

APPROVAL

PROVINCE OF ALBERTA

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT R.S.A. 2000, c.E-12, as amended.

APPROVAL NO. 249118-00-00

APPLICATION NO. 001-249118

EFFECTIVE DATE: April 21, 2009

EXPIRY DATE: April 1, 2019

APPROVAL HOLDER: Enerkem Greenfield Alberta Biofuels G.P. Inc.

ACTIVITY: **CONSTRUCTION, OPERATION AND RECLAMATION OF THE**

Edmonton Chemical (Biofuel) Manufacturing Plant

IS SUBJECT TO THE ATTACHED TERMS AND CONDITIONS.

A/for Designated Director under the Act *Anit Banerjee.*

Date Signed April 21, 2009

TERMS AND CONDITIONS ATTACHED TO APPROVAL

PART 1: DEFINITIONS

SECTION 1.1: DEFINITIONS

- 1.1.1 All definitions from the Act and the regulations apply except where expressly defined in this approval.
- 1.1.2 In all PARTS of this approval:
- (a) "Act" means the *Environmental Protection and Enhancement Act*, R.S.A. 2000, c.E-12, as amended;
 - (b) "application" means the written submissions to the Director in respect of application number 001-249118 and any subsequent applications for amendments of approval number 249118-00-00;
 - (c) "chemical" means any substance that is added or used as part of the treatment process;
 - (d) "commencing operation" means to start up the plant, process unit or equipment for the first time with the introduction of feed material, electrical or thermal energy and the simultaneous production of products for which the plant, process unit or equipment was designed excluding predetermined period of commissioning or testing;
 - (e) "container" means any portable device in which a substance is kept, including but not limited to drums, barrels and pails which have a capacity greater than 18 litres but less than 210 litres;
 - (f) "day" means any sampling period of 24 consecutive hours unless otherwise specified;
 - (g) "decommissioning" means the dismantling and decontamination of a plant undertaken subsequent to the termination or abandonment of any activity or any part of any activity regulated under the Act;
 - (h) "decontamination" means the treatment or removal of substances from the plant and affected lands;
 - (i) "Director" means an employee of the Government of Alberta designated as a Director under the Act;

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- (j) "dismantling" means the removal of buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, railways, roadways, pipelines and any other installations that are being or have been used or held for or in connection with the plant;
- (k) "fugitive emissions" means emissions of substances to the atmosphere other than ozone depleting substances, originating from a plant source other than a flue, vent, or stack but does not include sources which may occur due to breaks or ruptures in process equipment;
- (l) "Fugitive VOC Emissions Code" means the Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions from Equipment Leaks, CCME-EPC-73E, as amended;
- (m) "ISO 17025" means the international standard, developed and published by International Organization for Standardization (ISO), specifying management and technical requirements for laboratories;
- (n) "incompatible wastes" means substances which when mixed can produce effects which are harmful to human health or the environment such as heat, pressure, fire, explosion, violent reaction, toxic dusts, mists, fumes or gases, or flammable fumes or gases, and include those substances listed in Appendix 5 of the *Guidelines for Industrial Landfills*, Alberta Environment, June 1987, as amended;
- (o) "industrial runoff" means precipitation that falls on or traverses the plant developed area;
- (p) "industrial runoff control system" means the parts of the plant that collect, store or treat industrial runoff from the plant;
- (q) "industrial wastewater" means the composite of liquid wastes and water-carried wastes, any portion of which results from any industrial process carried on at the plant;
- (r) "industrial wastewater control system" means the parts of the plant that collect, store or treat industrial wastewater;
- (s) "Integrated Groundwater Monitoring Program" means the groundwater monitoring program for the City of Edmonton Waste Management Centre described in *City of Edmonton, Hydrogeological Assessment and Integrated Groundwater Monitoring Plan, Edmonton Waste Management Centre (Clover Bar)*, prepared by UMA Engineering Ltd., dated February 2003, as amended;

