2010
Hermiston ID								350 gals plus 24 gals of Captain
North Unit ID					1597 lbs	301 lbs	1447 lbs	
Ochoco ID								
Owyhee ID								
Stanfield ID				3750 lbs	3200 lbs	4450 lbs		3500 lbs, 70 gals
Vale Oregon ID								
West Extension ID		1400 lbs	2000 lbs	2500 lbs	1050 lbs	900 lbs	1525 lbs	1900 lbs
Westland ID								

Table 5: Quantities of Xylene Used Per Year

	Xylene, Aquatic Weed Killer or T-Chem, units in gallons							
Name of Entity	2003	2004	2005	2006	2007	2008	2009	2010
North Unit ID	8410	7527	8694	7000	3732	3568	3639	2651
Ochoco ID	4951	4447	3884	3651	4407	3276	3091	2466
Owyhee Ditch ID								
Owyhee ID	7212	9304	7764	6572	6748	8233	5250	1358
West Extension ID								

Table 6: Water Quality Monitoring Reports Received

Name of Entity	2003	2004	2005	2006	2007	2008	2009	2010
Hermiston ID								
Klamath ID	x	x	x	x	x	x	x	x
North Unit ID	Renewal app. states that monitoring has been done. Reports not submitted.							
Ochoco ID	x	x	x	x	x		x	
Owyhee Ditch ID								
Owyhee ID								
Stanfield ID								
Vale Oregon ID								
West Extension ID								
Westland ID								

The water quality monitoring reports that have been received contain no exceedances of permit limits.

DEQ is pursuing taking enforcement action against districts that have failed to submit annual reports and any other documents required by the permit.

DESCRIPTION OF IRRIGATION SYSTEMS AND PESTICIDE APPLICATION ACTIVITIES

This section is intended to provide background information on how irrigation systems are operated and why pesticides are used.

What is an irrigation system?

An irrigation system is a controlled system consisting primarily of manmade canals, ditches and ponds designed and operated for the delivery and management of water for irrigation purposes. It includes main canals, lateral canals, pipes, ponds for holding water or buffering flow, and drainage ditches. It also includes all the gates, valves, overflow structures and other system components used for transporting water or directing its flow. Irrigation systems may be operated by irrigation districts or private groups, such as individual farmers or private companies.

Why is pesticide application necessary?

Pesticide application is necessary in order to mitigate weed growth within the canals. This plant growth consists primarily of submerged and floating aquatic vegetation, algae/moss and pondweed. As the vegetation accumulates, it causes partial blockage of the irrigation canals, delivery points, screens, trash racks and check gates. This blockage can restrict water flow, thereby causing backwater areas. These backwater areas can cause the water to crest the banks of the canals and reduce water supply to irrigators. The vegetation also clogs pumping station intakes, causing the pumps to switch off, and thereby eliminating the supply of water for agricultural purposes.

How are pesticides applied?

Aquatic pesticide applications are typically made in sections of irrigation systems. An entire system can rarely be treated with one application and many districts only use pesticides in specific problem areas because the chemicals can be expensive. Pesticide is usually added at a specific point and flows through the irrigation canal for a certain distance before it is no longer present at effective concentrations due to dilution or degradation. Often pesticide applications must be repeated during the irrigation season because weed growth can be excessive and continuous. Pesticide applicators are required to follow FIFRA label requirements during applications.

What are the alternatives to pesticides?

There are alternatives to pesticide application, including:

- Physical (hand-pulling, backhoe excavations, mechanical harvesting),
- Biological (stocking with grass carp), and
- Ecological methods (sediment amendment/removal, canal lining, piping, etc.) (Sytsma and Parker 1997).

However, as with pesticide applications, these alternatives have their pros and cons. For example, mechanical cleaning usually requires access on both sides of the ditch in order to have tractors drag a chain across the ditch bottom. In many cases such access is not available system-wide. Also, mechanical cleaning can stir up sediment and debris, which will clog irrigation drip and sprinkler systems. This makes it difficult to conduct mechanical cleaning during the irrigation season. Piping is another effective method for reducing plant growth however it can be very expensive and may be difficult for systems that receive storm water runoff. Biological methods such as stocking with grass carp are considered impractical and carry with them the risk of introducing nonnative species to Oregon.

Any owner or operator of an irrigation system needs to evaluate these options carefully, and is likely to choose a combination of activities to control weeds.

PESTICIDES COVERED UNDER THE PROPOSED PERMIT

This section is intended to provide background information on the pesticides covered by this permit.

What are acrolein, copper, and xylene?

The proposed NPDES general permit allows the application of acrolein, copper, and xylene-based aquatic pesticides in irrigation systems. Acrolein and xylene are "contact" pesticides. Contact pesticides act quickly and are generally lethal to all plant cells that they contact. However, they do not kill the roots and reapplication is often necessary. Acrolein and xylene are highly toxic and are used as aquatic pesticides only in irrigation systems. Copper is a contact pesticide as well, but it is less toxic than acrolein and xylene. Since copper is an elemental metal, it is persistent in the environment. However, it will eventually adsorb to sediments where it is generally considered nontoxic.

