APPROVAL

ALBERTA ENERGY REGULATOR

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

94-03-00
APPROVAL NO.: ........................................................................................................................................

077-94
APPLICATION NO.: ....................................................................................................................................

June 12, 2019
EFFECTIVE DATE: ....................................................................................................................................

May 31, 2029
EXPIRY DATE: ........................................................................................................................................

Suncor Energy Inc.
APPROVAL HOLDER: ....................................................................................................................................

ACTIVITY: Construction, operation and reclamation of the

Suncor Energy Inc. Oil Sands Processing Plant and Mine

is subject to the attached terms and conditions.

Hannah LaPlante
Approvals Manager, Authorizations Branch
Alberta Energy Regulator

June 12, 2019
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) "24-hour rolling average" means the arithmetic average of hourly sulphur dioxide emissions from the specified sources (in tonnes) for a consecutive 24-hour period, which is calculated for any hour by adding the sulphur dioxide emissions during that hour to the sulphur dioxide emissions during the previous 23 hours, and dividing the sum by 24;

(b) "365-day rolling average" means the arithmetic average of daily sulphur dioxide emissions from the specified sources (in tonnes) for a consecutive 365-day period, which is calculated for any day by adding the sulphur dioxide emissions during that day to the sulphur dioxide emissions during the previous 364 days, and dividing the sum by 365;

(c) "720-hour rolling average" when referring to emissions, means rolling average of hourly emissions for 720 consecutive hours, using hourly mean emission for each hour and excluding all those hours that have zero emissions;

(d) "Act" means the Environmental Protection and Enhancement Act, R.S.A. 2000, c.E-12, as amended;

(e) "air contaminant" means any solid, liquid or gas or combination of any of them in the atmosphere resulting directly or indirectly from the activities of man;

(f) "application" means, except where the context requires otherwise, the written submissions to the Director in respect of application number 077-94 and any subsequent applications for amendments of approval number 94-03-00;

(g) "BOD5" means the Biochemical Oxygen Demand in milligrams per litre measured at 20°C over a 5 day period;

(h) "buffering capacity" means the ability of tailings material and pore or release water to resist change in pH and remain near neutral conditions;

(i) "CBOD" means the carbonaceous BOD5 in milligrams per litre which is measured after the nitrogenous demand has been inhibited with an inhibitory chemical;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(j) "CEM" means continuous emissions monitor;


(l) "CGA" means Cylinder gas audit as defined in the CEMS Code;

(m) "chemical" means any substance that is added or used as part of the treatment process;

(n) "Clearwater overburden" means overburden typically rated as poor or unsuitable as subsoil, with electrical conductivity greater than 5 dS m\(^{-1}\) and sodium adsorption ratio greater than 8;

(o) "coarse texture" means a textural class coarser than sandy loam;

(p) "commencement of operations" 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 any predetermined period of commissioning or testing;

(q) "composite " means a refrigerated (approximately 4°C) sample consisting of not less than twenty-four portions of equal volume collected sequentially at regular time intervals over a 24 hour period;

(r) "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;

(s) "coversoil" means any of the following:

(i) upland surface soil;

(ii) transitional soil;

(iii) organic horizons; or

(iv) peat-mineral mix;

(t) "day" means any period of 24 consecutive hours unless otherwise specified;

(u) "decommissioning" means the dismantling and decontamination of a plant or any part of a plant undertaken subsequent to the termination or abandonment of any activity or any part of any activity regulated under the Act;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(v) "decontamination" means the treatment or removal of substances from the plant and disturbed lands;

(w) “Dedicated Disposal Area 1 (DDA1)” means a DDA location including DDA1 (East) and DDA1 (8A), where fluid tailings are mixed with a polymer and deposited in thin lifts where water is recycled, and thereafter the resulting tailings deposit, after further drying, is transferred to Mine Dump 9 (MD9);

(x) “Dedicated Disposal Area 3 (DDA3)” means an in-pit dedicated disposal area located in the Millennium pit between SD8 and SD9;

(y) "direct placement" means a combined salvage and placement operation wherein reclamation material is moved directly from the area of salvage to the area of placement;

(z) "Director" means the Alberta Energy Regulator (AER) or the individual authorized by the AER board of directors under section 6(2) of the Responsible Energy Development Act to carry out the powers, duties or functions of the named Director under the Act;

(aa) "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;

(bb) “Dissolved Air Flotation (DAF) Wastewater Treatment Plant (WWTP)” means a Dissolved Air Flotation Wastewater Treatment Plant consisting of pond C wastewater intake pump station, chemical coagulation and pipeline flocculation, dissolved air flotation units, disposal of DAF float waste and discharge of treated pond C/DAF effluent as described in the application 059-94;

(cc) "disturbed land" means any land disturbed by the approval holder in any manner in association with the activity which is the subject of this approval;

(dd) "downtime" means the period of time when equipment is not effectively functioning due to breakdown, repair, calibration, servicing, maintenance or replacement of any of its components;

(ee) "East Bank Mine" means that part of the East Bank Plant Site outside of the plant developed area;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(ff) "East Bank Plant Site" means that part of the plant located on the east side of the Athabasca River, which is equivalent to East Bank Development Area (EBDA);

(gg) "ecosite" means an ecological unit that develops under specific environmental influences (climate, moisture and nutrient regime), as defined in Field Guide to Ecosites of Northern Alberta, Beckingham and Archibald, 1996, as amended;

(hh) "ecosite phase" means a subdivision of an ecosite based on the dominant tree species in the canopy, as defined in Field Guide to Ecosites of Northern Alberta, Beckingham and Archibald, 1996, as amended;

(ii) "effluent stream" means any substance in a gaseous medium released by or from the plant;

(jj) "every three months" means once per quarter year with at least 60 days between samples;

(kk) "FGD" means flue gas desulphurization;

(ll) "flaring" means any combustion of sour gases, hydrocarbon gases or any off-specification volatile liquids in a flare that occurs during:

(i) a routine flaring event, which is flaring that is due to:
   (A) normal start-up of any process units,
   (B) normal shutdown of any process units,
   (C) catalyst activation in any process units,
   (D) excess of fuel gas or hydrogen gas, or
   (E) routing to a flare from the U1 steam-out oil/sour water separator (5C-18), the U2 steam-out oil/sour water separator (52C-311), and the plant 7 compressor seals;

(ii) an emergency flaring event, which is flaring that exceeds 20 tonnes per day of sulphur dioxide emissions due to:
   (A) a process upset,
   (B) an equipment malfunction, or
   (C) an unplanned equipment repair, modification, replacement; or
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(iii) a planned major flaring event, which is a non-routine or non-emergency flaring event, that exceeds 20 tonnes per day of sulphur dioxide emissions during the event;

(iv) a planned minor flaring event, which is a non-routine or non-emergency flaring event, that is less than or equal to 20 tonnes per day of sulphur dioxide emissions during the event;

(mm) "fine texture" means a textural class finer than sandy loam and including sandy loam;

(nn) "floating roof" means a structure that floats upon and is supported by the surface of a liquid being contained in a tank, which is equipped with a closure seal or seals to close the space between the structure edge and tank wall, for the purpose of limiting emissions to the atmosphere;

(oo) "forest ecosystem" means the sum of the plants (predominantly trees and other woody vegetation), animals, environmental influences, and their interactions;

(pp) "fuel gas" means any gas stream containing 0.025 or less mole percent of hydrogen sulphide;

(qq) "fugitive emissions" means air contaminant emissions 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;

(rr) "Fugitive VOC Emissions Code" means the Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions from Equipment Leaks, Publication CCME-EPC-73E, as amended;

(ss) "grab" means an individual sample collected in less than 30 minutes and which is representative of the substance sampled;

(tt) "greenhouse gases" means gases that trap heat near the earth’s surface, primarily carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride;