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- (t) "local environmental authority" means the Department of Environment, in the Province of Alberta, or the agency that has the equivalent responsibilities for any jurisdiction outside the Province;
- (u) "manual stack survey" means a survey conducted in accordance with the *Alberta Stack Sampling Code*, Alberta Environment, 1995, as amended;
- (v) "month" means calendar month;
- (w) "plant" means all buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, roadways, pipelines and other installations, and includes the land, located on the Northwest Quarter of Section 21, Township 53, Range 23, West of the 4th Meridian, or Site #420, 13111 Meridian Street NE in the City of Edmonton, that is being or has been used or held for or in connection with the Edmonton Chemical (Biofuel) Manufacturing plant;
- (x) "plant developed area" means the areas of the plant used for the storage, treatment, processing, transport, or handling of raw material, intermediate product, by-product, finished product, process chemicals, or waste material;
- (y) "QA/QC" means quality assurance and quality control;
- (z) "soil" means mineral or organic earthen materials that can, have, or are being altered by weathering, biological processes, or human activity;
- (aa) "suitable quality" means topsoil having a good, fair or poor rating as described in the *Soil Quality Criteria Relative to Disturbance and Reclamation*, Alberta Agriculture March, 1987, as amended;
- (bb) "tank" means a stationary device, designed to contain an accumulation of a substance, which is constructed primarily of non-earthen materials that provide structural support including wood, concrete, steel, and plastic;
- (cc) "topsoil" means the uppermost layer of suitable quality soil, containing organic matter, ordinarily moved in tillage or its equivalent in uncultivated soils;
- (dd) "waste storage areas" means the areas designated for waste container storage and/or waste tank storage as described in the application;
- (ee) "week" means any consecutive 7-day period unless otherwise specified; and
- (ff) "year" means calendar year.

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PART 2: GENERAL

SECTION 2.1: GENERAL

- 2.1.1 The approval holder shall immediately report to the Director by telephone any contravention of the terms and conditions of this approval at 1-780-422-4505.
- 2.1.2 The approval holder shall submit a written report to the Director within 7 days of the reporting pursuant to 2.1.1.
- 2.1.3 The terms and conditions of this approval are severable. If any term or condition of this approval or the application of any term or condition is held invalid, the application of such term or condition to other circumstances and the remainder of this approval shall not be affected thereby.
- 2.1.4 The approval holder shall immediately notify the Director in writing if any of the following events occurs:
- (a) the approval holder is served with a petition into bankruptcy;
 - (b) the approval holder files an assignment in bankruptcy or Notice of Intent to make a proposal;
 - (c) a receiver or receiver-manager is appointed;
 - (d) an application for protection from creditors is filed for the benefit of the approval holder under any creditor protection legislation; or
 - (e) any of the assets which are the subject matter of this approval are seized for any reason.
- 2.1.5 If the approval holder monitors for any substances or parameters which are the subject of operational limits as set out in this approval more frequently than is required and using procedures authorized in this approval, then the approval holder shall provide the results of such monitoring as an addendum to the reports required by this approval.
- 2.1.6 All abbreviations used in this approval follow those given in *Standard Methods for the Examination of Water and Wastewater* published jointly by the American Public Health Association, the American Water Works Association, and the Water Environment Federation, 1998, as amended, unless otherwise specified in this approval.

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SECTION 2.2: RECORD KEEPING

- 2.2.1 The approval holder shall record and retain all the following information in respect of any sampling conducted or analyses performed in accordance with this approval for a minimum of ten years, unless otherwise authorized in writing by the Director:
- (a) the place, date and time of sampling;
 - (b) the dates the analyses were performed;
 - (c) the analytical techniques, methods or procedures used in the analyses;
 - (d) the names of the persons who collected and analyzed each sample; and
 - (e) the results of the analyses.

SECTION 2.3: ANALYTICAL REQUIREMENTS

- 2.3.1 With respect to any sample required to be taken pursuant to this approval, the approval holder shall ensure that:
- (a) collection;
 - (b) preservation;
 - (c) storage;
 - (d) handling; and
 - (e) analysis;

shall be conducted in accordance with the following unless otherwise authorized in writing by the Director:

- (i) for air monitoring;
 - (A) the *Alberta Stack Sampling Code, Alberta Environment, 1995*, as amended;
 - (B) the *Methods Manual for Chemical Analysis of Atmospheric Pollutants*, Alberta Environment, 1993, as amended;
 - (C) the *Air Monitoring Directive*, Alberta Environment, 1989, as amended; and