Acrolein

Overview

Acrolein is a water-soluble aldehyde that is colorless, pungent, and a highly volatile liquid. It is found throughout the environment in very small amounts and is a natural product of incomplete combustion. As an aquatic pesticide, acrolein is used as a "contact" pesticide that acts quickly and is generally lethal to all plant cells that it contacts. It is toxic to most submerged and floating weeds, as well as algae. However, it does not kill the roots and reapplication later in the season is often necessary. Acrolein-based pesticide is highly toxic and is only used in irrigation systems where it must be applied before plant growth becomes dense in order to be effective.

Water Quality Criteria

Prior to rule changes adopted in 2004, DEQ's water quality criteria for acrolein the protection of freshwater aquatic life were 68 µg/L (0.068 mg/L) for acute exposure and 21 µg/L (0.021 mg/L) for chronic exposure. Since this time, these criteria have been reclassified as guidance values.

In 2009, EPA promulgated water quality criteria for acrolein which states that "except where a locally important freshwater species is very sensitive, freshwater aquatic organisms and their uses should not be affected unacceptably if the one-hour average concentration of acrolein does not exceed 3.0 µg/L more than once every three years on the average, and if the four-day average concentration of acrolein does not exceed 3.0 µg/L more than once every three years on average.

DEQ's water quality criteria for acrolein for the protection of human health are currently under review. The values adopted in 2004 were 320 µg/L for water and fish ingestion, and 780 µg/L for fish consumption only. DEQ's water quality criteria for the protection of human health are being re-evaluated to account for a higher fish consumption rate than was used previously.

EPA has not developed a MCL (Maximum Contaminant Level) for drinking water for acrolein.

Magnacide® H
Acrolein is the active ingredient in the aquatic pesticide Magnacide® H. Magnacide® H is by weight 92% acrolein and 8% inert ingredients. Hydroquinone is listed as a toxic inert ingredient in Magnacide® H. However, hydroquinone is present at approximately 0.3% so, when Magnacide® H is used at recommended concentrations, hydroquinone would be present at very low concentrations. Other inert ingredients include acetone, propionaldehyde and acetaldehyde. All of the inert ingredients are less toxic than acrolein to aquatic organisms. They do not bioaccumulate and they degrade or dissipate in the environment. The Department does not expect these ingredients to be present in discharges to natural waters at levels that would violate water quality standards.

Application Procedures
Magnacide® H is applied into an irrigation canal by using nitrogen to pressure the liquid chemical out of its container directly into the water. Applications are made upstream from the area needing treatment and in varying sections of an irrigation system.

Acrolein-based pesticide is applied at specific points in the system that provide for good mixing. The acrolein-based pesticide application forms a wave of treated water that flows through the irrigation canal for a certain distance before it is no longer present at effective concentrations due to dilution and degradation. Acrolein-based pesticide is typically applied at a rate of 0.25 – 0.50 gallons/cubic feet per second. This results in a target acrolein concentration of 2 – 4 mg/L near the application point.

Acrolein in the Environment
Acrolein degrades fairly quickly into water and carbon dioxide. It is relatively non-persistent depending on the temperature, abundance of aquatic vegetation, and processes of hydration and volatilization. During the irrigation season when temperatures are warmer, weed growth is excessive and water velocities are higher, acrolein is not expected to be present after six days. However, its half-life in aquatic systems may range from less than one to approximately four days.

Human Health Effects (ATSDR Acrolein Fact Sheet 1999)
Breathing large amounts of acrolein damages the lungs and could cause death. Exposure to lower amounts may cause eye watering, burning of the nose and throat, and a decreased breathing rate. Animal studies have shown that breathing causes irritation to the nasal cavity, lowered breathing rate, and damage to the lining of the lungs. It is not known whether acrolein causes reproductive effects or birth defects in people or animals. There are no definitive studies on the cancer causing effects of acrolein in people or animals.

Copper

Overview

There are a variety of copper compounds used in irrigation systems. Copper sulfate and chelated copper formulations are examples of products that are currently being used. Copper is widely used to control algae and aquatic plants. Chelated formulations of copper are less toxic to fish than copper sulfate products (Sytsma and Parker 1997). Under FIFRA, water treated with most copper compounds can be used for swimming, drinking, fishing, livestock watering or irrigating turf, ornamental plants or crops immediately after treatment.