(uu) "groundwater monitoring well" means a well, piezometer or water table well established for the purpose of collecting a groundwater sample;

(vv) "hazardous waste storage area" means the sites used for the storage of hazardous wastes and hazardous recyclables;

(ww) "hour" means clock hour;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(xx) "incompatible substances" means substances which when mixed can produce effects which are harmful to human health or to the environment such as heat, pressure, fire, explosion, violent reaction, toxic dusts, mists, fumes or gases, or flammable fumes or gases, and includes those substances listed in Appendix 5 of the Guidelines for Industrial Landfills, Alberta Environment, June 1987, as amended;

(yy) "industrial runoff" means precipitation that falls on, or traverses disturbed areas of the plant;

(zz) "industrial runoff control system" means the parts of the plant that collect, store or treat industrial runoff from the plant;

(aaa) "industrial wastewater" means the composite of liquid wastes and water-carried wastes, any portion of which results from any industrial process or pit dewatering carried on at the plant;

(bbb) "industrial wastewater control system" means the parts of the plant that collect, store or treat industrial wastewater;

(ccc) "in-stack opacity" means the degree to which visible emissions obstruct the passage of light within a stack, flue, duct, or stack breaching;

(ddd) "ISO 17025" means the international standard, developed and published by International Organization for Standardization (ISO), specifying management and technical requirements for laboratories;

(eee) "land reclamation" means the stabilization, contouring, maintenance, conditioning, reconstruction, and revegetation of the surface of the land to a state that permanently returns the plant to an equivalent land capability;

(fff) "Lease 86/17 Mine" means that part of the West Bank Plant Site outside of the plant developed area;

(ggg) "LFH" means the organic horizons developed primarily from accumulation of leaves, twigs and woody material with or without a minor component of mosses. They are normally associated with upland forested soils with imperfect drainage or drier, as defined in The Canadian System of Soil Classification (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998, as amended;

(hhh) "liquid waste" means a waste which contains free liquids as determined by US EPA Method 9095 Paint Filter Liquids Test, Test Methods for Evaluating Solid Wastes - Physical/Chemical Methods (EPA Publication No. SW-846);
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(iii) "local environmental authority" means Alberta Environment and Parks or the Alberta Energy Regulator, in the Province of Alberta, or the agency that has the equivalent responsibilities for any jurisdiction outside the Province;

(jjj) "lubricating oil" means petroleum-derived or synthetic crankcase oil, engine oil, hydraulic fluid, transmission fluid, gear oil, heat transfer fluid or other oil or fluid, used for lubricating purposes in machinery or equipment;

(kkk) "major emissions event" means an incident of abnormal sulphur dioxide emissions that is due to a failure, outage, or malfunctioning of the wet gas compressors, the gas recovery units, the amine treating units, the acid gas incinerator, or the flue gas desulphurization plant and any other incident of abnormal sulphur dioxide emissions that the Director deems to be a major emissions event;

(lll) "manual stack survey" means a survey conducted in accordance with the Alberta Stack Sampling Code, Alberta Environment, 1995, as amended;

(mmm) "maximum daily" means the value not to be exceeded by any daily determination of concentration;

(nnn) “Millennium End Pit Lake” means an in-pit waterbody that will receive inflows from the East Bank Plant Site designed to discharge directly to the Athabasca River;

(ooo) "mine" means the disturbed lands but does not include the plant developed area;

(ppp) "mineral horizon" means a layer of soil containing 17% or less organic carbon by weight, as defined in The Canadian System of Soil Classification (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998, as amended;

(qqq) "monitoring system" means all equipment used for sampling, conditioning, analyzing or recording data in respect of any parameter listed or referred to in this approval, including equipment used for continuous monitoring;

(rrr) "month" means calendar month;

(sss) "monthly average" means the value as determined by the arithmetic average of all daily determinations of mass, concentration or as specified during any month;

(ttt) "net or lower heating value" means the quantity of heat evolved on complete combustion where the combustion products remain as vapour at 15°C;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(uuu) “NRU” means naphtha recovery unit;

(vvv) “on spec stripped sour water” means sour water that has been treated by the base plant sour water stripper and contains 20 ppmw or less of H2S, and sour water that has been treated by the Millennium Upgrader or the Voyageur Upgrader sour water strippers and contains 8 ppmw or less of H2S;

(www) "organic horizon" means an organic horizon (L, F, H or O) containing more than 17% organic carbon by weight, as defined in The Canadian System of Soil Classification (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998, as amended;

(xxx) "overburden" means material below the soil profile and above the bituminous sand;

(yyy) "PAH" means polycyclic aromatic hydrocarbons;

(zzz) "peat-mineral mix" means a mixture of an organic horizon with one of the following:

(i) underlying mineral material;

(ii) subsoil from another location; or

(iii) suitable overburden;

(aaaa) "planned tail gas treatment unit bypass" means a planned outage of the tail gas treatment unit for maintenance, modifications, or repairs during which time period the sulphur recovery plant will be operated with the sulphur recovery unit only;

(bbbb) "plant" means the Suncor Energy Inc. Oil Sands Processing Plant and associated Mines, and all associated infrastructure and equipment, including but not limited to, all buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, roadways, pipelines, tailings ponds, mature fine tailings drying (MFTD) operations, Dedicated Disposal Areas (DDA’s) and other installations, and includes the land located on Township 90, Range 8 and 9, Township 91, Range 8, 9, and 10, Township 92, Range 8, 9, and 10, and Township 93, Range 10, all west of the Fourth Meridian, that is being used, has been used, or held for or in connection with the Suncor Energy Inc. Oil Sands Processing Plant and associated Mines;

(cccc) "plant developed area" means the areas of the plant used for the storage, treatment, processing, transport, or handling of raw material, intermediate
TERMS AND CONDITIONS ATTACHED TO APPROVAL

product, by-product, finished product, process chemicals, or waste material;

(dddd) "QA/QC" means quality assurance and quality control;

(eeee) "quarter year" means a time period of three consecutive months designated as January, February, and March; or April, May, and June; or July, August, and September; or October, November, and December;

(ffff) "RATA" means Relative Accuracy Test Audit as defined in the CEMS Code;

(gggg) "reclamation material" means:
   (i) coarse woody debris;
   (ii) coversoil;
   (iii) subsoil; or
   (iv) suitable overburden;

(hhhh) "recorder" means a device which continuously records a measurement including a strip chart, circular chart, or electronic data logger;

(iiii) "regulations" means the regulations issued pursuant to the Act as amended;

(jjjj) "RSC" means reduced sulphur compounds;

(kkkk) "sedimentation pond" means a water treatment pond or a polishing pond that accepts water from muskeg drainage, overburden dewatering, overburden disposal areas, reclamation material storage areas, cleared areas, areas with little to no contact with oil sands materials, or any areas not yet disturbed by mining and discharges to the environment;

(llll) "sediments" means all fine sands, silts and clays or any other fines resulting from the settlement of impounded water or wastewater;

(mmmm) "seepage collection system" means the system of pipes, ditches, and ponds used to collect tailings pond dyke seepage for the purpose of dyke stability and to minimize any potential contamination of the groundwater regime;

(nnnn) "self-sustaining" means able to support various land uses after land conservation and reclamation is complete without requiring the use of fertilizers or any other special management;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(oooo) "settlement" means a lowering of the ground surface (gradual or sudden) due to settling, by subsurface movement of earth materials or other means;

(pppp) "soil" means the naturally occurring, unconsolidated mineral or organic material at least 10 cm thick that occurs at the earth’s surface and is capable of supporting plant growth, as defined in The Canadian System of Soil Classification (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998, as amended;

(qqqq) "sour gas" means any gas stream containing more than 0.025 mole percent of hydrogen sulphide;

(rrrr) "sour water" means any liquid stream containing more than 0.025 mole percent of hydrogen sulphide;

