FACILITY NAME AGRIUM US, INC.

November 1, 2007

PURPOSE OF THIS FACT SHEET

This fact sheet explains and documents the decisions Ecology made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for Agrium US, Inc., Kennewick, Washington.

The Environmental Protection Agency (EPA) developed the NPDES permitting program as a tool to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." EPA delegated to Ecology the power and duty to write, issue, and enforce NPDES permits within Washington State. Both state and federal laws require any industrial facility to obtain a permit before discharging waste or chemicals to a water body.

An NPDES permit limits the types and amounts of pollution the Permittee may discharge. Those limits are based either on (1) the pollution control or wastewater treatment technology available to the industry, or on (2) the receiving water's customary beneficial uses. This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit *and accompanying fact sheet* for public evaluation before issuing an NPDES permit.

PUBLIC ROLE in the Permit

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before we issue the final permit to the facility operator (WAC 173-220-050). Copies of the fact sheet and draft permit for Agrium US, Inc., NPDES permit WA-000369-9**,** are available for public review and comment from December 20, 2007 until the close of business January 21, 2008 For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement**.

Before publishing the draft NPDES permit, Agrium US, Inc., reviewed it for factual accuracy. Ecology corrected any errors or omissions about the facility's location, product type or production rate, discharges or receiving water, or its history.

After the public comment period closes, Ecology will summarize substantive comments and our responses to them. Ecology will include our summary and responses to comments to this Fact Sheet as **Appendix D - Response to Comments**, and publish it when we issue the final NPDES permit. The rest of the fact sheet will not be revised, but the full document will become part of the legal history contained in the facility's permit file.

SUMMARY

Agrium owns three facilities located near Kennewick, Washington. Each facility discharges into the Columbia River. These three facilities include the Kennewick Plant, the Finley area, and the Hedges area. The Kennewick Plant is the only location that is actively producing fertilizer at this time. This NPDES permit fact sheet addresses the Kennewick Plant only. Ecology's main concerns with this facility's discharge include ammonia, nitrates, and heat (measured as temperature).

TABLE OF CONTENTS

I. INTRODUCTION

Table 1 - General Facility Information

Applicant:	Agrium US, Inc.
Facility Name and Address:	227515 Bowles Road Kennewick, WA 99337
Type of Treatment:	None – Once through noncontact cooling water
SIC Code	2873 - Nitrogenous Fertilizers
Discharge Location:	Columbia River Outfall 001 / Outfall 002 Latitude: 46º 10' 00" N / 46º 09' 53" N Longitude: 119º 00' 43" W / 119º 00' 46" W
Water Body ID Number:	26-00-02

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the State of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

Ecology adopted rules describing how we exercise our authority:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC),
- Water quality criteria for surface waters (chapter 173-201A WAC) and for ground waters (chapter 173-200 WAC)
- Sediment management standards (chapter 173-204 WAC).

These rules require any industrial facility operator to obtain an NPDES permit before discharging wastewater to state waters. They also define the basis for limits on each discharge and for other performance requirements imposed by the permit.

Under the NPDES permit program Ecology must prepare a draft permit and accompanying fact sheet, and make it available for public review. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments on the draft permit, during a period of thirty days (WAC 173-220-050). (See **Appendix A--Public Involvement** for more detail about the Public Notice and Comment

procedures). After the Public Comment Period ends, Ecology may make changes to the draft NPDES permit in response to comment. Ecology will summarize the responses to comments and any changes to the permit in **Appendix D.**

II. BACKGROUND INFORMATION

A. Facility Description

History

In this fact sheet, Ecology will refer to the Agrium facility as the Kennewick Fertilizer Operations (KFO). The following describes the KFO, located southeast of Kennewick, Washington in rural Benton County.

Agrium operates the three areas of KFO using an integrated and interactive approach. Raw material and product pipelines link the three areas.

The local air authority considers KFO a single source for air permitting purposes. Ecology considers each area a separate facility for NPDES permitting, hazardous waste management, and most other regulatory purposes.

Historical Overview

The three operating areas of the KFO include:

- Kennewick area, located at the east end of Bowles Road (227515 Bowles Road).
- Finley area, located at the east end of Game Farm Road (231610 East Game Farm Road).
- Hedges area, located at the east end of Perkins Road (227108 East Hedges Road).

This permit only covers the Kennewick Plant discharges at 227515 Bowles Road.

Kennewick Plant, Kennewick Area

1959

California Spray Chemical Company, a subsidiary of the Chevron Corporation built the first process facilities at the Kennewick area in 1959. California Spray Chemical changed its name to Chevron Chemical Company. Chevron was attracted to the area by the demand for agricultural chemicals in the newly developed irrigated area of the Columbia River Basin region and by the available supply of ammonia from the nearby Phillip's Pacific Chemical Company ammonia plant (now the Finley Area of KFO). The original 1959 facility produced nitric acid (Plant 2), prilled ammonium nitrate (Plant 3), various grades of N-P-K granular Unipel® fertilizer (Plant 1), and ammonium nitrate solution (AN20). The facility annually produced 80,000 tons.

The facility used once-through cooling water for process heat transfer and discharged to the Columbia River at river mile 322.6 through a 30-inch outfall pipe extending out into the river. The facility originally extracted once-through cooling water from the groundwater via large capacity groundwater pumps.

1968

The plant expanded by adding another nitric acid plant (Plant 7). Chevron Chemical Company built Plant 7 with catalytic fume abatement equipment to meet opacity air quality standards and retrofitted Plant 2 with abatement equipment at the same time.