There are many products and different formulations of EPA-registered and approved copper-based pesticides available for purchase. Copper sulfate pentahydrate is the most basic product with little or no other ingredients. Cutrine Plus®, Clearigate®, Captain®, and Nautique® are examples of chelated-copper formulations that also contain other ingredients at varying concentrations. In pesticides, other or "inert" ingredients may be used as wetters, dispersants, thickeners, antifoaming agent, preservatives, binders, or coatings. In all of these products, copper is the active ingredient that is toxic to the target weed. Inerts may include monoethanolamine, triethanolamine, tall-oil fatty acids, isooctanol, xylenesulfonic acid sodium salt, d-limonene, ethylene diamine, and water.

In 2002, the Department reviewed EPA's Ecotoxicology Database for aquatic toxicity data on these inerts (excluding water). Monoethanolamine, triethanolamine, isooctanol, d-limonene, and ethylene diamine are all less toxic than the copper criteria established by the Department. There was no aquatic toxicity data for tall-oil fatty acids and xylenesulfonic acid sodium salt. Tall-oil fatty acids are composed mainly of palmitic acid, stearic acid, oleic acid, and linoleic acid, which are natural products derived from the pulping of pine trees. According to the Physicians Committee for Responsible Medicine, they are characterized by low toxicity to animals and are found in many food products, soaps and lotions (PCRM 2001 letter to EPA). Xylenesulfonic acid sodium salt is a hydrotropic solvent commonly used in liquid household detergents and shampoos. Toxicological studies on these chemicals indicate that the acute oral lethal dose to 50% of rats is >10,000 mg/kg for tall-oil fatty acids and 1000 mg/kg for xylenesulfonic acid sodium salt.

Water Quality Criteria

Oregon's water quality criteria for copper for the protection of aquatic life are 18 µg/L (0.018 mg/L) for acute exposure and 12 µg/L (0.012 mg/L) for chronic exposure based on a water hardness of 100 mg/L (OAR 340-41, Table 20). As water hardness (measured as CaCo3) decreases, the toxic form of copper becomes more available. The Department has determined that the geometric mean hardness value for Eastern Oregon, where the majority of irrigation districts are currently located, is 40. At a hardness of 40, the chronic criterion is reduced from 12 µg/L (0.012 mg/L) to 8 µg/L (0.008 mg/L).

Oregon's water quality criteria adopted in 2004 for the protection of human health is equivalent to EPA's MCL for copper which is 1300 µg/L (1.3 mg/L). This is much higher than the criteria for the protection of aquatic health. DEQ's water quality criteria for the protection of human health are being re-evaluated to account for a higher fish consumption rate than was used previously.

Application Procedures
In some irrigation canals copper is applied as a continuously metered supply at concentrations ranging from 0.005 mg/L to 0.02 mg/L for periods of days or weeks. Chelated copper is often mixed with other pesticides as a tank-mix for increased efficacy (Sytsma and Parker 1997). Some irrigation districts have also applied copper compounds for spot treatments or as a preventative maintenance strategy. Most districts use copper sulfate because it is usually the least expensive form of copper, but other chelated forms of copper pesticides may become popular because they are less toxic to fish.

Copper in the Environment
Since it is an elemental metal, copper is persistent in the environment. Copper is highly reactive, and tends to adsorb to clays and dissolved organic carbon in the water to form inorganic and organic complexes. The majority of copper applied to an aquatic system will eventually sorb to sediments. The soluble copper ion is considered the toxic form because it is bioavailable to most species. Complexed and adsorbed species are considered nontoxic, although fish-kills and loss of invertebrates in some lakes have been attributed to long-term copper application for algae control that led to extremely high sediment copper concentrations (Sytsma and Parker 1997).

Irrigation systems generally remove sediment from their canals on a regular basis so high sediment concentrations are not of concern. The levels of copper are low enough so the sediment usually does not present a disposal problem. When dry, sediments are typically used as clean fill.

Human Health Effects (ATSDR Copper Fact Sheet 1999)
While small amounts of copper are necessary for good health, long-term exposure to copper in the air can irritate the nose, mouth, and eyes, and cause dizziness, headaches, and diarrhea. Eating or drinking very high amounts of copper can cause liver and kidney damage. Copper has not been shown to cause cancer in people or animals.

Xylene

Overview

Xylene is an insoluble aromatic, colorless liquid solvent that must be applied with an emulsifier to disperse it in the canal flow. Application is generally delayed until the submerged growth begins to interfere with the flow and delivery of water.

Xylene is marketed under the trade name Aquatic Weed Killer. Aquatic Weed Killer is 98% xylene and 2% inert ingredients. Ethylbenzene, naptha solvent, n-Butanol and napthalene are the inert ingredients found in Aquatic Weed Killer. These inert ingredients are less toxic than xylene, are not known to bioaccumulate, and degrade or dissipate when released to the environment.

Water Quality Criteria

DEQ and EPA have not established ambient water quality criteria for xylene. The Safe Drinking Water Act maximum contaminant level (MCL) is 10 mg/L.