(ssss) “South Tailings Pond” means a tailings storage facility for the storage of tailings and all associated infrastructure including, but not limited to, a seepage mitigation system located in portions of Townships 90 and 91, Ranges 8 and 9, W4M as identified in application No. 42-94;

(tttt) "species at risk" means any species:

(i) identified by the Alberta Wildlife Act, as amended, as ‘Endangered’, ‘Threatened’ or ‘Species of Special Concern’;

(ii) listed in The General Status of Alberta Wild Species, 2015, as amended, as ‘At Risk’, ‘May Be At Risk’ or ‘Sensitive’;

(iii) classified as ‘at risk’ by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), as amended; or

(iv) listed under Schedule 1 of the Canadian Species at Risk Act, as amended;

(uuuu) "stream" means any fluid flow, discharge or release;

(vvvv) "subsoil" means a stratum that includes one or more of the following:

(i) that portion of the B horizon left after salvage of upland surface soil;

(ii) the C horizon of an upland soil; and

(iii) the C horizon of an organic soil (e.g., Terric layer);
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(www) "substrate" means the material present at the surface of a terrestrial landform prior to the placement of reclamation material;

(xxx) "suitable overburden" means overburden that has a pH less than or equal to 8.0, an electrical conductivity less than or equal to 5 dS m\(^{-1}\) and a sodium adsorption ratio less than or equal to 8;

(yyy) "tailings" means the waste residue separated in the process of extracting bitumen from oil sands;

(zzz) "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, and without precluding the generality of the foregoing, may include substances such as wood, concrete, steel, and plastic;

(aa) "the boundary of the regulatory mixing zone" means a lateral transect of approximately 100 meters from the west bank of the Athabasca River at a distance of approximately 2000 meters downstream of the Pond C/Pond E common outfall independent of whether or not the multiport diffuser is in operation;

(bbb) "transitional soil" means a soil developed on mineral parent material under forest in locations with imperfect drainage or wetter, typically including organic horizons that are less than 40 cm in depth over a mineral horizon;

(ccc) "TRS" means Total Reduced Sulphur as defined in the *Alberta Stack Sampling Code*, Alberta Environment, 1995, as amended;

(dd) "upland soil" means a soil developed on mineral parent material under forest in locations with imperfect drainage or drier, typically including LFH and A, B, and C horizons;

(eee) "upland subsoil" means a stratum salvaged from an upland soil that includes one or more of the following:

(i) that portion of the B horizon left after salvage of upland surface soil; and

(ii) the C horizon of an upland soil;

(ff) "upland surface soil" means a stratum salvaged from an upland soil that includes the LFH, A horizon and in some cases part or all of the B horizon;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(ggggg) "Upper Pit Lake" means an in-pit waterbody resulting from the placement of a water cover on DDA3 that will receive inflows from the East Bank Plant Site, and is designed to discharge to the Millennium End Pit Lake;

(hhhhh) "vapour control system" means a gathering and control system for collecting vapours and gases from specified storage tanks and processing units so as to direct the vapours and gases to subsequent treatment systems;

(iiiii) "volatile organic compounds (VOC)" means any organic compound that participates in atmospheric photochemical reactions, that is, any organic compound other than the following which have been excluded because of their negligible photochemical reactivity: methane, ethane, 1,1,1-trichloroethane, methylene chloride, chlorofluorocarbons (CFCs), fluorocarbons (FCs) and hydrochlorofluorocarbons (HCFCs);

(iiijj) "waste storage area" means the areas designated for waste container storage and/or waste tank storage as described in the applications;

(kkkkk) "week" means any consecutive seven day period;

(lllll) "weekly average" means the value by the arithmetic average of all daily determinations of concentration or as specified during any week;

(mmmmm) "West Bank Plant Site" means that part of the plant located on the west side of the Athabasca River, which is equivalent to West Bank Development Area (WBDA);

(nnnnn) "wetland" means land saturated with water long enough to promote formation of water altered soils, growth of water tolerant vegetation, and various kinds of biological activity that are adapted to the wet environment, and separated into 5 classes: fen, bog, marsh, swamp, and shallow open water wetlands (includes open water or littoral areas < 2 m deep with wetland characteristics); and

(ooooo) "year" means calendar year, unless otherwise specified.

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 subsection 2.1.1.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

2.1.3 An application for renewal of this approval must be submitted by the approval holder to the Director a minimum of 12 months prior to the approval expiry date unless otherwise authorized in writing by the Director.

2.1.4 Any discrepancy between the application or any document and the terms and conditions of this approval shall be resolved in favour of the approval.

2.1.5 The terms and conditions of this approval do not affect any rights or obligations created under any other approval issued by the Alberta Energy Regulator.

2.1.6 The mention of trade names, commercial products or named technologies in this approval does not constitute an endorsement or recommendation by Her Majesty the Queen in Right of Alberta, her employees, agents, the Alberta Energy Regulator and the Director for general use.

2.1.7 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.

2.1.8 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 for the approval holder;

(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.

2.1.9 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.

2.1.10 The approval holder shall submit all monthly reports required by this approval to be compiled or submitted to the Director on or before the end of the month following the month in which the information was collected, unless otherwise specified in this approval.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

2.1.11 The approval holder shall submit all annual reports required by this approval to be compiled or submitted to the Director on or before April 30 of the year following the year in which the information was collected, unless otherwise specified in this approval or authorized in writing by the Director.

2.1.12 Environmental Protection and Enhancement Act Approval No. 94-02-00, as amended, is cancelled.

SECTION 2.2: RECORD KEEPING

2.2.1 The approval holder shall record and retain all the following information for a minimum of ten years:

(a) the names and addresses of all persons who discover any contravention of the Act, the regulations or this approval;

(b) the names and addresses of all persons who take any remedial action arising from the contravention of the Act, the regulations or this approval; and

(c) a detailed description of the remedial measures taken in respect of a contravention of the Act, the regulations or this approval.

2.2.2 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;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(d) handling; and
(e) analysis;

shall be conducted in accordance with the following:

(i) for air:
   (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, 2016, as amended; and
   (D) the CEMS Code, Alberta Environment, 1998, as amended;

(ii) for industrial wastewater, industrial runoff, groundwater and domestic wastewater parameters:
   (A) the *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, American Water Works Association, and the Water Environment Federation, 2012, as amended;

(iii) for whole effluent toxicity tests:
   (A) the *Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout*, Environment Canada, Environmental Protection Series 1/RM/13, December 2000, as amended;
   (B) the *Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna*, Environment Canada, Environmental Protection Series 1/RM/14, December 2000, as amended;
   (C) the *Biological Test Method: Growth Inhibition Test Using a Freshwater Alga*, Environment Canada, Environmental Protection Series 1/RM/25, March 2007, as amended;
   (D) the *Biological Test Method: Test of Reproduction and Survival Using the Cladoceran Ceriodaphnia dubia*, Environment Canada, Environmental Protection Series 1/RM/21, February 2007, as amended;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(E) the Biological Test Method: Test of Larval Growth and Survival Using Fathead Minnows, Environment Canada, Environmental Protection Series 1/RM/22, February 2011, as amended; and

(F) the Biological Test Method: Toxicity Test Using Luminescent Bacteria, Environment Canada, Environmental Protection Series 1/RM/24, November 1992, as amended;

(iv) for soil:

(A) Soil Sampling and Methods of Analysis, Second Edition, CRC Press, 2008, as amended; and

(v) for waste:

(A) the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA, SW-846, September 1986, as amended;

(B) the Methods Manual for Chemical Analysis of Water and Wastes, Alberta Environmental Centre, Vegreville, Alberta, 1996, AECV96-M1 as amended;

(C) the Toxicity Characteristic Leaching Procedure (TCLP) USEPA Regulation 40 CFR261, Appendix II, Method No. 1311, as amended; and

(D) 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, 2012, as amended;

unless otherwise authorized in writing by the Director.