1975

The Chevron fertilizer plant underwent a major expansion in 1975, bringing the production capacity of the facility to 550,000 tons annually. Chevron added another nitric acid production unit (Plant 9) after the NSPS applicability date (1971) and designed it to meet nitric acid new source performance standards (NSPS) for air quality. Chevron used extended absorption, an integral part of the process, as the control technology.

During this time Chevron added Plant 10, a combination of an ammonium nitrate neutralizer and an ammonium nitrate granulation plant, and converted Plant 3 from production of prilled ammonium nitrate to production of granulated ammonium nitrate (GAN).

Chevron replaced the old N-P-K complex fertilizer plant (Plant 1) by an entirely new and expanded N-P-K complex plant (Plant 8) designed to meet the effluent limitation guidelines of 40 CFR 418.70. One of the multi-component products it produced was a Chevron registered trademark product called Unipel. Chevron converted the original Unipel plant (Plant 1) to produce urea-ammonium nitrate solution (UAN-32) and renamed it Plant 11. The facility also built additional large-capacity warehouses to increase raw material and product storage capacity.

Chevron needed additional cooling water to run the expanded process, and obtained permits to draw surface water from the Columbia River. The facility converted the former 30-inch effluent line to an intake line to an on-shore pump vault, and used it to draw once-through cooling water from the river. This intake structure consists of a 200-foot long, 30-inch steel pipe, with a 60-foot pile-supported intake pipe section. The intake header line consists of nine 30-inch intake ports each with a 4-foot long screen cylinder. They used the necessary slot size to protect fish. Agrium currently uses this system.

Chevron continued to use the original cooling water wells at reduced flow. The water volume supplied by the wells was 2,365 gpm while the river intake supplied the balance at 22,693 gpm. Chevron used approximately 94% of the water supplied to the plant as once through non-contact cooling water. The facility used the balance of the water in the plant becoming contact return flow. The contact water included refrigeration condensate, and process water discharges from each of the separate plants. Chevron collected contact water in a return gravity sewer and monitored the contact return flow at a continuous sampling point (Manhole 7) prior to mixing with the non-contact cooling water (Manhole 8). Agrium currently operates the facility in the same manner.

Chevron constructed a new outfall diffuser line, as required to meet State Water Quality Standards, in conjunction with the plant expansion in 1975. The facility designed the diffuser to achieve dilution to less than ½ degree F, i.e. 0.28 degree C rise above ambient temperature within the dilution zone.

1980

Chevron added a larger natural gas fired boiler (CB-3) in 1980, bringing the total count of boilers at the facility to four.

1990

Chevron suspended production of multi-grade Unipel fertilizer in 1990.

1992

Unocal purchased the Kennewick fertilizer operations in 1992. Unocal modified Plant 8 (the discontinued N-P-K process) to produce calcium ammonium nitrate solution (CAN-17) and UAN-32 and added two nitric acid concentrator columns (shell and tube boilers) to produce 68% nitric acid from 57% acid.

1994 - 2000

In 1994 Unocal restarted nitric acid Plant 2, that Chevron had temporarily shutdown in 1992. In 1996, Unocal replaced the existing catalyst in the fume abator of Plant 2 with a catalyst capable of selectively reducing NO_x to gaseous N_2 in the presence of ammonia (SCR). The facility installed similar control technology (SCR) on nitric acid Plant 7 in 2000.

In 1999 Unocal reorganized the KFO (Kennewick, Finley, and Hedges) into a limited liability corporation named Prodica. Formation of the LLC was part of organizing the business for sale. In 2000 Agrium US Inc purchased the facility from Unocal/Prodica.

2004

With submittal of a PSD permit application in 2004, Agrium identified units that had been shut down and would no longer operate, to include Kennewick Area acid Plant #2 and boiler CB-1.

2005

In 2005 Agrium discontinued production of dry product granular ammonium nitrate. For permit purposes this is a suspension, not abandonment, of operation of Plant 10 and Plant 3 dry product granulators.

2006-2007

In 2006 the Kennewick Area produced about 18,000 tons of "product" nitric acid (57% and 68%) and about 170,000 tons of nitrogen fertilizer solutions. Agrium currently sells product acid as acid and does not include the acid incorporated into fertilizer solutions in the product acid quantity noted above.

Industrial Process

The Kennewick Area manufactures nitric acid and liquid nitrogen fertilizer solutions, with the capacity to also produce granular ammonium nitrate (GAN). Agrium manufactures nitric acid from ammonia for use as an intermediate feedstock to produce ammonium nitrate. Agrium also sells nitric acid as a final product at either a 57% or 68% concentration. The facility makes eighty three percent ammonium nitrate solution (83% AN) from nitric acid and ammonia and mix and blend it to produce fertilizer solutions. Agrium mixes the 83% AN with water to make a solution of ammonium nitrate (AN20) containing 20% nitrogen. The facility also mixes the 83% AN with urea and water to make urea ammonium nitrate (UAN-32) containing 32% nitrogen. Agrium makes calcium ammonium nitrate (CAN-17), containing 17% nitrogen, by dissolving limestone (Calcium carbonate) with nitric acid to make a calcium nitrate solution, which it mixes with 83% AN and water.

Wastewater Treatment

The facility has no wastewater treatment system. Agrium uses approximately 94% of the water supplied to the plant as once through non-contact cooling water. The facility uses the balance of the water in the plant resulting in contact return flow. The contact water includes refrigeration condensate, and process water discharges from each of the separate plants.