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- (D) the *CEMS Code*;
- (ii) for industrial wastewater, industrial runoff, groundwater and domestic wastewater parameters:
 - (A) the *Standard Methods for the Examination of Water and Wastewater*, published jointly by the American Public Health Association, American Water Works Association, and the Water Environment Federation, 1998, as amended;
- (iii) for soil samples:
 - (A) *Soil Sampling and Methods of Analysis*, Lewis Publishers, 1993, as amended;
 - (B) the *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, USEPA, SW-846; September 1986, as amended;
 - (C) the *Soil Quality Criteria Relative to Disturbance and Reclamation*, Alberta Agriculture, March 1987, as amended;
 - (D) the *Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites – Volume I: Main Report*, CCME EPC-NCS62E, 1993, as amended; and
 - (E) the *Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites – Volume II: Analytical Method Summaries*, CCME EPC-NCS66E, 1993, as amended;
- (iv) for waste analysis:
 - (A) the *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, USEPA, SW-846, September 1986, as amended; or
 - (B) the *Methods Manual for Chemical Analysis of Water and Wastes*, Alberta Environmental Centre, Vegreville, Alberta, 1996, AECV96-M1 as amended; or
 - (C) the *Toxicity Characteristic Leaching Procedure (TCLP)* USEPA Regulation 40 CFR261, Appendix II, Method No. 1311, as amended; or

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- (D) the *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, American Water Works Association, and the Water Environment Federation, as amended.
- 2.3.2 The approval holder shall analyze all samples that are required to be obtained by this approval in a laboratory accredited pursuant to ISO 17025, as amended, for the specific parameter(s) to be analyzed, unless otherwise authorized in writing by the Director.
- 2.3.3 The approval holder shall comply with the terms and conditions of any written authorization issued by the Director under 2.3.2.

SECTION 2.4: OTHER

- 2.4.1 All tanks shall conform to the *Guideline for Secondary Containment for Above Ground Storage Tanks*, Alberta Environment, 1997, as amended, unless otherwise authorized in writing by the Director.
- 2.4.2 All aboveground storage tanks containing liquid hydrocarbons or organic compounds shall conform to the *Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks*, CCME-EPC-87-E, as amended.

PART 3: CONSTRUCTION

SECTION 3.1: GENERAL

- 3.1.1 If construction of the Edmonton Chemical (Biofuel) Manufacturing Plant as described in application 001-249118 has not commenced by December 31, 2010, the approval holder shall apply for an amendment to this approval unless otherwise authorized in writing by the Director.
- 3.1.2 The approval holder shall notify the Director in writing at least 14 days before commencing operations at the plant.
- 3.1.3 The approval holder shall control dusting levels during construction to the lowest practicable level through the use of best construction practices, such as road and surface watering, when required.
- 3.1.4 Tanks shall be equipped, at a minimum, with all of the following:
 - (a) sensors for detecting the level in each tank;
 - (b) high level alarms that activate when a tank overfill is imminent;

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- (c) automatic shut-off devices or sufficient freeboard space above the high level sensor to allow operators time to prevent overflow from occurring; and
- (d) earthen dikes or equivalent secondary containment structures capable of containing 110% of the volume of the largest tank within the bermed area plus 10% of the aggregate capacity of all other tanks in the bermed area.

3.1.5 The approval holder shall construct the Edmonton Chemical (Biofuel) Manufacturing Plant as described in the application and shall include, at a minimum, all of the following major unit operations, unless otherwise authorized in writing by the Director:

- (a) gasifier feed system;
- (b) gasification;
- (c) gas conditioning (syngas treatment);
- (d) effluent treatment;
- (e) steam generation and power island;
- (f) waste heat recovery;
- (g) alcohol production;
- (h) air separation; and
- (i) associated equipment.

SECTION 3.2: AIR

3.2.1 The approval holder shall construct all stacks according to the following height requirements as prescribed in TABLE 3.2-A.