2.3.2 With the exception of field measurements, 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 term sample as used in subsection 2.3.2 does not include samples directed to continuous monitoring equipment, until specifically required in writing by the Director.

2.3.4 The approval holder shall comply with the terms and conditions of any written authorization issued by the Director under subsection 2.3.2.

PART 3: CONSTRUCTION
SECTION 3.1: GENERAL

COGENERATION

3.1.1 The approval holder shall construct two cogeneration units consisting of gas turbines and the Heat Recovery Steam Generators (HRSGs) equipped with the Selective Catalytic Reduction (SCR) systems for Coke Fired Boiler Replacement Project and associated facilities, as described in the application No. 076-94, 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 of the cogeneration units referred to in Subsection 3.1.1.

STORAGE TANKS

3.1.3 All new aboveground and underground storage tanks shall conform to the Alberta Energy Regulator Directive 055: Storage Requirements for the Upstream Petroleum Industry, as amended, unless otherwise authorized in writing by the Director.

3.1.4 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, PN1180, as amended, unless otherwise authorized in writing by the Director.

3.1.5 The approval holder shall provide a notification to the Director 30 days prior to the installation of an underground storage tank (including repurposed underground storage tank) and shall provide the following information:

(a) a justification why an underground storage tank has to be installed rather than an aboveground storage tank;

(b) a description of the underground storage tank including equipment name and identification number, size, location, contents, wall specification, process flow diagram and description, storage time, operation strategy, environmental sensitivity of the storage site and primary and secondary containment;

(c) leak detection and emission control measures;

(d) groundwater protection and monitoring measures;

(e) tank inspection and monitoring;

(f) a map of the location of the tank;

(g) a statement that the tank installation and operation will meet the requirements of Alberta Energy Regulator Directive 055; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(h) any other information as required in writing by the Director;

unless otherwise authorized in writing by the Director.

SECTION 3.2: AIR

HEATERS, BOILERS AND TURBINES

3.2.1 All new or replacement boilers and heaters, which have a capacity equal to or greater than 10.5 GJ/hr of energy input, shall meet the Multi-Sector Air Pollutants Regulations, SOR/2016-151, Current to January 18, 2018, Published by the Minister of Justice, as amended, or the Emission Guidelines for Oxides of Nitrogen (NOx) for New Boilers, Heaters and Turbines Using Gaseous Fuels Based on a Review of Best Available Technology Economically Achievable (BATEA), Alberta Environment, December 14, 2007, as amended, whichever more stringent standard is to apply.

3.2.2 All new combustion turbines with a power rating equal to or greater than 1 MW, shall meet the more stringent standard of either the Guidelines for the Reduction of Nitrogen Oxide Emissions from Natural Gas-fuelled Stationary Combustion Turbines, Environment and Climate Change Canada, 2017, or the Emission Guidelines for Oxides of Nitrogen (NOx) for New Boilers, Heaters and Turbines Using Gaseous Fuels Based on a Review of Best Available Technology Economically Achievable (BATEA), Alberta Environment, December 14, 2007, as amended, whichever more stringent standard is to apply.

3.2.3 The approval holder shall obtain written authorization or an approval amendment from the Director for the construction of the boilers and heaters referred to in subsection 3.2.1.

MONITORING EQUIPMENT

3.2.4 All new boilers and heaters which have a capacity equal to or greater than 10.5 GJ/hr of energy input shall be equipped with the capability required to allow for the measurement and monitoring of emissions of oxides of nitrogen (for emission verification) as prescribed in the National Emission Guideline for Commercial/Industrial Boilers and Heaters, CCME, March, 1998, unless otherwise authorized in writing by the Director.

3.2.5 Exhaust stacks of utility boilers shall be equipped with sampling facilities, in order to comply with the monitoring requirements as required in subsections 3.2.6 and 4.1.36.

3.2.6 The sampling facilities required in subsection 3.2.5 shall, at a minimum, be:

(a) installed;

(b) operated; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(c) maintained;

to comply with:

(i) the Alberta Stack Sampling Code, Alberta Environment, 1995, as amended;

(ii) the CEMS Code, Alberta Environment, 1998, as amended; and

(iii) the Air Monitoring Directive, Alberta Environment, 2016, as amended;

unless otherwise authorized in writing by the Director.

SUBMISSION AND ACCEPTANCE OF DETAILED DESIGN

3.2.7 The approval holder shall submit the following information to the Director:

(a) for new or replacement boilers or heaters, which have a capacity equal to or greater than 10.5 GJ/hour of energy input:

(i) stack dimensions;

(ii) predicted emissions; and

(iii) plans for demonstration of conformance;

with the requirements prescribed in the Emission Guidelines for Oxides of Nitrogen (NOx) for New Boilers, Heaters and Turbines Using Gaseous Fuels Based on a Review of Best Available Technology Economically Achievable (BATEA), Alberta Environment, December 14, 2007, as amended or the Multi-Sector Air Pollutants Regulations, SOR/2016-151, Current to January 18, 2018, Published by the Minister of Justice, as amended, whichever more stringent standard is to apply;

(b) for new or replacement NRU and associated facilities with regards to:

(i) efficiency;

(ii) service factor;

(iii) the expected amount of emissions of volatile organic compounds and potentially odorous compounds; and

(iv) a plan to prevent the release of untreated froth treatment tailings and associated solvent directly to the tailings pond;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(c) for new or replacement diluted-bitumen storage/shipping terminal and solvent storage, the proposed methods for the control of emissions of volatile organic compounds and potentially odorous compounds; and

(d) a detailed description of the technologies and practices that will be used to minimize emissions of volatile organic compounds and oxides of nitrogen (NOX) emissions from significant stationary sources including a description of the options and rationale that were considered for minimizing emissions.

3.2.8 The approval holder shall submit the detailed information at least 90 days prior to commencing the construction or installation of the project components referred to in subsection 3.2.7, unless otherwise authorized in writing by the Director.

3.2.9 The approval holder shall obtain written authorization or approval amendment from the Director prior to commencing the construction or installation of the project components referred to in subsection 3.2.7.

SECTION 3.3: INDUSTRIAL WASTEWATER AND INDUSTRIAL RUNOFF

3.3.1 The approval holder shall design and construct the industrial wastewater control system as described in the application, and the system shall include, at a minimum, all of the following:

(a) ponds sized to handle a 1 in 100 years, 24 hour precipitation event, without spilling to natural receiving waters; and

(b) in accordance with the approved Suncor’s Base Plant Surface Water Management Plan (SWMP);

unless otherwise authorized in writing by the Director.

3.3.2 The approval holder shall design and construct the industrial runoff control system, and at a minimum all of the following design criteria must be met:

(a) adequate pond retention time to remove 15 micron and greater sized particles for all precipitation events up to and including a 1 in 10 years precipitation event occurring over 24 hours;

(b) design to meet the release limits specified in TABLE 4.2-B; and

(c) in accordance with the approved Suncor’s Base Plant Surface Water Management Plan (SWMP);

unless otherwise authorized in writing by the Director.

3.3.3 The approval holder shall submit the design details to the Director at least 60 days prior to construction of the sedimentation ponds referred to in subsection 3.3.2.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

3.3.4 The approval holder shall obtain written authorization from the Director before construction of the sedimentation ponds referred to in subsection 3.3.2.

WATER MANAGEMENT PLAN

3.3.5 The approval holder shall manage the industrial wastewater and industrial runoff in accordance with the Suncor’s Oil Sands Base Plant Surface Water Management Plan (SWMP), dated April 2018, unless otherwise specified in this approval or authorized in writing by the Director.