Residual Solids

Agrium does not produce residual solids since the facility does not have a wastewater treatment system. When the facility cleans processing tanks, it handles solids generated as solid or dangerous waste, as appropriate, and transports those solids to permitted disposal sites.

Discharge Outfall

Agrium continuously discharges wastewater from the Kennewick Plant through a submerged, multi-port outfall diffuser into the Columbia River at River Mile 322.6. The discharge is located offshore of the west river bank, approximately 2 miles downstream from the confluence of the Snake River with the Columbia River. The 42-inch steel outfall pipe extends approximately 374 feet from the shore to the start of the diffuser. The 172 foot-long diffuser section lies on the river bed, and stretches from 375 feet to 525 feet from the river shore. The multi-port diffuser consists of 44 6-inch diameter port spaced 4 feet apart. All of the discharge ports point horizontally downstream. The water depth at the diffuser is 21 feet measured at normal pool elevation of 340 feet. The outfall is 15 degree angle downstream from perpendicular to the stream flow.

Permit application

B. Permit Status

Agrium US, Inc. Kennewick, Washington submitted an application for permit renewal on October 22, 2007. Ecology accepted it as complete on November 30, 2007.

Ecology issued the previous permit for this facility on July 10, 2003. The previous permit placed effluent limits on ammonia, nitrates, pH, and temperature

C. Summary of Compliance with Previous Permit Issued

Ecology staff conducted a sampling compliance inspection on June 11, 2007.

Agrium US, Inc.'s wastewater treatment discharge has been in compliance during the history of the permit issued July 10, 2003. Ecology assessed facility compliance based on our review of the facility's Discharge Monitoring Reports (DMRs) and on inspections conducted by Ecology.

The Permittee sends samples for ammonia, nitrate, and whole effluent toxicity to an accredited laboratory. The Permittee performs pH on site without accreditation.

D. Wastewater Characterization

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. The effluent is characterized as follows:

Table 2: Wastewater Characterization

Parameter	Average Mass	Maximum Mass
Nitrate-Nitrite (as N)	12 lbs/day	46 lbs/day
Ammonia (as N)	37 lbs/day	269 lbs/day

Parameter	Average Concentration	Maximum Concentration
Biochemical Oxygen Demand	-	< 5 mg/L
Chemical Oxygen Demand	-	12.7 mg/L
Total Organic Carbon	-	1.27 mg/L
Total Suspended Solids	-	4 mg/L
Iron	-	83.5 µg/L

III. PROPOSED PERMIT CONDITIONS

Federal and State regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC) or the National Toxics Rule (40 CFR 131.36).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application. Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the State of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Nor does Ecology usually develop permit limits for pollutants that were not reported in the permit application but that may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology, as described in 40 CFR 122.42(a), if significant changes occur in any constituent. Industries may be in violation of their permit until the permit is modified to reflect additional discharge of pollutants.

A. Design Criteria

According to WAC 173-220-150 (1)(g), neither flows nor waste loadings may exceed approved design criteria. Ninety-four percent of the wastewater is once through non-contact cooling water. The other wastewater (6 %) is discharged without treatment limited by the effluent guidelines (40 CFR 418). Since this facility does not have a wastewater treatment system, Ecology did not include a design capacity condition or a design efficiency study in the proposed permit.

B. Technology-Based Effluent Limits

Technology based limits are set by regulations or developed on a case by case basis. The federal effluent guidelines for best available control achievable (BAT) for production of nitric acid and ammonia nitrate are defined in 40 CFR part 418.50 Subpart E and 40 CFR part 418.40 Subpart D, published in 1976 and 1978, respectively. These subcategories were defined more than ten years ago; therefore, we must determine if they can be considered to be equivalent to all known, available, and reasonable treatment (AKART) for ammonia and nitrates pollutants. There have been no changes in the method of production of nitric acid or ammonia nitrate in the past thirty years since the effluent guidelines were published. Therefore, Ecology considers that the 1976 and 1978 effluent guidelines for nitric acid and ammonia nitrate represent AKART for the facility at Kennewick, Washington. The allowances for BAT for the facility are given below:

40 CFR Part 418.43 Subpart D—Ammonium Nitrate Subcategory
Best Available Technology (BAT)

Effluent characteristics	Effluent limitations in Pounds/1000 Pounds of Product	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
Ammonia (as N)	0.08	0.04
Nitrate (as N)	.12	.07

40 CFR Part 418.53 Subpart E—Nitric Acid Subcategory
Best Available Technology (BAT)

Effluent characteristic	Effluent limitations in Pounds/1000 Pounds of Product	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
Ammonia (as N)	0.08	0.008
Nitrate (as N)	0.17	0.023

Nitric Acid Production

40 CFR 418, Subpart E – Nitric Acid		
Plant	Production	Units
Plant 9 Nitric Acid	750	Tons/day
Plant 7 Nitric Acid	225	Tons/day

Ammonium Nitrate Production

40 CFR 418, Subpart D – Ammonium Nitrate		
Plant	Production	Units
Plant 3 Ammonia Nitrate	320	Tons/day
Plant 10 Ammonia Nitrate	550	Tons/day
AN 20 Production	180	Tons/day
CAN-17	500	Tons/day
UAN-32	1,950	Tons/day
Total	3,500	

Using the above production and the categorical standards allowance, Ecology calculated the effluent limits as follows

Pollutants	Monthly Average	Daily Maximum
Ammonia	295 Lbs/day	716 Lbs/day
Nitrates	535 Lbs/day	1,171 Lbs/day

The pH range defined by the current permit is 6.0 and 9.0 with no single excursion between 9 and 10 or between 5 and 6 lasting more than 60 minutes and the total time of all of these excursions is less than 7 hours 30 minutes in any month. Ecology based these limits on the categorical limits in the federal effluent guidelines and included these in the proposed permit with the exception as described above.