When DEQ first began issuing permits to irrigation districts for the use of Xylene, concentrations in excess of 10 mg/L were not allowed to be discharged into receiving waters under the EPA-approved FIFRA label. Since this time, this level has been reduced to 1 mg/L The rational for this reduction is documented in EPA's Reregistration Eligibility Decision for Xylene (Case No. 3020) dated September 26, 2005. The Reregistration Eligibility Decision also provides the following acute toxicity values for estimating risks to aquatic organisms:

- freshwater fish: 96-hour LC_{50} value of 2.6 mg/L for p-xylene in rainbow trout (*Salmo gairdneri*);
- freshwater invertebrates: 24-hour LC_{50} value of 1.0 mg/L for m-xylene in water flea (*Daphnia magna*);
- estuarine/marine fish: 24-hour LC_{50} value of 2.0 mg/L for p-xylene in striped bass *(Morone saxatilis)*;
- estuarine/marine invertebrates: 96-hour LC_{50} value of 1.3 mg/L for o-xylene in bay shrimp *(Crago francisocrum)*;
- algae: 72-hour LC_{50} value of 3.2 mg/L for p-xylene in green algae (*Selenastrum capricornutum*)."

The EPA used the above information and the results of an ecological risk assessment with a target RQ (Risk Quotient) to establish a "safe" concentration of 0.04 mg/L for xylene in receiving water.

Application Procedures

Xylene, the active ingredient in the pesticide Aquatic Weed Killer, is applied subsurface. A boom section from an ordinary sprayer is connected to the pump by a hose and then lowered to the bottom of the channel so that the nozzle discharges directly into the water without hitting the bottom, weeds or other obstacles. Application occurs at several locations, each about two to four miles apart.

Xylene in the Environment

Xylene persistence in the environment is low, depending on adsorption by the plants, breaking of the emulsion and volatilization processes. The estimated half-life for a model river system is 3 hours. Field studies suggest that the holding time required for xylene to decrease to less than 10 mg/L is less than 24 hours (Walsh, et al 1977) but this holding time has not been approved by EPA. Biodegradation of xylene is also an important environmental fate process in soils and groundwater. Xylene also can adsorb to suspended solids and sediments. The potential for bioconcentration in aquatic organisms is expected to be low.

Human Health Effects

Breathing large amounts of xylene can cause headaches, lack of muscle coordination, dizziness, confusion and changes in one's sense of balance. Exposure to high levels of xylene for short periods can also cause irritation of skin, eyes, nose, and throat; difficulty in breathing; lung problems; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. Exposure to xylene at very high levels can cause unconsciousness and even death. There are no definitive studies on the cancer causing effects of xylene in people or animals.

PERMIT LIMIT DEVELOPMENT

There are two categories of effluent limitations for NPDES permits. They are: 1) Technology-based effluent limits and 2) Water quality-based effluent limits. These limits may be numeric or narrative depending on the circumstances. Permits must contain the most stringent of technology and water quality-based limits. Each type of limit is described in more detail below.

Technology based limits are developed based on the Effluent Limitation Guidelines (ELGs) established by EPA for specific industrial categories. Technology-based effluent limits define a minimum level of treatment using readily-available technology. If there are no applicable ELGs, best professional judgment must be used.

If a discharge may cause or contribute to a violation of water quality standards with technology based limits, then the permit must include water quality based limits. This situation occurs when the receiving waters do not have adequate assimilative capacity for the pollutants discharged, for example, when the receiving stream is water quality-limited or shows evidence of impairment for a relevant pollutant.

As noted earlier, effluent limitations in reissued permits generally cannot be relaxed because of the prohibitions on backsliding established under CWA Section 402(o) and 40 CFR 122.44(l) Consequently, the most stringent of the technology-based and water quality-based permit limits included in the former individual permits have been carried forward into the proposed general permit.

The new permit limits proposed by DEQ for this permit are based on the following considerations:

- EPA has not developed ELGs for irrigation districts, thus the technology-based limits must be based on best professional judgment.
- Irrigation districts do not have treatment systems for irrigation tailwater, however they do have some control over how long water is held and when it is released from the district.
- There are no streams in Oregon that are listed as impaired on the 303(d) list for acrolein and xylene. There are some listings for copper, though not in the vicinity of any of the districts currently covered by individual permits.
- In the absence of flow data that would enable DEQ to develop permit limits that take into account dilution, a conservative approach to developing effluent limits is to develop concentration-based limits equivalent to water quality standards, where such standards have been developed.
- Oregon has not adopted water quality standards for acrolein and xylene. For these parameters, DEQ must make use of water quality criteria and risk assessment information developed by EPA to develop permit limits.

Reflective of the above considerations, the permit limits proposed by DEQ are a combination of the following:

- Concentration-based limits that are below levels likely to cause toxicity to aquatic life. DEQ considers these to be water quality-based limits.
- Required Best Management Practices regarding the application of aquatic pesticides, gate operation, inspection, recordkeeping and public notification. DEQ considers these to be technology-based limits.