3.3.6 The Approval Holder shall, at minimum, update and submit to the Director the Surface Water Management Plan referred to in subsection 3.3.5 on or before April 30, 2021, and thereafter on an annual frequency in accordance with Subsection 2.1.11, unless otherwise authorized in writing by the Director.

3.3.7 The plan referred to in subsection 3.3.6 shall include, at a minimum, the following:

(a) design basis and water management philosophy for:
   (i) industrial runoff; and
   (ii) industrial wastewater;

(b) water management areas and systems including:
   (i) each of industrial runoff facilities and associated catchment areas, drainage ditches and outlets;
   (ii) each of industrial wastewater facilities and associated catchment areas, inflow sources, drainage ditches or piping routes and outlets;
   (iii) a summary of project changes in the previous year;
   (iv) existing approved industrial runoff/industrial wastewater discharge locations; and
   (v) newly proposed industrial runoff/industrial wastewater discharge locations and its environmental impacts to the receiving streams;

(c) discussion on potential risks, issues and mitigation measures for surface water management system;

(d) planned surface water activities and proposed changes; and

(e) any other information as required by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

3.3.8 If the Suncor’s Base Plant SWMP is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

3.3.9 The approval holder shall implement the Suncor’s Base Plant SWMP referred to in subsection 3.3.6 as authorized in writing by the Director.

SECTION 3.4: DOMESTIC WASTEWATER

3.4.1 The approval holder shall submit an application for any modification to the Director and obtain a written authorization or an amendment to this approval prior to the commencement of construction of any changes to the existing domestic wastewater treatment system.

3.4.2 The approval holder shall submit an approval amendment application for a new Domestic Wastewater System to the Director at least 180 days prior to commencing construction of the Domestic Wastewater System, unless otherwise authorized in writing by the Director.

3.4.3 The approval holder shall obtain an amendment to this approval prior to the commencement of construction of the Domestic Wastewater System.

SECTION 3.5: LAND CONSERVATION

3.5.1 The approval holder shall conduct land conservation as described in the application unless otherwise:

(a) specified in this approval; or
(b) authorized in writing by the Director.

DRAINAGE AND EROSION CONTROL

3.5.2 The approval holder shall stabilize ditches and trenches that discharge directly to natural watercourses, wetlands and waterbodies, in order to minimize erosion and sediment input.

3.5.3 The approval holder shall conduct all activities in a manner that minimizes erosion and sedimentation on:

(a) all disturbed lands;
(b) reclaimed lands; and
(c) on all lands adjacent to the project lease boundary.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

3.5.4 The approval holder shall immediately report any major geotechnical failure within the plant, excluding mine faces, to the Director.

3.5.5 The approval holder shall submit a Stabilization and Reclamation Plan for any incident referred to in subsection 3.5.4 to the Director, by the date specified in writing by the Director.

3.5.6 The approval holder shall implement the plan referred to in subsection 3.5.5 as authorized in writing by the Director.

CLEARING AND TIMBER SALVAGE

3.5.7 The approval holder shall submit a Timber Salvage Plan for written authorization by the Director prior to conducting any salvage activities, unless otherwise authorized in writing by the Director.

3.5.8 The approval holder shall implement the Timber Salvage Plan referred to in subsection 3.5.7 as authorized in writing by the Director.

3.5.9 The approval holder shall manage woody debris in accordance with:


(c) the mine reclamation plan authorized in subsection 7.3.7; or

(d) as directed in writing by the Director.

3.5.10 The approval holder shall conduct all activities in a manner that minimizes each of the following:

(a) soil loss;

(b) soil degradation;

(c) physical disturbance of adjacent forest cover;

(d) loss of timber; and

(e) loss of plant propagules in the LFH.

CONSERVATION OF RECLAMATION MATERIAL
TERMS AND CONDITIONS ATTACHED TO APPROVAL

3.5.11 The approval holder shall immediately suspend salvage or placement of reclamation material if directed to do so in writing by the Director, or when:

(a) wet conditions;

(b) high wind velocities; or

(c) any other field condition or operation

will result in mixing, loss or degradation of the reclamation material.

3.5.12 The approval holder shall only recommence salvage or placement of reclamation material when the field conditions in subsection 3.5.11 no longer exist or if directed to do so in writing by the Director.

3.5.13 The approval holder shall conduct direct placement of reclamation material on recontoured portions of the disturbed land that are ready for permanent reclamation, wherever possible, unless otherwise authorized in writing by the Director.

3.5.14 The approval holder shall salvage upland surface soil from all land to be disturbed, unless otherwise authorized in writing by the Director.

3.5.15 The approval holder shall salvage the surface organic horizon and the underlying mineral material immediately below the surface organic horizon from transitional soil on all land to be disturbed, unless otherwise authorized in writing by the Director.

3.5.16 Where there is insufficient upland surface soil and transitional soil to meet the reclamation objectives in PART 7: of this approval, the approval holder shall salvage other coversoil.

3.5.17 The approval holder shall salvage upland subsoil from all land to be disturbed, unless otherwise authorized in writing by the Director.

3.5.18 Where there is insufficient upland subsoil to meet the reclamation objectives in PART 7: of this approval, the approval holder shall salvage suitable overburden.

3.5.19 The approval holder shall minimize mixing of the following during salvage and stockpiling:

(a) upland surface soil of coarse texture and upland surface soil of fine texture;

(b) upland surface soil and subsoil;

(c) upland surface soil and peat-mineral mix;

(d) transitional soil and subsoil; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(e) subsoil of coarse texture and subsoil of fine texture;

unless otherwise authorized in writing by the Director.


SECTION 3.6: COKE MANAGEMENT

3.6.1 The approval holder shall manage Coke Stockpiles as described in application, unless written authorization or an approval amendment is obtained from the Director.

3.6.2 The approval holder shall submit an update of the approved long-term plan for coke management for the plant by September 15, 2022, unless otherwise authorized in writing by the Director.

3.6.3 The plan referred to in subsection 3.6.2 shall include, at a minimum, the following:

(a) maps and details of location, volume and storage capacity;

(b) closure and reclamation design including reclamation material capping, establishment of drainage, revegetation etc.;

(c) the integration of landform design in the planning and development of coke stockpiles;

(d) plans for preventing and mitigating impacts to groundwater;

(e) plans for preventing and mitigating dust, fire hazard, emission and erosion caused by the handling and storage of coke;

(f) the incorporation of relevant reclamation research in the design and reclamation of the coke stockpiles; and

(g) any other information as required in writing by the Director.

3.6.4 The approval holder shall implement the plan referred to in subsection 3.6.2 as authorized in writing by the Director.

SECTION 3.7: VOYAGEUR UPGRADER AND EAST TANK FARM

3.7.1 The approval holder shall construct the Voyageur Upgrader and East Tank Farm as described in application Nos. 045-94, 070-94 and 077-94, and shall include, at a minimum, all of the following, unless written authorization or an approval amendment is obtained from the Director:
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(a) Delayed Coker Unit 3 (3 sets of cokers);
(b) Amine Unit 4;
(c) Sulphur Recovery Unit 6, 7 and 8;
(d) Sulphur Degassing Facility;
(e) Tail Gas Treatment Unit 4;
(f) Thermal Oxidation Unit 4;
(g) Sour Water Stripper Units 4 and 5;
(h) Hydrogen Plant 4;
(i) Diesel Hydrotreater Unit 2;
(j) Gas Oil Hydrotreater Unit 3;
(k) Naphtha Hydrotreater Unit 4;
(l) Vacuum Tower Unit 3;
(m) Gasifier Complex Unit 1; and
(n) East Tank Farm and Ancillary Facilities.

3.7.2 The approval holder shall notify the Director in writing at least 14 days before commencing operations of the modifications as described in application No. 45-94.