C. Surface Water Quality-Based Effluent Limits

The Washington State Surface Water Quality Standards (chapter 173-201A WAC) were designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will

meet established surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily loading study (TMDL).

Numerical Criteria for the Protection of Aquatic Life and Recreation

Numerical water quality criteria are published in the Water Quality Standards for Surface Waters (chapter 173-201A WAC). They specify the levels of pollutants allowed in the receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

Numerical Criteria for the Protection of Human Health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (40 CFR 131.36). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The Water Quality Standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative Criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200; 2006) and of all marine waters (WAC 173-201A-210; 2006) in the State of Washington.

Antidegradation

The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.

- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three Tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

This facility must meet Tier I requirements.

- Existing and designated uses must be maintained and protected. No degradation may be allowed that would interfere with, or become injurious to, existing or designated uses, except as provided for in this chapter.
- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards.
- Whenever the natural conditions of a water body are of a lower quality than the assigned criteria, the natural conditions constitute the water quality criteria. Where water quality criteria are not met because of natural conditions, human actions are not allowed to further lower the water quality, except where explicitly allowed in this chapter.

Ecology's analysis described in this section of the fact sheet demonstrates that the existing and designated uses of the receiving water will be protected under the conditions of the proposed permit. Ecology determined that Tier II and Tier III requirements do not apply to this facility.
Mixing Zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric criteria, so long as the diluting wastewater doesn't interfere with designated uses of the receiving water body (e.g., recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric criteria.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to

limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control and treatment (AKART). Mixing zones typically require compliance with water quality criteria within 200 to 300 feet from the point of discharge; and use no more than 25% of the available width of the water body for dilution. We use modeling to estimate the amount of mixing within the mixing zone. Through modeling we determine the potential for violating the water quality standards at the edge of the mixing zone and derive any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's Permit Writer's Manual). Each critical condition parameter (by itself) has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water comprises 90% of the total volume at the boundary of the mixing zone. We use dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life **acute** criterion is based on the assumption that organisms are not exposed to that concentration for more than one-hour and more often than one exposure in three years. Each aquatic life **chronic** criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic).

The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400; 2006). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. Ecology must specify both the allowed size and location in a permit.

The chronic mixing zone shall extend a distance of 321 feet downstream from each of diffuser ports and a distance of 100 feet upstream from each of the diffuser ports. The zone of acute criteria exceedance shall extend a distance of 32 feet downstream and 10 feet upstream from each of the diffuser ports.

2. The facility must fully apply "all known available and reasonable methods of prevention, control and treatment" (AKART) to its discharge.

Ecology has determined that the treatment provided and the pollution prevention activities practiced at Agrium US, Inc. meets the requirements of AKART (see "Technology based Limits").

3. Ecology must consider critical discharge conditions.

Surface water quality-based limits are derived for the water body's critical condition, (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated water body uses). The critical discharge condition is often pollutant-specific or water body-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology's Permit Writer's Manual describes additional guidance on criteria/design conditions for determining dilution factors. The Manual can be obtained from Ecology's website at: http://www.ecy.wa.gov/biblio/92109.html.

Ecology used the following critical conditions to model the discharge. Ecology obtained the data from Agrium Kennewick Facility – Outfall Diffuser Modeling, CH2M Hill, Inc., 2001:

- The seven day average low river flow with a recurrence interval of ten years (7Q10) 44000 cfs.
- River depth of 21 feet below normal pool level of +340 feet NGVD.
- River Velocity of 0.37 ft per second at Q710, 1.52 ft/sec average river flow of 178,000 cfs.
- Number, diameter, and spacing of ports: 44, 6-inch diameter ports, spaced at 4 feet.
- Port elevation above river bed: 18 inches.
- Angle of diffuser axis relative to ambient current direction: 105 degrees.

- The summer ambient receiving water 7DADMAX = 21. 7 °C.
- Ambient receiving water 7DADMAX = 17. 45 °C (June 16 – September 15).
- The ambient receiving water 1DADMAX = 21.89 °C.
- The 90th percentile ambient temperature, $T_{ambient90}$ = 21.45 °C.
- The 95th percentile effluent temperature, $T_{effluent95}$ = 23.65 °C.
- The 99th percentile effluent temperature, $T_{effluent99}$ = 23.99 °C.
- Maximum effluent temperature: 32.4 °C.
- Ambient temperature: dry season—21.1 °C and annual average 17.5 °C.
- Acute dilution ratio: 15:1
- Chronic dilution ratio is 27:1.
- The effluent temperature was calculated for a constant heat load. The excess heat load above ambient conditions of 1.70E+09 BTU/day was calculated from the 2004 and 2005 temperature and effluent flow data and the receiving water data sent by Agrium to Ecology via email, September-2007. The effluent temperatures and the incremental temperature increases are given below at the indicated flows:

Flows	Dilution ratio	Delta t
12	30.47	0.32
13	29.74	0.32
14	29.12	0.28
15	28.58	0.26
16	28.11	0.29
17	27.69	0.28
18	27.32	0.28
19	26.98	0.27
20	26.68	0.27
28	25.06	0.21
36	24.16	0.15
40	23.84	0.14

4. Supporting information must clearly indicate the mixing zone would not:

- **Have a reasonable potential to cause the loss of sensitive or important habitat,**
- **Substantially interfere with the existing or characteristic uses,**
- **Result in damage to the ecosystem, or**
- **Adversely affect public health.**

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms, and set the criteria to protect all aquatic species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for 1-hour. They set chronic criteria assuming organisms are exposed to the pollutant at the criteria concentration for 4 days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of being discharged.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that this effluent will not exceed 33 degrees C for more than 2 seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing.