ANTIDEGRADATION

The purpose of the Department's antidegradation policy in OAR 340-041-0004 is to guide decisions that affect water quality such that unnecessary further degradation from new or increased point and nonpoint sources of pollution is prevented, and to protect, maintain, and enhance existing surface water quality to ensure the full protection of all existing beneficial uses.

For the purpose of this antidegradation review, the Department considers the proposed new NPDES general permit to be similar to a permit renewal with no increase in discharge load because the proposed application of aquatic pesticide is expected to be the same as in previous years. The proposed level of aquatic pesticide application is consistent with past usage in that it will follow FIFRA label requirements (where applicable) and fluctuate with the severity of aquatic weed infestation, weather conditions and irrigation flows. Permit renewals with the same discharge load as the previous permits are not considered to lower water quality from existing water quality. For irrigation districts previously covered by individual permits, the proposed general permit is more stringent. Therefore, the Department finds that the application activity is not considered to lower existing water quality in irrigation systems.

DISCUSSION OF THE GENERAL PERMIT

DEQ Approach in Developing General Permit

It is widely recognized that irrigation systems have been developed over the years to provide farmers with water for irrigation of their crops. The primary beneficial use of water from irrigation systems is crop irrigation. However, DEQ also recognizes that irrigation systems are sometimes interconnected with natural systems and valid concerns can arise over the application of pesticides into these systems.

By developing the proposed NDPES general permit, DEQ intends to require additional practices of irrigation system owners and operators to prevent pesticide-treated irrigation waters from affecting natural waterways. The proposed NPDES general permit includes effluent limitations, monitoring, reporting and record keeping. The goal is to protect the beneficial uses of natural waterways that can include support of aquatic life, fishing, drinking water, swimming, etc.

Permit Applicability

The proposed NPDES general permit covers the application of acrolein, copper, and xylene-based pesticides in irrigation systems that are considered waters of the state because they interact with natural waters or may be considered tributaries of natural waters. Owners or operators of irrigation systems may be covered by this permit.

Permit Outline

The proposed NPDES general permit is organized in the standard format used by the Department for its water quality permits. The permit includes:

- Face Page
- Application for General Permit Coverage
- Schedule A - Waste Discharge Limitations, General Requirements, Required Management Practices, Required Gate Management Practices, Inspection and Record Keeping Requirements, and Public Notice Requirements
- Schedule B - Minimum Monitoring and Reporting Requirements
- Schedule C - Compliance Conditions and Schedules (not used for this permit)
- Schedule D - Special Conditions
- Schedule E - Not Applicable (this schedule is reserved for federal pretreatment requirements for publicly owned treatment works and is not applicable to this permit)
- Schedule F - General Conditions

More detail on these requirements is provided in the following sections.

Face Page

The face page of the proposed NPDES general permit states that the permit covers the application of acrolein, copper, or xylene-based aquatic pesticides into irrigation systems operated by districts formed under ORS 545 or by entities previously covered by an individual permit for the application of aquatic pesticides.

The permit will be issued for a period not to exceed five years from the date of issuance.

Application for General Permit Coverage

The permit specifies the application procedure to obtain permit coverage. The application form lists specific information that is required.

- Submit a complete copy of the Department-approved application form to the Department requesting coverage under this permit within 60 days of the permit effective date (for new sources, at least 180 days prior to the planned activity that will result in the discharge to waters of the state). A different application or schedule may be allowed if first approved by the Department.
- With the application, submit a map of the irrigation system indicating gate(s) where the system connects to natural waters and where monitoring will be done to establish compliance with permit limits contained in the permit.
- With the application, submit a fish control evaluation that documents the presence of fish screens, structures or other management practices intended to prevent fish from entering the treatment area. These measures must be sufficient to prevent fish from entering treatment areas during aquatic pesticide applications in order to obtain permit coverage.
- Attach a copy of the facility's written contingency plan as required by Schedule D.2. of the permit.
- Provide payment of all fees applicable to this permit prior to obtaining coverage.

The Department will notify applicants by mail that permit coverage has been obtained and they are authorized to operate under the conditions of this permit. If an applicant's operation cannot be approved for coverage under this permit, the applicant may apply for an individual permit.

Schedule A.1 *Waste Discharge Limitations*

Acrolein

For systems in the Klamath Basin, the Department is proposing to limit acrolein discharges into natural waters outside of irrigation systems to 2.3 µg/L (0.0023 mg/L). This is below DEQ's current guidance value of 21 µg/L for the protection of aquatic life, and it is also below EPA's ambient water quality criterion of 3 µg/L (0.003 mg/L) developed for the protection of aquatic life and promulgated in 2009. It is consistent with what was developed for Klamath Irrigation District's individual NPDES permit (*KID Fact Sheet and Permit Evaluation Report* dated July 8, 2002). This limit was based on acute toxicity testing on shortnose and Lost River suckers performed for the U.S. Bureau of Reclamation and comments received from the U.S. Fish and Wildlife Service. It

is more protective than the values developed for other irrigation district individual permits.