3.7.3 The approval holder shall submit to the Director the following information for the Sulphur Recovery Units 6, 7 and 8, and associated facilities:

(a) a detailed description and specifications of the sulphur recovery units;
(b) a detailed description of the tail gas clean-up unit;
(c) a detailed description and specifications for the sulphur storage facility; and
(d) a description of how the plant and the sulphur recovery facilities will be operated under all operating scenarios.

3.7.4 The approval holder shall obtain written authorization from the Director for the construction of the Sulphur Recovery Units 6, 7 and 8, and associated facilities referred to in subsection 3.7.3.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

3.7.5 The approval holder shall obtain written authorization from the Director for the construction and operation of the Voyageur Upgrader vacuum unit as described in application No. 45-94.

SECTION 3.8: NORTH STEEPBANK EXTENSION PROJECT

3.8.1 The approval holder shall construct the North Steepbank Extension Project as described in application Nos. 061-94 and 077-94, unless written authorization or an approval amendment is obtained from the Director;

SECTION 3.9: COGENERATION UNITS FOR COKE FIRED BOILER (CFB) REPLACEMENT PROJECT

3.9.1 The approval holder shall construct two cogeneration units consisting of gas turbines and the Heat Recovery Steam Generators (HRSGs) equipped with the Selective Catalytic Reduction (SCR) systems for Coke Fired Boiler Replacement Project and associated facilities, as described in the application No. 076-94, unless otherwise authorized in writing by the Director.

3.9.2 The approval holder shall notify the Director in writing at least 14 days before commencing operations of the cogeneration units referred to in Subsection 3.9.1.

SECTION 3.10: MINE DUMP 9 AND MINE DUMP 9 SOUTH

3.10.1 The approval holder shall construct the Mine Dump 9 (MD9), MD9 South Dump as described in application, unless otherwise authorized in writing by the Director.

3.10.2 The approval holder shall not implement the plans for MD9 required by the OSCA Approval, unless:
   (a) the approval holder has provided the information required by the OSCA Approval; and
   (b) an approval amendment or written authorization is granted by the AER.

SECTION 3.11: DEDICATED DISPOSAL AREA 3 (DDA3)

3.11.1 The approval holder shall construct DDA3 and associated facilities, as described in application Nos. 075-94, 077-94 and OSCA applications 1857274 and 1890348, unless otherwise authorized in writing by the Director.

PART 4: OPERATIONS, LIMITS, MONITORING AND REPORTING

SECTION 4.1: AIR

OPERATIONS
TERMS AND CONDITIONS ATTACHED TO APPROVAL

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

4.1.2 The approval holder shall only release effluent streams to the atmosphere from the sources designated as the following in the application:

(a) the new main powerhouse stack (37F-1);
(b) the old main powerhouse stack (31F-7);
(c) the thermal oxidation unit 1 stack (8F-5);
(d) the vapour recovery unit stack;
(e) the acid gas flare stack (19F-2);
(f) the two hydrocarbon flare stacks (19F-1 and 19F-3);
(g) the hydrogen plant flare stack (6F-3);
(h) the two froth heater stacks (3C-20 and 3C-21);
(i) the three froth deaerator stacks (3D-62, 3C-22A, 3C-22B);
(j) the two conditioning drum vents (3R-220 and 3R-232);
(k) the E Process Line vent (3R-24);
(l) the three diluent tower feed heater stacks (5F-1A, 5F-1B, and 5F-5);
(m) the four coker feed heater stacks (5F-2, 5F-3, 5F-4, and 5F-6);
(n) the deoke drum vent (5C-76);
(o) the reformer furnace stacks (6F-2);
(p) the hydrogenation preheat furnace stack (6F-5);
(q) the hydrogen plant carbon dioxide removal unit stack (6C-13);
(r) the naphtha charge heater stack (7F-1);
(s) the naphtha depropanizer boiler heater stack (7F-2);
(t) the kerosene charge heater stack (7F-10);
(u) the stripper reboiler stack (7F-11);
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(v) the three gas oil charge heater stacks (7F-20A/B/C);
(w) the plant 8 sulphur pit vent;
(x) the naphtha recovery unit (NRU) absorber stack (16C-5);
(y) the plant 34 slop tanks caustic scrubber tower vent (34C-2);
(z) steam vents;
(aa) the diluent tower feed heater stack (25F-1);
(bb) the vacuum distillation unit heater stack (25F-2);
(cc) the froth deaerator stack associated with the sixth line in the bitumen separation circuit;
(dd) vents associated with the East Bank Plant Site hydrotransport slurry preparation facilities (rotary drum breakers and pump boxes, and wet storage tank vents);
(ee) the hot process water surge tank vents;
(ff) gas turbines main stacks (GTG-5 and GTG-6);
(gg) SCR cogeneration units exhaust stacks (27F-2 and 27F-3);
(hh) Millennium ore preparation plant vents associated with the hydrotransport slurry preparation facilities (rotary drum breakers and pump boxes and agitation/surge tank vents, Millennium froth deaerator stacks);
(ii) Millennium diluent tower feed heater stacks (52F-101A/B);
(jj) Millennium coker charge heater stacks (52F-300/301/302);
(kk) Millennium gas-oil charge heater stack (55F-300);
(ll) Millennium hydrogen plant degasifiers (54C-105, 66C-105);
(mm) Millennium naphtha charge heater stack (55F-100);
(nn) Millennium diesel charge heater and stripper reboiler stack (55F-201);
(oo) The thermal oxidation unit 2 stack (53F-611);
(pp) Millennium and Millennium coker unit H2S/HC flare stacks (59F 101/102);
(qq) Millennium SWS flare stack (53F-612);
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(rr) Millennium sulphur pit vents (53D-300/400, and 68D-300);
(ss) Millennium hydrogen reformer furnace stacks (54F-102, 66F-102);
(tt) Millennium and Millennium coker unit hydrogen flares (54F-103, 66F 103);
(uu) Millennium vacuum tower charge heater stacks (57F-2 A/B);
(vv) Millennium diluent tower feed heater stacks (57F-1 A/B);
(ww) Millennium coker unit naphtha hydrotreater charge heater stack (64F-100);
(xx) the froth deaerator vents associated with the Steepbank Extraction Plant;
(yy) the Firebag pipeline maintenance flare stack;
.zz) Voyageur thermal oxidation unit 4 stack (208F- 611);
(aaa) Voyageur hydrogen reformer furnace stack (206F-102);
(bbb) Voyageur hydrogen plant degasifier (206C-105);
(ccc) Voyageur coker charge heater stacks (205F-300/301/302);
(ddd) Voyageur diesel hydrotreater heater stacks (207F-200A/B, 207F-201);
(eee) Voyageur gas oil hydrotreater heater stacks (207F-300A/B);
(fff) Voyageur naphtha hydrotreater heater stack (207F-100);
(ggg) Voyageur package boiler exhaust stacks (214F-103, 214F-203);
(hhh) Voyageur vacuum tower heater stacks (202F-200A/B);
(iii) Voyageur gasifier, high pressure boiler package heater stacks;
(jjj) Voyageur sour water stripper flare stack (208F-612);
(kkk) Voyageur hydrogen flare stack (206F-103);
(III) Voyageur H2S/HC flare stack (219F-100);
(mmm) East Tank Farm Vapour Combustion Unit Stacks (220F-202, 220F-791A and 220F-791B), and Catalytic Heater (217VE-5);
(nnn) Voyageur Upgrader pipeline pig trap scrubber stacks;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(ooo) mine mobile equipment (trucks and shovels, conveyors and transfer points, etc.);

(ppp) exposed mine faces, active mining areas, the tailings ponds, emergency dump ponds, oil sands stockpiles, subject to the requirements of subsection 4.1.5; and

(qqq) any additional utilities or processing unit vents or stacks associated with the plant, for which written authorization or an approval amendment has been obtained from the Director.

4.1.3 In addition to the limits specified in subsection 4.1.25, the approval holder shall not operate the process equipment, unless and until, the pollution-abatement equipment associated with the process equipment is fully operational, unless otherwise authorized in writing by the Director.