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics and the discharge location. Based on this review we conclude that the discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem or adversely affect public health

5. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.

Ecology conducted a reasonable potential analysis, using procedures established by the EPA and by Ecology, for each pollutant. We concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone.

6. The size of the mixing zone and the concentrations of the pollutants must be minimized.

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. The plume rises through the water column as it mixes therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed the discharge and the receiving water is more completely mixed in a shorter time period. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor and the lowest flow occurring once in every 10 years to perform the reasonable potential analysis.

The facility continues to conduct pollution prevention activities and has completed pollution prevention projects. These activities also minimize the affects on the receiving waters.

Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. Maximum size of mixing zone.

The authorized mixing zone does not exceed the maximum size restriction.

8. Acute Mixing Zone -

- **The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.**

Ecology determined the acute criteria will be met at 10% of the distance (or of the chronic mixing zone at the ten year low flow.

- **The pollutant concentration, duration and frequency of exposure to the discharge, will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.**

As described above the toxicity of any pollutant depends upon the exposure, the pollutant concentration and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organism near the point of discharge (below the rising effluent).

- **Comply with size restrictions.**

The mixing zone authorized for this discharge complies with the size restrictions published in chapter 173-201A WAC.

8. Overlap of Mixing Zones.

This mixing zone does not overlap another mixing zone.

D. Description of the Receiving Water

The facility discharges to the Columbia River. Other nearby point source outfalls include cities of Kennewick, Pasco, and Richland stormwater and wastewater discharges, Hedges and Finley Agrium's facilities, Corps of Engineer ground water pumping station, and Columbia Irrigation District return flows. There are no significant nearby non-point sources of pollutants.

The ambient background data used for this permit includes the following parameters:

Table 3 Ambient Background Data

Parameter	Value used
Temperature (highest annual 1-DADMax)	21.89 ^{o}C*
Temperature (highest annual 7-DADMax)	21.7 ^{o}C*
pH (high)	8.23 SU**
Total Ammonia-N	0.016 mg/L**
Turbidity	1.1 – 9.6 NTU**
Nitrates	0.434 mg/L**

* Calculated from the 2004 and 2005 temperature and effluent flow data and the receiving water data sent by Agrium to Ecology via email, September-2007.

**Taken from Ecology stream data at Rock Glade - River Mile 290.5. The Agrium US Inc. outfall is at River Mile 322.

E. Designated Uses and Surface Water Quality Criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (40 CFR 131.36). Criteria applicable to this facility's discharge are summarized below in **Table 5**.

Table 5 Aquatic Life Uses & Associated Criteria

Salmonid Spawning, Rearing, And Migration	
Temperature Criteria – Highest 7DAD MAX	20°C (68°F)
Dissolved Oxygen Criteria – Lowest 1 Day Minimum	8.0 mg/L
Turbidity Criteria	• 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU
Total Dissolved Gas Criteria	Total dissolved gas shall not exceed 110 percent of saturation at any point of sample collection
pH Criteria	pH shall be within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.5 units

Table 6 Recreational Uses & Associated Criteria

Recreational use	**Criteria**

Primary Contact Recreation	Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies /100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies /100 mL

- The **water supply use**s are domestic, agricultural, industrial, and stock watering.
- The **miscellaneous fresh water use**s are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

F. Evaluation of Surface Water Quality -Based Effluent Limits for Numeric Criteria

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biological oxygen demand (BOD) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

Pollutant concentrations in the proposed discharge exceed water quality criteria despite using technology-based controls which Ecology determined fulfills AKART. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones described in chapter 173-201A WAC.

The diffuser at Outfall 001 is 172 feet long with a diameter of 42 inches. The diffuser has a total of 44 6-inch diameter ports. The distance between ports is 4 feet. The diffuser depth is 21 feet below the normal pool of 340 feet. The diffuser has a hang angle or 15º from perpendicular to the flow, that is, it is 105º measured from the upstream flow.

Chronic Mixing Zone

WAC 173-201A-400(7)(a) specifies that mixing zones must not extend in a downstream direction from the discharge ports for a distance greater than 300 feet plus the depth of water over the discharge ports or extend upstream for a distance of over 100 feet, not utilize greater than **25%** of the flow, and not occupy greater than **25%** of the width of the water body.

The horizontal distance of the chronic mixing zone is 321 feet down stream and 100 feet upstream. The mixing zone extends from the river bottom to the top of the water surface.

Acute Mixing Zone

WAC 173-201A-400(8)(a) specifies that in rivers and streams a zone where acute toxics criteria may be exceeded must not extend beyond 10% of the distance towards the upstream and downstream boundaries of the chronic zone, not use greater than **2.5%** of the flow and not occupy greater than **25%** of the width of the water body.

The acute mixing zone for Outfall 001 extends 32 feet in any spatial direction from any discharge port. The dilution factor is based on this distance.