TABLE 3.2-A: STACK HEIGHTS

STACK	MINIMUM HEIGHT ABOVE GRADE (metres)
Waste Heat Recovery Unit Stack	12
Boiler Stack	7
Gasifier (CO ₂) Vent Stack	7

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- 3.2.2 The approval holder shall construct all heaters and boilers to meet the emission requirements as prescribed in the *National Emission Guideline for Commercial/Industrial Boilers and Heaters*, CCME-PN 1286, as amended.
- 3.2.3 The approval holder shall submit a Carbon Capture Proposal to the Director at least six months prior to commencing construction of any carbon capture facilities at the Edmonton Chemical (Biofuel) Manufacturing Plant.
- 3.2.4 The Carbon Capture Proposal referred to in Subsection 3.2.3 shall include, at a minimum, all of the following information:
- (a) design details and specifications of the carbon capture facilities;
 - (b) detailed description of how carbon capture affects other plant processing units and emission sources;
 - (c) details regarding construction requirements, a proposed construction schedule and a proposed implementation schedule;
 - (d) description of how the plant and the carbon capture facilities will be operated under all operating scenarios; and
 - (e) any other information requested in writing by the Director.
- 3.2.5 The approval holder shall implement the Carbon Capture Proposal as authorized in writing by the Director or by an amendment to this approval.
- 3.2.6 The approval holder shall notify the Director in writing at least 14 days before commencing carbon capture operations at the plant.

MONITORING EQUIPMENT

- 3.2.7 All air monitoring sampling facilities shall, at a minimum, be:
- (a) installed;
 - (b) operated; and
 - (c) maintained;
- to comply with:
- (i) the *Alberta Stack Sampling Code*, Alberta Environment, 1995, as amended;

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- (ii) the *CEMS Code*; and
- (iii) the *Air Monitoring Directive*, Alberta Environment, 1989, as amended.

POLLUTION ABATEMENT EQUIPMENT

- 3.2.8 The approval holder shall install, at a minimum, all of the following pollution abatement equipment:
- (a) two cyclones, operated in parallel, for particulate removal from the syngas leaving the gasifier;
 - (b) a two-stage wet scrubber system on the gas conditioning phase of the operations;
 - (c) a Waste Heat Recovery Unit, equipped with an auxiliary burner fired by natural gas;
 - (d) a baghouse system for particulate control when transporting char resulting from operations to bulk storage;
 - (e) low NO_x burner on the boiler, in accordance with the *National Emission Guideline for Commercial/Industrial Boilers and Heaters*, CCME-PN 1286, as amended;
 - (f) tank vapor control system to control fugitive emissions from above ground storage tanks; and
 - (g) any other equipment designed to minimize emissions to the atmosphere,
- as described in the application.

SECTION 3.3: INDUSTRIAL WASTEWATER

- 3.3.1 The approval holder shall construct the Industrial Wastewater Control System as described in the application.

PART 4: OPERATIONS, LIMITS, MONITORING AND REPORTING

SECTION 4.1: AIR

OPERATIONS

- 4.1.1 The approval holder shall not release any effluent streams to the atmosphere except as provided in this approval.

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- 4.1.2 The approval holder shall only release effluent streams to the atmosphere from the following sources:
- (a) the Waste Heat Recovery Unit stack;
 - (b) the boiler stack;
 - (c) the Gasifier (CO₂) Vent Stack; and
 - (d) any other source authorized in writing by the Director or by an amendment to this approval.
- 4.1.3 In addition to the limits specified in 4.1.12, the approval holder shall not operate the process equipment unless and until the pollution abatement equipment associated with the process equipment is operating.
- 4.1.4 Except as provided for by the Director in writing, the approval holder shall control fugitive emissions and any source not specified in 4.1.2 in accordance with 4.1.5 of this approval.
- 4.1.5 With respect to fugitive emissions and any source not specified in 4.1.2, the approval holder shall not release a substance or cause to be released a substance that causes or may cause any of the following:
- (a) impairment, degradation or alteration of the quality of natural resources; or
 - (b) material discomfort, harm or adverse affect to the well being or health of a person; or
 - (c) harm to property or to plant or animal life.
- 4.1.6 The approval holder shall not burn any debris by means of an open fire unless authorized in writing by the Director.
- 4.1.7 The approval holder shall submit a Fugitive Emissions Leak Detection and Correction Program to the Director by December 31, 2011.
- 4.1.8 The Fugitive Emissions Leak Detection and Correction Program shall include the periodic inspection and repair of any equipment found to be leaking, and shall be consistent with the Fugitive VOC Emissions Code.
- 4.1.9 The approval holder shall implement the Fugitive Emissions Leak Detection and Correction Program as authorized in writing by the Director.