For systems outside the Klamath Basin, the Department is proposing to limit acrolein discharges to EPA's ambient water quality criterion of 3 µg/L described above.

Copper
The Department is proposing to limit acrolein discharges to 8 µg/L (0.008 mg/L). This is equivalent to the water quality criteria for copper for the protection of aquatic life against acute toxicity, adjusted to a hardness of 40. As explained previously, this is consistent with hardness values found in Eastern Oregon where most irrigation districts are located.

Xylene
DEQ is proposing to limit xylene discharges to 40 µg/L (0.040 mg/L). This is equivalent to the level established by EPA to be safe through an ecological risk assessment described in EPA's Reregistration Eligibility Decision for Xylene (Case No. 3020) dated September 26, 2005.

"Treated Water"
The permit specifies that irrigation water is no longer considered "treated" if the water in the irrigation ditch meets the concentrations specified above for the allowable aquatic pesticides.

Schedule A.2 ***General Requirements***

In addition to the waste discharge limitation discussed previously, the Department is proposing several general requirements. The permit registrant must:

- Comply with other federal and state requirements, such as Endangered Species Act biological opinions, FIFRA labeling, and Oregon Department of Agriculture licensing requirements.
- Control fish entry into treatment areas with fish screens, other structures, or management practices.

Schedule A.3 ***Required Management Practices***

The Department is proposing several specific management practices to ensure that aquatic pesticides applications do not affect natural waters. The permit registrant must:

- Apply aquatic pesticides only into the irrigation system and in accordance with an Integrated Vegetation Management Plan. No application into natural waters or upstream of any delivery point for water used for potable purposes is allowed. If the irrigation system intersects with natural waterways, the permit registrant must prevent discharge of aquatic pesticides to natural waters. This may be accomplished by not applying aquatic pesticides in these areas, applying only when the natural watercourse outside of the

irrigation system is dry with no hyporheic zone (see *Schedule D6.a*, *Definitions*), or by implementing engineering controls such as siphoning the irrigation system under the natural watercourse or physically separating the irrigation system from the natural watercourse.

- Use aquatic pesticide only when plant growth has reached a specified size or at levels such that irrigation water cannot be delivered consistent with good water supply management.
- Use a licensed applicator.
- Stop water deliveries during an application when requested to do so by a water user and tag water delivery points that cannot be locked. The tag must state that the delivery point has been closed at the request of the water user and may be reopened only by irrigation district personnel.
- Provide interested persons with access to the application schedule.
- Reduce water flow in the treatment area to match the target rate for water use.

Schedule A.4 ***Required Gate Management Practices***

The management of gates is essential to preventing discharge of the treated water to natural waters. For gates that may discharge to natural waters, the Department is proposing that all gates within the treatment area be closed and locked at least two hours before the aquatic pesticide wave is expected to reach the gate. The determination of when the pesticide wave is expected to reach the gate must be based on the results of a current time travel study.

Gates can be reopened only when aquatic pesticide is no longer present at levels above the permitted discharge limitation. This determination may be made using one of the following:

1. **Holding.** For acrolein-based pesticide only, waiting for expiration of the holding period sufficient to allow acrolein to dissipate to levels that will not exceed permit limits.

2. **Testing.** For copper and xylene-based pesticide application, collection and analysis of representative samples of water within the treatment area to demonstrate that treated water is no longer present prior to discharge. At least two samples must be collected: the first upstream of the open delivery point farthest from the application site within the treatment area, and the second at the midpoint between the most downstream point in the treatment area and the application site. If the treatment area consists of the main canal and laterals, sampling may be conducted in the main canal or in a lateral, whichever best fits the description of the two required sampling locations.

3. **Turnover.** Alternatively, for all allowable aquatic pesticides, calculate the rate at which the volume of water in the treatment area is replaced by fresh, untreated water based on the portion of the treatment area where turnover is the slowest. The proposed NPDES general permit requires that gate(s) may

not be opened until the water in the treatment area has turned over at least two times from the time aquatic pesticide is no longer being applied to the irrigation system. For irrigation systems that are not able to demonstrate two turnover times, the irrigation district can use one turnover time from the time aquatic pesticide is no longer detected in the irrigation system using a field sampling kit with a method detection limit equal to or less than 10 ug/L. The following also applies:

- The permit registrant may use turnover calculations to open gates in individual laterals that are fed from the main canal. For example, a lateral closer to the aquatic pesticide application point may turnover more quickly than the main canal or a lateral located farther away from the application point.
- In making the calculation above, the permit registrant must consider the distance between the aquatic pesticide application point and the gate farthest from the application point to be reopened.
- These calculations and measurements must be documented in the application log.