Agrium US Inc.'s consultant determined the dilution factors of effluent to receiving water that occur within these zones at the critical condition using UM3 model in the Plumes platform. The dilution factors are listed in Table 7:

Table 7 Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	15	27
Human Health, Carcinogen		27
Human Health, Non-carcinogen		27

Ecology determined the impacts of temperature, pH, and ammonia as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

BOD_5--This discharge results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. No limits are required to ensure that dissolved oxygen criteria are met in the receiving water.

Temperature— The state temperature standards include multiple criteria, each with different durations of exposure and points of application. Ecology evaluates each criterion independently to determine reasonable potential and permit limits.

- Temperature Chronic Effects

  a) Annual summer maximum.

  The annual maximum temperature criteria 20ºC protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures. This criterion must be met at the edge of the chronic mixing zone boundary. Freshwater criteria are expressed as the highest seven-day average of the daily maximum temperatures (7-DADMax). The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures.

Ecology listed the Columbia River at the point of Agrium US discharge for temperature in the 2004 303(d) listing. Since the temperature of Columbia River is above the criteria, no further measurable increase in temperature is allowed due to human activities. The incremental increase in temperature due to human cause can be no larger than 0.3 ° C. The current permit required the Permittee to perform a two year monitoring study to determine if their discharge impacted the receiving water below the point of discharge. The Permittee monitored temperature of the receiving water upstream and downstream of the discharge near the surface, at mid depth, and near the bottom in the summer months between June and September of each of the two years of the study. Agrium submitted the final report for the river study to Ecology on July 24, 2006. The Permittee also monitored the effluent temperature and effluent flow for permit compliance. The following table gives the results of the study determined by subtracting the measured upstream value from the measured downstream value for each depth:

Depth	Delta
Upper Sonde	-0.02
Middle Sonde	-0.01
Bottom Sonde	+0.03

Considering that the accuracy of the temperature recording devices may vary by up to ± 0.10 ° C, Agrium concluded that there was no measurable difference in temperature between the upstream and downstream temperatures.

Ecology included three limits for temperature in the current permit depending on the flow. The temperature limits are summarized in the table below:

Temperature Limit (º C)	Flow(MGD
33.3	≤ 19
30.6	>19 to 28
29.0	>28 to 40

With the above results, we must determine if the limits are valid and required in the permit to protect the water quality uses. When the current permit was written, the permit writer assumed that with the increase flow there would be an increase in the heat load. In the proposed permit Ecology determined the heat load to be constant. The Permittee has been running two nitric acid plants for several years. The Permittee expects to continue this production level of nitric acid for the foreseeable future. With a constant production level, Ecology expects the heat load would be fairly constant. The electronic data submitted with the river temperature study listed the effluent temperatures and wastewater flows for the period mid June through mid September for both 2004 and 2005. The average flow was 19.6 MGD while the minimum and maximum flows were 9 MGD and 24 MGD, respectively. Ecology calculated the average daily heat load above the ambient temperature, $T_{ambient90}$ using the daily wastewater flows and the corresponding daily temperature. The Permittee expects to minimize the flow in order to reduce energy use and operational costs. With a constant heat load, the temperature of the effluent would increase for smaller wastewater flows. Ecology determined the effluent temperature at various flows. The data are tabulated as follows:

	Flow MGD	Ambient Temperature ° C	Calculated Effluent Temperature	Sacrificial cell	Heat load Calorie/day	Heat load MBTU/hr	Dilution Factor	Delta T ° C
1	40.2		28.1		1.69E+10	206.8		
2	19.6	21.00	26.8		1.70E+09	21.3		
3	12	21.00	30.47	0.00E+00	1.70E+09	21.3	29.24	0.32
4	13	21.00	29.74	0.00E+00	1.70E+09	21.3	27.63	0.32
5	14	21.00	29.12	0.00E+00	1.70E+09	21.3	29.49	0.28
6	15	21.00	28.58	0.00E+00	1.70E+09	21.3	28.67	0.26
7	16	21.00	28.11	0.00E+00	1.70E+09	21.3	24.70	0.29

8	17	21.00	27.69	0.00E+00	1.70E+09	21.3	23.48	0.28
9	18	21.00	27.32	0.00E+00	1.70E+09	21.3	22.83	0.28
10	19	21.00	26.98	0.00E+00	1.70E+09	21.3	22.24	0.27
11	20	21.00	26.68	0.00E+00	1.70E+09	21.3	21.10	0.27
12	28	21.00	25.06	0.00E+00	1.70E+09	21.3	19.14	0.21
13	36	21.00	24.16	0.00E+00	1.70E+09	21.3	20.73	0.15
14	40	21.00	23.84	0.00E+00	1.70E+09	21.3	20.62	0.14

The preliminary draft TMDL report WLA for Agrium is given in row 1. The actual heat load determined from the measured flows and temperature of the waste stream and the 90th percentile river temperature are shown in row 2. Rows 3 through 14 show the calculated effluent temperature corresponding to the expected flows in column 2. Column 5 – rows 3 through 14 reflects the difference between the known heat content determined from actual data (column 5 – row 2) minus the heat content in the respective flows set to zero by changing the calculated temperature in column 4 – rows 3 through 14. Column 7 reflects the actual heat load. Ecology determined the dilution factors in column 8 using PLUMES dilution platform and the UM3 model for the various flows and the calculated temperature. The calculated incremental increase in temperature in Column 9 is shown in degree centigrade. The incremental increase in temperature is above 0.3 rounded to two significant figures when the effluent flow is reduced below 14 MGD. The proposed permit sets a minimum flow of 15 MGD during the period June 15 to September 15 of each year when the facility is operating. Other than the restriction on the flows, no temperature limits are required. With the temperature limit imposed by the current permit, the receiving water gained heat since the Permittee had to increase the pumping of river water in order to meet the temperature limit. By pumping more water there was no beneficial effect on the river since 94 % of the pumped water is non contact cooling water. If the Permittee starts up more nitric acid plants, the minimum flow limit will have to be re-evaluated.