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4.1.10 The approval holder shall ensure the combustion of all combustible gases released to the Waste Heat Recovery Unit.

4.1.11 All dust from the cyclones and baghouse systems shall be:

- (a) collected;
- (b) stored;
- (c) transported; and
- (d) disposed of,

in a manner which prevents release back to the atmosphere.

AIR LIMITS

4.1.12 Releases of the following substances to the atmosphere shall not exceed the limits specified in TABLE 4.1-A.

TABLE 4.1-A: LIMITS

EMISSION SOURCE	SUBSTANCE	LIMIT
Waste Heat Recovery Unit Stack	Oxides of Nitrogen (expressed as Nitrogen Dioxide)	10 kg/hr
	Sulphur Dioxide	1.3 kg/hr
Boiler Stack	Oxides of Nitrogen (expressed as Nitrogen Dioxide)	0.9 kg/hr
All baghouse and dust collection systems	Particulate Matter	0.20 g/kg

MONITORING AND REPORTING

4.1.13 The sampling required by 4.1.14 shall, at a minimum, comply with

- (a) the *Alberta Stack Sampling Code*, Alberta Environment, 1995 as amended;
- (b) the *CEMS Code*; and

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(c) the *Air Monitoring Directive*, Alberta Environment, 1989, as amended.

4.1.14 The approval holder shall monitor the following emission sources as specified in TABLE 4.1-B.

4.1.15 The approval holder shall report to the Director the results of the emission source monitoring as required in TABLE 4.1-B.

TABLE 4.1-B: AIR EMISSION SOURCE MONITORING AND REPORTING

EMISSION SOURCE	PARAMETER	FREQUENCY	METHOD OF MONITORING	METHOD OF ANALYSIS	REPORTING	
					MONTHLY	REPORT TO
Waste Heat Recovery Unit Stack	Oxides of Nitrogen (expressed as NO ₂), SO ₂ , PM, HCl	Once per year	Manual Stack Survey	Alberta Stack Sampling Code	End of the month following the month in which the information was collected	Director
Boiler Stack	Oxides of Nitrogen (expressed as NO ₂)	Initial verification test within 6 months following commencing operations				

4.1.16 In addition to 4.1.14, the approval holder shall conduct a one-time commissioning manual stack survey as required in Table 4.1-C, unless otherwise authorized in writing by the Director.

TABLE 4.1-C: COMMISSIONING MANUAL STACK SURVEY

EMISSION SOURCE	PARAMETER	FREQUENCY	METHOD OF MONITORING	METHOD OF ANALYSIS	REPORTING
Waste Heat Recovery Unit Stack	<ul style="list-style-type: none"> • Oxides of Nitrogen (expressed as NO₂) • SO₂ • PM • HCl • dioxins/furans • H₂S • CO • THCs • HF • NH₃ • metals (Hg, Pb, Cd, As, Cr, Mn, and Ni) 	One-time event to be completed within 90 days following commencing operations	Manual Stack Survey	Alberta Stack Sampling Code	To be submitted to the Director by the end of the month following the month in which the information was collected

4.1.17 The approval holder shall notify the Director in writing a minimum of two weeks prior to any manual stack survey that is required to be conducted by this approval.

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REGIONAL INITIATIVES

- 4.1.18 The approval holder shall prepare and submit an Air Emission Reduction Study following the outcomes outlined by the Industrial Heartland Cumulative Effects Air Management Program or other programs that are developed by Alberta Environment under the Industrial Heartland Cumulative Effects Project, when notified in writing by the Director.
- 4.1.19 The study referred to in subsection 4.1.18 shall include the following information:
- (a) identify how the approval holder will meet the requirements outlined by the Industrial Heartland Cumulative Effects Air Management Program, or other programs that are developed by Alberta Environment under the Industrial Heartland Cumulative Effects Project, using the most technically feasible and cost-effective reduction options;
 - (b) provide a detailed explanation of how cost effectiveness was determined;
 - (c) provide an estimate of the timeframe that will be required to implement each emission reduction option if it were required; and
 - (d) any other information requested in writing by the Director.
- 4.1.20 The approval holder shall implement the Air Emission Reduction Study as authorized in writing by the Director or by an amendment to this approval.