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 subsection 4.1.2 in accordance with subsection 4.1.5 of this approval.

4.1.5 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) the impairment, degradation or alteration of the quality of natural resources; or

(b) material discomfort, harm or adversely affect the well being or health of a person; or

(c) harm to property or to plant or animal life.

4.1.6 All effluent streams from the three main coke-fired boilers shall be directed to the electrostatic precipitators to remove particulate matter, when coke is used as a fuel source.

4.1.7 All effluent streams from the 125,000 kg/h gas-fired boiler and from the natural gas-fired boilers in the auxiliary boiler house (Plant 35) shall be directed to the old main powerhouse stack (31F-7).

4.1.8 During time periods that the FGD plant is operating (excluding FGD plant start-up and shutdown), all effluent streams from the electrostatic precipitators shall be directed to the FGD plant to remove sulphur dioxide, and then directed to the new main powerhouse stack (37F-1).

4.1.9 The waste collected in the electrostatic precipitator hoppers and coke silos shall be handled and disposed of in such a manner as to minimize entrainment of the particulates in the ambient air.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.1.10 The approval holder shall continuously operate the flare system with the following minimum systems:

(a) all acid gas flare stacks:
   (i) continuously burning pilot lights; and
   (ii) electronic igniters;

(b) all hydrocarbon flare stacks:
   (i) continuously burning pilot lights;
   (ii) electronic igniters; and
   (iii) smokeless flare tips;

(c) all hydrogen plant flare stacks in the Millennium and Voyageur Upgraders:
   (i) continuously burning pilot lights; and
   (ii) electronic igniters;

(d) all sour water stripper flare stacks:
   (i) continuously burning pilot lights; and
   (ii) electronic igniters;

(e) a closed circuit television monitoring system in a central control room to ensure proper operation of the acid gas flare stack (19F-2), the two hydrocarbon flare stacks (19F-1 and 19F-3), and the Millennium and Millennium Coker Unit H2S/HC flare stacks (59F-101 and 59F-102); and

(f) a closed circuit television monitoring system in the Voyageur central control room to ensure proper operation of the Voyageur H2S/hydrocarbon flare stack (219F-100).

unless an alternative system is authorized in writing by the Director.

4.1.11 The approval holder may use the following stacks for flaring sour gas during a routine flaring event and during an emergency flaring event:

(a) the acid gas flare stack (19F-2);

(b) the two hydrocarbon flare stacks (19F-1 and 19F-3);

(c) the Millennium sour water stripper flare stack (53F-612);
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(d) the Millennium and Millennium coker unit H2S/HC flare stacks (59F-101 and 59F-102);

(e) the Voyageur H2S/hydrocarbon flare stack (219F-100); and

(f) the Voyageur sour water stripper flare stack (208F612).

4.1.12 The approval holder shall minimize and control emissions from the routine flaring event and emergency flaring event referred to in subsection 4.1.11 in a manner satisfactory to the Director.

4.1.13 The approval holder shall obtain a written authorization from the Director for each planned major flaring event referred to in subsection 1.1.2(ll)(iii) for its duration and sulphur dioxide emission rate.

4.1.14 The approval holder shall ensure the combustion of all combustible gases released to any flare stack.

4.1.15 The net or lower heating value of the combined gas stream released to any flare stack (excluding hydrogen flare stacks) shall be maintained, at a minimum, at 12 MJ/m³ when adjusted for 101.325 kPa and 15°C by adding natural gas to the sour gas, unless otherwise authorized in writing by the Director.

4.1.16 The approval holder shall maintain and operate the following:

(a) a vapour control system and vapour recovery unit to collect and treat all vapours and gases, for the removal of hydrogen sulphide, hydrocarbons, and mercaptans, from:

(i) the NRU;

(ii) the secondary extraction (plants 4 and 87) vents;

(iii) the diluent storage tanks (20D-4 and 20D-35); and

(iv) the diluent or diluted bitumen storage tanks (20D-1/2/3/5/6 and 20D-71);

(b) sour water stripper units or any combination of units to process all sour water streams to remove reduced sulphur compounds and ammonia gases;

(c) sulphur recovery units and tail gas treatment units to process all sour gas effluent streams produced in:

(i) the amine treating units; and

(ii) the sour water stripper units;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

except during time periods that the streams are authorized to be flared in accordance with 4.1.11 or 4.1.13 of this approval;

(d) a NRU to minimize naphtha discharge to the tailings ponds from:

(i) all industrial wastewater from the froth treatment units (inclined plate separators and centrifuges);

(ii) all effluent streams from the froth treatment units; and

(iii) the sour water streams from the sour water stripper unit or any combination of units referred in subsection 4.1.16(b);

(e) a vapour control system and a caustic vent scrubber to collect and treat all vapours and gases from the slop tanks 34D-3, 34D-7, 34D-8, and 34D-14;

(f) a vapour control system for the Voyageur Upgrader slop tanks;

(g) a nitrogen blanket, a gas oil blanket and floating roof system for:

(i) sour water surge tanks 10D-17 and 53D-100; and

(ii) the Voyageur sour water surge tanks (208D-100/700);

(h) a floating roof system for the naphtha storage tanks 20D-14, 20D-15, 20D-31, 20D-34 and 20D-56 and the Voyageur naphtha and swing product storage tanks; and

(i) an iron sponge absorber (16C-5) to treat vapours and gases from the NRU during any time periods that the vapour recovery unit is not operating.

unless otherwise authorized in writing by the Director.

4.1.17 Notwithstanding subsection 4.1.16(d)(iii), on spec stripped sour water streams from the sour water stripper units is authorized to:

(a) discharge to the tailings ponds;

(b) be used in the Suncor owned and operated In Situ projects; or

(c) be reused within the plant,

subject to the requirements of Subsections 4.1.4 and 4.1.5.

4.1.18 The discharge of on spec stripped sour water streams from the sour water stripper units referred to in subsection 4.1.17(a) shall be monitored for H₂S using an online analyzer.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.1.19 Six months prior to beginning discharge of on spec stripped sour water to the tailings ponds, the approval holder shall submit a report to the Director outlining:

(a) the expected volumes of on spec stripped sour water to be discharged;
(b) planned monitoring for this discharge including monitoring of on spec stripped sour water quality and ambient air quality in the tailings pond area;
(c) response plans for odours attributed to the discharge of on spec stripped sour water to the tailings pond;
(d) planned reporting of the monitoring program; and
(e) any other information requested by the Director.

4.1.20 The approval holder shall take all reasonable measures to ensure that the NRU is operating effectively and efficiently when the froth treatment units are in operation.

4.1.21 The approval holder shall notify the Director in writing a minimum of one week prior to:

(a) planned vapour recovery unit outage;
(b) planned FGD plant outage; and
(c) planned tail gas treatment unit bypass.

4.1.22 The approval holder shall restrict the materials that are stored in tanks that vent directly to atmosphere (storage tanks 8D-1, 8D-2, 10D-4, 20D-10/11/12/13, 20D-30, 20D-32, 20D-36, 20D-57, and 20D-58) to only those materials that are listed for the subject tanks in TABLE 4.1-A, unless otherwise authorized in writing by the Director.

4.1.23 The true vapour pressure referred to in TABLE 4.1-A shall be measured or calculated in the run-down line based on a 3 hour rolling averaging period; except for sour water tanks 10D-17, 53D-100, 208D-100, 208D-700, 34D-3, 34D-8 and 34D-14, unless otherwise authorized in writing by the Director.

4.1.24 For sour water tanks 10D-17, 53D-100, 208D-100 and 208D-700, the true vapour pressure of the oil layer of the tank under the floating roof shall be controlled in accordance with TABLE 4.1-A, unless otherwise authorized in writing by the Director.