- Temperature Acute Effects

  a) Instantaneous lethality to passing fish.

  The upper 99th percentile daily maximum effluent temperature must not exceed 33°C; unless a dilution analysis indicates ambient temperatures will not exceed 33°C 2-seconds after discharge. The highest one day temperature of the effluent is 31.4 °C during the summer months of 2004-2005. The Permittee has measured 32.4 °C in the past. The highest effluent temperature is below the maximum of 33 °C allowed; therefore, the Permittee meets the 33 °C criteria at the end of the pipe. Therefore there is no instantaneous lethality for passing fish.

  b) General lethality and migration blockage.

  Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C. The 7DADMAX and the 1DMAX receiving water temperature are 21.4 °C and 21.89, respectively. The criteria for the 7DADMAX and the 1DMAX are 22 °C and 23 °C, respectively. The discharge meets both criteria. The 7DADMAX temperature of the receiving water from September 16 through June 14 was below 17.5 °C; therefore, it meets the designated aquatic uses during this time period. Ecology determined the 7DADMAX temperature using data measured at the Corps of Engineer Pasco monitoring station.

Ecology's publication "Waters Requiring Supplemental Spawning and Incubation Protection for Salmonid Species" does not list any salmon spawning and/or incubation areas in WRIA 31 near the point of Agrium US, Inc. discharge.

pH-- Compliance with the technology-based limits of 6.0 to 9.0 will assure compliance with the water quality standards of surface waters.

We predict no violation of the pH criteria under critical conditions. Therefore, Ecology placed the technology-based effluent limits for pH in the permit.

Turbidity—Ecology evaluated the impact of turbidity based on the range of turbidity in the effluent and turbidity of the receiving water. Due to the large degree of dilution, Ecology expects no violations of the turbidity criteria outside the designated mixing zone.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutant is present in the discharge: ammonia. We conducted a reasonable potential analysis on this parameter to determine whether effluent limits would be required in this permit.

Ecology evaluated ammonia's reasonable potential to exceed water quality standards. Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature, and pH. The amount of unionized ammonia depends on the temperature and pH in the receiving freshwater. To evaluate ammonia toxicity, Ecology used the available receiving water information for ambient station Rock Glade RM 290.5 and Ecology spreadsheet tools. Ecology found no reasonable potential for ammonia to exceed the water quality criteria.

G. Whole Effluent Toxicity

The water quality standards for surface waters forbid discharge of effluent that causes toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

WET testing conducted during effluent characterization showed no reasonable potential for effluent discharges to cause receiving water chronic toxicity. The proposed permit will not impose acute or chronic WET limit. Agrium US Inc. must retest the effluent before submitting an application for permit renewal. In addition,

- If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization

- If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased. Agrium US Inc. may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing after the process or material changes have been made.

H. Human Health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the applicant's effluent does contain chemicals of concern. Ecology performed a reasonable potential analysis for nitrates at the concentration that may be found in the effluent based on proposed permit limit. The reasonable potential analysis showed that the nitrates that may be discharged will not violate the health quality criteria.

Ecology conducted a determination of the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d). We followed the procedures published in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and Ecology's Permit Writer's Manual (Ecology Publication 92-109, July, 2006) to make this reasonable potential determination. Our evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards, thus an effluent limit is not warranted except there will be a the restrictions on the flow to be greater 16 MGD during the months June through September of each year.

I. Sediment Quality

Through a review of the discharger characteristics and of the effluent characteristics, Ecology determined that this discharge has no reasonable potential to violate the Sediment Management Standards.

J. Ground Water Quality Limits

The Ground Water Quality Standards, (chapter 173-200 WAC), protect beneficial uses of ground water. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

Agrium US Inc. does not discharge wastewater to ground and therefore we imposed no permit limits to protect ground water.

K. Comparison of Effluent Limits With Limits of the Previous Permit Issued on July 10, 2003.

Table 8 Comparison of Effluent Limits

	Basis of Limit	Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
Parameter		Average Monthly	Maximum Daily	Average Monthly	Maximum Daily

	Basis of Limit	Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
Parameter		**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Ammonia	Technology	108 Lbs/day	341 Lbs/day	295 Lbs/day	716 Lbs/day
Nitrates	Technology	206 Lbs/day	610 Lbs/day	535 Lbs/day	1,171 Lbs/day
pH	Technology	6.0 – 9.0		6.0 – 9.0	

IV. MONITORING REQUIREMENTS

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

A. Lab Accreditation

Ecology requires that all monitoring data (with the exception of certain parameters) must be prepared by a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* Ecology accredited the laboratory at this facility for ammonia, WET testing, and nitrates. The Permittee performs pH without certification.

V. OTHER PERMIT CONDITIONS

A. Reporting and Recordkeeping

Ecology based permit condition S3 on our authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

B. Non Routine and Unanticipated Discharges

Occasionally, this facility may generate wastewater which was not characterized in the permit application because it is not a routine discharge and was not anticipated at the time of application. These wastes typically consist of waters used to pressure-test storage tanks or fire water systems or of leaks from drinking water systems. These generally clean waste waters may be contaminated with pollutants.