Note: In making these calculations, such as two hours before flow reaches gate or at least two turnover times, the irrigation district must consider the volume and velocity of flow in the treatment area and the distance between the pesticide application point and the gate. These are standard channel flow calculations and are commonly used by water providers. In addition, licensed applicators are also required to perform these calculations to properly apply aquatic pesticide according to label instructions.

Schedule A.5 ***Inspection and Record Keeping Requirements***

The Department is proposing the following to ensure that treatment areas within the irrigation system are properly maintained and inspected and that application logs are maintained.

- Prior to application, assure that all gates in the treatment area are in working order. Inspections and repairs must be documented in an inspection log.
- At least once a day during the period when pesticide levels in the irrigation system are likely to be above the permitted discharge limitation, inspect each locked gate within the treatment area and water user delivery point that has been closed as requested by the water user. The permit registrant must document this inspection in an inspection log.
- Maintain an application log.

Schedule A.6 ***Public Notice Requirements***

The proposed public notice requirement includes a requirement to give notice of intended use prior to the first aquatic pesticide application of each calendar year to each water user (by general newsletter, notice, newspaper, website, etc.), to users of public and private drinking water wells and the general public in the area served by the irrigation system by publication in newspaper(s). The following information must be included in the notice:

- A statement of the permit registrant's intent to use aquatic pesticides, purpose of use, general description of where they will be used, general time period of expected use, and any water use restrictions or precautions during treatment.
- A link to DEQ's Drinking Water Protection Program webpage at http://www.deq.state.or.us/wq/dwp/dwp.htm. A phone number that interested persons can call to get more information from the permit registrant.
- For water users, a statement indicating that the user may request in writing that water deliveries be stopped during aquatic pesticide application.
- Prior to application, the permit registrant is also required to provide notice to farmers with livestock within its irrigation district so that farmers will have an opportunity to move animals away from irrigation ditches.

Schedule B ***Minimum Monitoring and Reporting Requirements***

Monitoring Requirements

If the irrigation system returns tail water or overflows to natural waters following aquatic pesticide application, monitoring is required to assure that the required management practices are effective in keeping aquatic pesticides from entering natural waters is required. The Department is proposing that the first aquatic pesticide application of the month in which an application is made, be monitored by taking a grab sample of discharges to natural waters, if any, within 30 minutes of reopening gates. Separate sampling and analysis for each aquatic pesticide used must be performed. Monitoring is not required if the irrigation system does not overflow or return flow to natural waters following pesticide applications.

The Department is also proposing that when more than one pesticide is used at a time, that the permit holder be required to have a Whole Effluent Toxicity (WET) on *Pimephales Promelas* (fathead minnow) performed not more than once a year, using a sample of water that is released from the irrigation system to natural waters. The sample must also be tested to determine the concentration of pesticides present. If the test indicates that there is toxicity, the permit holder must have a test done on laboratory water at the same pesticide concentrations to demonstrate that the toxicity was not the result of the pesticides being used to treat aquatic weeds. If the results indicate that toxicity may be due to the presence of pesticides, the Department may elect to re-open the permit. The Department's justification for this requirement is that the information available for establishing permit limits does not address the possibility of mixtures of pesticides being used.

Acrolein, xylene, and copper must be analyzed using EPA approved test methods specified in 40 CFR §136 (not field test kits). Acrolein analysis may also be conducted using Solid Waste Method 8260, and copper analysis may also be conducted using EPA Method 200.8. Monitoring must be conducted at the location nearest to where the treated water would enter natural waters.

Reporting Requirements

The Department is proposing the following reporting requirements:

- Submittal of monitoring reports for the first aquatic pesticide application of the

month for every month during which pesticide applications are made. Monitoring results must be reported on approved forms. Monitoring is not required during months in which the irrigation system is operated in such a manner that there is no overflow or return flow to natural waters.

- Submittal of a Time Travel Study once every five years to insure that turnover times and holding times are accurate.
- Submittal of Integrated Aquatic Vegetation Management Plans to insure that the use of aquatic pesticides is minimized. The Department is proposing to allow 180 days from the date that permit coverage is obtained to submit this plan to the Department. The components of this plan are detailed in Schedule D.
- Submittal of an annual report to the Department's regional office by December 31 of each year that includes: the total amount of each aquatic pesticide applied during the calendar year, name of pesticide(s), EPA Registration Number, formulation information, the dates on which applications were made and the chemicals applied on those dates, the months during which no monitoring was required due to lack of overflow or return flow to natural waters, and a summary of the water quality monitoring data collected.

Schedule D ***Special Conditions***

The Department is proposing the following special conditions to assure compliance with the permit, to assure appropriate spill prevention and response, and to assure the appropriate use of aquatic pesticides. The permit registrant must:

- Record and maintain copies of the flow calculations used to determine when gates are to be closed and reopened, inspection and repair of gates, daily inspections, application logs, and public notice. This information must be made available to the Department upon request.