SECTION 4.2: INDUSTRIAL WASTEWATER AND INDUSTRIAL RUNOFF

OPERATIONS

- 4.2.1 The approval holder shall not release any substances from the plant to the surrounding watershed except as authorized by this approval.
- 4.2.2 Industrial wastewater shall be managed as described in the application, unless otherwise authorized in writing by the Director.
- 4.2.3 The approval holder shall direct all industrial wastewater to the Industrial Wastewater Control System.
- 4.2.4 The approval holder shall only release industrial wastewater from the Industrial Wastewater Control System:
- (a) to the City of Edmonton in accordance with the terms and conditions of the City of Edmonton and provided permission from the City of Edmonton has first been obtained;

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- (b) for use within the plant; or
 - (c) by means of a method authorized in writing by the Director.
- 4.2.5 All industrial runoff from the plant developed area shall be directed to the Industrial Runoff Control System.
- 4.2.6 The approval holder shall only release industrial runoff from the Industrial Runoff Control System:
- (a) to the City of Edmonton in accordance with the terms and conditions of the City of Edmonton and provided permission from the City of Edmonton has first been obtained;
 - (b) for use within the plant; or
 - (c) by means of a method authorized in writing by the Director.

REGIONAL INITIATIVES

- 4.2.7 The approval holder shall prepare and submit an Industrial Wastewater Management Study following the outcomes outlined by Alberta Environment's Water Management Framework for the Industrial Heartland and Capital Region or other programs that are developed by Alberta Environment under the Industrial Heartland Cumulative Effects Project, when notified in writing by the Director.
- 4.2.8 The study referred to in subsection 4.2.7 shall include the following information:
- (a) identify how the approval holder will meet the requirements outlined by Alberta Environment's Water Management Framework for the Industrial Heartland and Capital Region or other programs that are developed by Alberta Environment under the Industrial Heartland Cumulative Effects Project, using the most technically feasible and cost-effective reduction or upgrade options;
 - (b) provide a detailed explanation of how cost effectiveness was determined;
 - (c) provide an estimate of the timeframe that will be required to implement each reduction or upgrade option if it were required; and
 - (d) any other information requested in writing by the Director.
- 4.2.9 The approval holder shall implement the Industrial Wastewater Management Study as authorized in writing by the Director or by an amendment to this approval.

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SECTION 4.3: WASTE MANAGEMENT

OPERATIONS

- 4.3.1 The approval holder shall not receive or dispose of the following wastes:
- (a) explosives (Class 1 Transportation of Dangerous Goods Regulation (TDGR) wastes);
 - (b) radioactive wastes regulated under the Canadian Nuclear Safety Act (Canada);
 - (c) radioactive wastes (Class 7 TDGR wastes); and
 - (d) biological wastes and pathological wastes.
- 4.3.2 Hazardous waste or hazardous recyclables stored in containers or tanks shall be stored in accordance with the *Hazardous Waste Storage Guidelines*, June 1988, Alberta Environment, as amended.
- 4.3.3 All containers and unrinsed empty containers shall be stored in the waste storage area.
- 4.3.4 All waste that is unloaded shall be immediately transferred to the waste storage area.
- 4.3.5 Wastes shall be transferred only at designated transfer areas designed to contain spills and leaks.
- 4.3.6 The approval holder shall provide and maintain an adequate aisle space between containers in the waste storage area to allow inspection, unobstructed movement of personnel, fire protection equipment, spill control equipment and decontamination equipment to any area of the waste storage area. Inspection aisles shall be arranged such that each container is exposed to view from at least one side.
- 4.3.7 The approval holder shall dispose of waste generated at the plant only to facilities holding a current Approval, Registration or as otherwise authorized under the Act, or to facilities approved by a local environmental authority outside of Alberta.
- 4.3.8 Incompatible wastes shall be prevented from mixing by a dyke, berm, wall or other appropriate barrier.

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SECTION 4.4: DOMESTIC WASTEWATER

OPERATIONS

- 4.4.1 The approval holder shall not release any substances from the domestic wastewater system to the surrounding watershed except as authorized by this approval.
- 4.4.2 The approval holder shall direct all domestic wastewater from the plant to the on-site tank for storage of domestic wastewater.
- 4.4.3 The approval holder shall direct all domestic wastewater from the on-site tank for storage of domestic wastewater to the City of Edmonton in accordance with the terms and conditions of the City of Edmonton and provided permission from the City of Edmonton has first been obtained.