The permit authorizes non-routine and unanticipated discharges under certain conditions. The facility must characterize these waste waters for pollutants and examine the opportunities for reuse. Depending on the nature and extent of pollutants in this wastewater and on any opportunities for reuse, Ecology may:

- authorize the facility to discharge the water directly via the process wastewater outfall or through a stormwater outfall for clean water.
- require the facility to treat the wastewater.
- require the facility to reuse the wastewater.

C. Spill Plan

This facility stores a quantity of chemicals on-site that have the potential to cause water pollution if accidentally released. Ecology can require a facility to develop best management plans to prevent this accidental release [section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080].

The proposed permit requires this facility to update and implement the plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs.

D. Solid Waste Plan

Agrium US Inc. could cause pollution of the waters of the state through inappropriate disposal of solid waste or through the release of leachate from solid waste.

This proposed permit requires this facility to update the approved solid waste plan designed to prevent solid waste from causing pollution of waters of the state. The updated plan must be submitted to Ecology for approval (RCW 90.48.080).

E. Outfall Evaluation

Ecology requires Agrium US Inc. to conduct an outfall inspection and submit a report detailing the findings of that inspection (proposed Permit Condition S. 11). The facility must inspect its discharge pipe and diffusers to determine their physical condition, and to evaluate the extent of sediment accumulations in the vicinity of the outfall.

F. General Conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual industrial NPDES permits issued by Ecology.

G. Stormwater Discharge

The proposed permit includes stormwater requirements in Special Conditions S12 and S13 specific to the Agrium US, Inc. facility. Agrium is currently covered by the Industrial Stormwater General Permit for Outfall 002. Once this proposed permit is effective, the Permittee will need to submit a Notice of Termination form to Ecology to terminate coverage under the Industrial Stormwater General Permit. The permittee can find the form at the following website: http://www.ecy.wa.gov/biblio/ecy02086.html

The provisions of CFR 418 subpart D apply to discharges resulting from the manufacture of ammonium nitrate. Discharges attributable to precipitation runoff from outside the battery limits of the ammonium nitrate manufacturing operations are excluded. The categorical limits include no provisions for stormwater. Ecology only included monitoring requirements for nitrates in the proposed permit stormwater condition.

VI. PERMIT ISSUANCE PROCEDURES

A. Permit Modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for ground waters, after obtaining new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed Permit Issuance

This proposed permit includes all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the State of Washington. Ecology proposes to issue this permit for a term of 5 years.

VII. REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

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1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

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1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to reissue a permit to Agrium US Inc. The permit prescribes operating conditions and wastewater discharge limits. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology will place a Public Notice on December 20, 2007 in Tricity Herald to inform the public and to invite comment on the proposed reissuance of this National Pollutant Discharge Elimination System permit as drafted.

The Notice –

- tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the closest Regional or Field Office, posted on our website.).
- offers to provide the documents in an alternate format to accommodate special needs.
- asks people to tell us how well the proposed permit would protect the receiving water.
- invites people to suggest fairer conditions, limits, and requirements for the permit.
- invites comments on Ecology's determination of compliance with antidegradation rules.
- urges people to submit their comments, in writing, before the end of the Comment Period
- tells how to request a public hearing of comments about the proposed NPDES Permit.
- explains the next step(s) in the permitting process.

Ecology has published a document entitled **Frequently Asked Questions about Effective Public Commenting** which is available on our website at http://www.ecy.wa.gov/biblio/0307023.html.

You may obtain further information from Ecology by telephone, Don Nelson at 360-407-6940 or by writing to the permit writer at the address listed below.

Don Nelson
Department of Ecology
Industrial Section
Solid Waste and Financial Assistance
PO Box 47600
Olympia, WA 98504-7600

The primary author of this permit and fact sheet is Don Nelson.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The average of the measured values obtained over a calendar month's time.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor (DF)--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Responsible Corporate Officer-- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to receiving waters may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into receiving waters.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on Ecology's homepage at http://www.ecy.wa.gov.

APPENDIX D--RESPONSE TO COMMENTS

Comment 1

Under section "S2. Monitoring" the flow monitoring location is listed as between manholes 8 and 9 on the effluent pipeline. We have significantly reduced our effluent flow over recent years and during lower flow we do not have full pipe flow in the effluent line. This causes the metering to be inaccurate. During these periods of low flow we propose to use the inflow metering as a substitute. Below is a suggested footnote to section S2.

During periods of low process water flow the effluent pipe is not full and cannot be metered correctly. During periods of low effluent flow the influent flow can be used as a substitute measurement.

Response

We agree and the permit has been changed.

Comment 2

Under section "S3. Reporting and Recordkeeping Requirements" the monthly and quarterly reporting of process waters and stormwaters is discussed. Below is a suggested revision that may clarify that process waters are reported monthly on the DMR and that stormwater nitrate is incorporated with process waters and reported monthly. The remaining stormwater parameters are reported quarterly on the stormwater DMR format.

A. Reporting
The first monitoring period begins on the effective date of the permit. Monitoring results must be submitted monthly for all process waters with stormwater nitrate included in the summary on the monthly discharge monitoring report (DMR). Other stormwater parameters are reported quarterly on the stormwater DMR forms.

Monitoring results obtained during the reporting period must be reported on the forms as provided, or otherwise approved, by Ecology and be postmarked or received no later than the 15th day of the month following the completed monitoring period, unless otherwise specified in this permit.

Response
We agree and the permit has been changed.