- Upon obtaining permit coverage, have a written contingency plan for the prevention, containment, and handling of spills and releases into the air or into or on any land or waters of the state from the application, storage and transportation of aquatic pesticides. The permit registrant must also:
  - ✓ Ensure that the licensed applicator has a copy of the contingency plan on site during application of pesticide.
  - ✓ Maintain a continuing program of employee orientation and education to ensure proper action in the event of a spill or accident.
  - ✓ As required by OAR 340-142, report all spills exceeding reportable quantities to the Oregon Emergency Management Division's Oregon Emergency Response System (OERS) at 1-800-452-0311.
  - ✓ Update the plan as needed and provide it the Department upon request.

- Develop and follow an integrated aquatic vegetation management plan or integrated pest management plan that addresses aquatic vegetation to examine the possibility of alternatives to reduce the need for aquatic pesticides. In developing its plan, the permit registrant must ensure that:
  - ✓ Pesticides are used only after the assessment of all available control technologies.

- ✓ Site-specific action thresholds for aquatic plant removal are determined.
- ✓ The least amount of the pesticide needed to effectively control the aquatic weeds is added to the irrigation system.
- ✓ The latest chemical control technologies are considered and used if technically and economically feasible.
- ✓ An evaluation of the infrastructure to identify changes that could be made to reduce growth of aquatic vegetation is performed.
- ✓ A schedule for implementing the plan is developed, if necessary.

- Notify the appropriate Department Regional Office in accordance with the response times contained in *Schedule F, General Conditions* of the permit of any malfunction so that corrective action can be coordinated between the permit registrant and the Department.

- Perform Whole Effluent Toxicity (WET) testing when mixtures of pesticides are used, according to methods approved by the Department. WET testing only needs to be performed when mixtures of pesticides are used, and it does not need to be performed more than once per year.

In addition, the Department has provided the following definitions in the permit for terms that the reader may not be familiar with:

- ***Hyporheic Zone*** means a subsurface environment that has variable proportions of water from surface water and groundwater. (Hyporheic zones provide ecologically important services, including thermal, temporal, and chemical buffering, food nutrients, habitat, flow augmentation, and refugia.)

- ***Irrigation System*** means a controlled system consisting primarily of manmade canals, ditches and ponds designed and operated for the delivery or management of water for irrigation purposes.

- ***Natural Waters*** means surface waters outside of the irrigation system.

- ***Treatment Area*** means the area within an Irrigation System in which aquatic pesticide will be applied and to which it is intended or reasonably expected to migrate.

Schedule F ***General Conditions***

These conditions are standard to all NPDES permits as required by 40 CFR §122.41. Some of these conditions may not be applicable to irrigation districts.

DIFFERENCES BETWEEN THE GENERAL PERMIT AND CURRENT INDIVIDUAL PERMITS

The proposed general permit is generally more stringent than the individual permits that have been issued to irrigation districts in Oregon. Areas where the proposed permit differs from the original permits are as follows:

1. The permit application now must be accompanied by the following:
   a. A fish control evaluation. The requirement for this was formerly in Schedule C, which allowed it to be provided after permit issuance.
   b. A map of discharge points where monitoring will be done to demonstrate compliance with permit limits.

2. This permit contains limits for acrolein, copper and xylene. The original permits did not all include all 3 chemicals.

3. The permit limits are more stringent, as follows:

Chemical	Old Limit	New Limit	Comments
Acrolein	2.3 ug/L for KID, 6 -21 ug/L for everyone else	3 ug/L	This is equivalent to the water quality criteria that EPA came out with in 2009.
Copper	12 ug/L	8 ug/L	The new value takes into account hardness.
Xylene	1.3 mg/L	0.040 mg/L	The new value reflects information in EPA's re-registration eligibility decision for xylene.

4. The proposed permit contains a requirement to perform a time travel study to support decisions regarding the opening/closing of gates and determination of turnover time.

5. The proposed permit contains expanded public notice requirements. Districts must now identify and contact users of public and private drinking water wells located in areas where irrigation canals can potentially recharge groundwater. The information necessary to do so was not readily available when the original permits were written. Now it has been compiled and is accessible DEQ's website. The proposed permit will ensure that this information used.

6. The proposed permit requires permit registrants to provide notice to farmers with livestock rather than just farmers with dairy animals, so that farmers will have an opportunity to move animals away from irrigation ditch.

7. Monitoring frequency in the proposed permit is the same each year. The original permits allowed for monitoring to be reduced to the first application of the irrigation season if discharge limitations were met in the first year.
8. The proposed permit contains a requirement to perform a Whole Effluent Toxicity test when mixtures of pesticides are used.

9. The proposed permit explicitly requires annual reporting even if there was no discharge.

10. Schedule C is not used in the proposed permit. Schedule C is used for permits with compliance schedules and the proposed permit does not have one.

11. The proposed permit contains the updated version of Schedule F.