SECTION 4.5: WATERWORKS

- 4.5.1 The approval holder shall obtain all drinking water from an approved potable water facility or from a bottled water supply company.

SECTION 4.6: GROUNDWATER

- 4.6.1 The approval holder shall develop a proposal for a Groundwater Monitoring Program for the plant which shall include, at a minimum, all of the following:
- (a) a hydrogeologic description and interpretation of the plant;
 - (b) a map and description of surface water drainage patterns for the plant;
 - (c) a lithologic description and maps, including cross-sections, of the surficial and the upper bedrock geologic materials at the plant;
 - (d) maps showing depth to water table, patterns of groundwater movement and hydraulic gradients at the plant;
 - (e) the hydraulic conductivity of all surficial and bedrock materials at the plant;
 - (f) a map showing the location of existing and additional proposed groundwater monitor wells at the plant;
 - (g) lithologs of all boreholes drilled at the plant;
 - (h) construction details of existing groundwater monitor wells;

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- (i) a rationale for proposed groundwater monitor well locations and proposed completion depths of those wells;
 - (j) a description of groundwater monitor well development protocols;
 - (k) a list of parameters to be monitored and the monitoring frequency for each groundwater monitor well or group of groundwater monitor wells at the plant;
 - (l) a description of the groundwater sampling and analytical QA/QC procedures;
 - (m) details of a groundwater response plan specifying actions to be taken should contaminants be identified through the Groundwater Monitoring Program;
 - (n) a plan for aligning with the Integrated Groundwater Monitoring Program for the City of Edmonton Waste Management Facility, as amended; and
 - (o) any other information relevant to groundwater quality at the plant.
- 4.6.2 The approval holder shall submit two copies of the proposal for the Groundwater Monitoring Program to the Director on or before October 31, 2009.
- 4.6.3 If the Groundwater Monitoring Program proposal is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director within 120 days of the deficiency letter.
- 4.6.4 The approval holder shall implement the Groundwater Monitoring Program for the plant as authorized in writing by the Director.
- 4.6.5 The samples extracted from the groundwater monitor wells shall be collected using scientifically acceptable purging, sampling and preservation procedures so that a representative groundwater sample is obtained.
- 4.6.6 All groundwater monitor wells shall be:
- (a) protected from damage; and
 - (b) locked except when being sampled; unless otherwise authorized in writing by the Director.
- 4.6.7 If a representative groundwater sample cannot be collected because the groundwater monitor well is damaged or is no longer capable of producing a representative groundwater sample:
- (a) the groundwater monitor well shall be cleaned, repaired or replaced; and

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- (b) a representative groundwater sample shall be collected and analyzed prior to the next scheduled sampling event; unless otherwise authorized in writing by the Director.

4.6.8 In addition to the sampling information recorded in 2.2.1, the approval holder shall record the following sampling information for all groundwater samples collected:

- (a) a description of purging and sampling procedures;
- (b) the static elevations, above sea level, of fluid phases in the groundwater monitor well prior to purging;
- (c) the temperature of each sample at the time of sampling;
- (d) the pH of each sample at the time of sampling; and
- (e) the specific conductance of each sample at the time of sampling.

4.6.9 The approval holder shall compile an Annual Groundwater Monitoring Program Summary Report which shall include, at a minimum, all of the following information:

- (a) a legal description of the plant and a map illustrating the plant boundaries;
- (b) a topographic map of the plant;
- (c) a description of the industrial activity and processes;
- (d) a map showing the location of all surface and groundwater users, and, a listing describing surface water and water well use details, within at least a three kilometre radius of the plant;
- (e) a general hydrogeological characterization of the region within a five kilometre radius of the plant;
- (f) a detailed hydrogeological characterization of the plant;
- (g) a geological cross-section(s) of the plant;
- (h) a map of surface drainage patterns located within the plant;
- (i) a map of groundwater monitor well locations and a description of the existing groundwater monitoring program for the plant;
- (j) a summary of any changes to the groundwater monitoring program made since the last groundwater monitoring report;

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- (k) analytical data recorded as required in 4.6.4 and 4.6.8;
- (l) a summary of fluid elevations recorded as required in 4.6.8(b) and an interpretation of changes in fluid elevations;
- (m) an interpretation of groundwater flow patterns;
- (n) an interpretation of the analytical results including the following:
 - (i) diagrams indicating the location of any contamination identified;
 - (ii) probable sources of contamination; and
 - (iii) the extent of contamination identified;
- (o) a summary and interpretation of the data collected since the groundwater monitoring program began including:
 - (i) control charts which indicate trends in contaminant concentrations; and
 - (ii) the migration of contaminants;
- (p) a description of the following:
 - (i) contaminated groundwater remediation techniques employed;
 - (ii) source elimination measures employed;
 - (iii) risk assessment studies undertaken; and
 - (iv) risk management studies undertaken;
- (q) a sampling schedule for the following year;
- (r) recommendations, as follows:
 - (i) for changes to the groundwater monitoring program to make it more effective; and
 - (ii) for remediation, risk assessment or risk management of contamination identified.

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- 4.6.10 Commencing in the year 2011, the approval holder shall submit one paper and one electronic copy of the Annual Groundwater Monitoring Summary Report to the Director on or before May 15 of the year following the year in which the information on which the report is based was collected, unless otherwise authorized in writing by the Director.

SECTION 4.7: SOIL

MONITORING

- 4.7.1 The approval holder shall develop and document proposals for the Soil Monitoring Program in accordance with the *Soil Monitoring Directive*, Alberta Environment, May 1996, as amended.
- 4.7.2 The approval holder shall submit a Soil Monitoring Program proposal to the Director no later than April 30, 2014, unless otherwise authorized in writing by the Director.
- 4.7.3 If the Soil Monitoring Program proposal is found deficient by the Director, the approval holder shall correct all the deficiencies as outlined by the Director within 120 days of the deficiency letter.
- 4.7.4 The approval holder shall implement the Soil Monitoring Program proposal as authorized in writing by the Director.
- 4.7.5 The approval holder shall implement QA/QC provisions in accordance with the *CCME Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume I*, Report CCME EPC-NCS62E, Winnipeg, Manitoba, December 1993, as amended.

STANDARDS

- 4.7.6 For the purpose of soil monitoring reports, the approval holder shall compare the concentration of substances in soil to the corresponding concentrations set out in or derived from the following:
- (a) *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*, Alberta Environment, June 2007, as amended; or
 - (b) *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*, Alberta Environment, June 2007, as amended.

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REPORTING

- 4.7.7 The approval holder shall submit two copies of the Soil Monitoring Program Report to the Director, summarizing the data obtained from the soil monitoring referred to in 4.7.4, no later than April 30, 2015, unless otherwise authorized in writing by the Director.
- 4.7.8 The Soil Monitoring Program Report shall be as prescribed in the reporting requirements of the *Soil Monitoring Directive*, May 1996, as amended.

SOIL MANAGEMENT PROGRAM

- 4.7.9 If the Soil Monitoring Program, or any other soil monitoring, reveals that there are substances present in the soil at concentrations greater than the applicable concentrations in 4.7.6, the approval holder shall develop and document a Soil Management Program Proposal in accordance with the *Guideline for Monitoring and Management of Soil Contamination Under EPEA Approvals*, Chemicals Assessment and Management Division, May 1996, as amended, or as otherwise authorized in writing by the Director.
- 4.7.10 If required pursuant to 4.7.9, the approval holder shall submit a Soil Management Program Proposal to the Director within six months after the date that the Soil Monitoring Report referred to in 4.7.7 is due.
- 4.7.11 The Soil Management Program Proposal shall include, at a minimum, all of the following:
- (a) steps to be taken to control sources of contamination;
 - (b) remediation objectives for substances identified by soil monitoring as exceeding the applicable maximum standards in 4.7.6;
 - (c) proposed steps for management of soil contamination; and
 - (d) a schedule for implementing the Soil Management Program.
- 4.7.12 If the Soil Management Program Proposal is found deficient by the Director, the approval holder shall correct all the deficiencies as outlined by the Director by the date specified in the deficiency letter.
- 4.7.13 The approval holder shall implement the Soil Management Program as authorized in writing by the Director.