TABLE 4.1-A: DETAILS ON SUNCOR STORAGE TANKS

<table>
<thead>
<tr>
<th>Tank ID No.</th>
<th>Description of Tank</th>
<th>Diameter of Tank (M)</th>
<th>Volume of Tank (M$^3$)</th>
<th>Type of Tank</th>
<th>Type of Vent/True Vapour Pressure (Max) PSIA</th>
<th>Emission Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>20D-1</td>
<td>STF:D/B, D</td>
<td>30.5</td>
<td>15899</td>
<td>CR</td>
<td>PVRV/13.6</td>
<td>YES - VRU</td>
</tr>
<tr>
<td>20D-2</td>
<td>STF:D/B, D</td>
<td>30.5</td>
<td>15899</td>
<td>CR</td>
<td>PVRV/13.6</td>
<td>YES - VRU</td>
</tr>
</tbody>
</table>
## TERMS AND CONDITIONS ATTACHED TO APPROVAL

<table>
<thead>
<tr>
<th>Tank ID No.</th>
<th>Description of Tank</th>
<th>Diameter of Tank (M)</th>
<th>Volume of Tank (M³)</th>
<th>Type of Tank</th>
<th>Type of Vent/True Vapour Pressure (Max) PSIA</th>
<th>Emission Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>20D-3</td>
<td>STF;D/B, D</td>
<td>30.5</td>
<td>15899</td>
<td>CR</td>
<td>PVRV/13.6</td>
<td>YES - VRU</td>
</tr>
<tr>
<td>20D-4</td>
<td>STF;D</td>
<td>30.5</td>
<td>15899</td>
<td>CR</td>
<td>PVRV/2.5</td>
<td>YES - VRU</td>
</tr>
<tr>
<td>20D-5</td>
<td>STF;D/B</td>
<td>48.5</td>
<td>25438</td>
<td>CR</td>
<td>PVRV/13.6</td>
<td>YES - VRU</td>
</tr>
<tr>
<td>20D-6</td>
<td>STF;D/B</td>
<td>48.5</td>
<td>25438</td>
<td>CR</td>
<td>PVRV/13.6</td>
<td>YES - VRU</td>
</tr>
<tr>
<td>20D-35</td>
<td>STF;D</td>
<td>27.4</td>
<td>7949</td>
<td>CR</td>
<td>PVRV/2.5</td>
<td>YES - VRU</td>
</tr>
<tr>
<td>20D-57</td>
<td>STF;DSL</td>
<td>9.1</td>
<td>795</td>
<td>CR</td>
<td>PVRV/2.5</td>
<td>NO</td>
</tr>
<tr>
<td>20D-58</td>
<td>STF;GAS</td>
<td>12.2</td>
<td>2146</td>
<td>CR</td>
<td>PVRV/1</td>
<td>NO</td>
</tr>
<tr>
<td>34D-3</td>
<td>STF;SLOP</td>
<td>9.8</td>
<td>795</td>
<td>CR</td>
<td>PVRV/14.7</td>
<td>YES-SCRUBBER</td>
</tr>
<tr>
<td>34D-8</td>
<td>STF;SLOP</td>
<td>11.7</td>
<td>1192</td>
<td>CR</td>
<td>PVRV/8.1</td>
<td>YES-SCRUBBER</td>
</tr>
<tr>
<td>34D-14</td>
<td>STF;SLOP</td>
<td>19.5</td>
<td>3180</td>
<td>CR</td>
<td>PVRV/8.1</td>
<td>YES-SCRUBBER</td>
</tr>
<tr>
<td>20D-10</td>
<td>NTF;GAS</td>
<td>34.2</td>
<td>12718</td>
<td>CR</td>
<td>ATM&lt;1</td>
<td>NO</td>
</tr>
<tr>
<td>20D-11</td>
<td>NTF;GAS or HVGO</td>
<td>34.2</td>
<td>12718</td>
<td>CR</td>
<td>ATM&lt;1</td>
<td>NO</td>
</tr>
<tr>
<td>20D-12</td>
<td>NTF;KER or LVGO</td>
<td>27.4</td>
<td>8267</td>
<td>CR</td>
<td>ATM&lt;1</td>
<td>NO</td>
</tr>
<tr>
<td>20D-13</td>
<td>NTF;KER</td>
<td>27.4</td>
<td>8267</td>
<td>CR</td>
<td>ATM&lt;1</td>
<td>NO</td>
</tr>
<tr>
<td>20D-14</td>
<td>NTF;NAP</td>
<td>27.4</td>
<td>7790</td>
<td>FR</td>
<td>/11</td>
<td>YES - FR</td>
</tr>
<tr>
<td>20D-15</td>
<td>NTF;NAP or D/B</td>
<td>27.4</td>
<td>7790</td>
<td>FR</td>
<td>/12.5</td>
<td>YES - FR</td>
</tr>
<tr>
<td>20D-30</td>
<td>NTF;GAS</td>
<td>34.2</td>
<td>12718</td>
<td>CR</td>
<td>ATM&lt;1</td>
<td>NO</td>
</tr>
<tr>
<td>20D-31</td>
<td>NTF;SWIN, NAP</td>
<td>34.2</td>
<td>12718</td>
<td>FR</td>
<td>/12.5</td>
<td>YES - FR</td>
</tr>
<tr>
<td>20D-32</td>
<td>NTF;KER</td>
<td>27.4</td>
<td>8267</td>
<td>CR</td>
<td>ATM&lt;1</td>
<td>NO</td>
</tr>
<tr>
<td>20D-34</td>
<td>NTF;KER or NAP</td>
<td>27.4</td>
<td>7790</td>
<td>FR</td>
<td>/11</td>
<td>YES - FR</td>
</tr>
<tr>
<td>20D-36</td>
<td>NTF;GAS</td>
<td>34.2</td>
<td>12718</td>
<td>CR</td>
<td>ATM&lt;1</td>
<td>NO</td>
</tr>
<tr>
<td>20D-55</td>
<td>NTF;SWIN, or LVGO</td>
<td>34.2</td>
<td>12718</td>
<td>FR</td>
<td>/12.5</td>
<td>YES - FR</td>
</tr>
<tr>
<td>20D-56</td>
<td>NTF;SWIN</td>
<td>34.2</td>
<td>12718</td>
<td>FR</td>
<td>/12.5</td>
<td>YES - FR</td>
</tr>
<tr>
<td>20D-71</td>
<td>STF;D/B, D</td>
<td>61</td>
<td>53260</td>
<td>CR</td>
<td>PVRV/13.6</td>
<td>YES - VRU</td>
</tr>
<tr>
<td>4D-11</td>
<td>EXT, BIT D, Mineral, H20</td>
<td>6.1</td>
<td>127</td>
<td>CR</td>
<td>VRU</td>
<td>YES</td>
</tr>
<tr>
<td>4D-12</td>
<td>EXT, BIT D, Mineral, H20</td>
<td>7.16</td>
<td>254</td>
<td>CR</td>
<td>VRU</td>
<td>YES</td>
</tr>
<tr>
<td>4D-13</td>
<td>EXT, BIT, Mineral, H20</td>
<td>35.05</td>
<td>23848</td>
<td>CR</td>
<td>ATM&lt;1</td>
<td>NO</td>
</tr>
<tr>
<td>8D-1</td>
<td>UPGR;DEA Solution</td>
<td>6.1</td>
<td>213</td>
<td>CR</td>
<td>PVRV/1</td>
<td>NO</td>
</tr>
<tr>
<td>8D-2</td>
<td>UPGR; Amine Solution</td>
<td>2.29</td>
<td>10</td>
<td>CR</td>
<td>ATM&lt;1</td>
<td>NO</td>
</tr>
<tr>
<td>10D-4</td>
<td>UPGR; Used Seal Oil</td>
<td>2.1</td>
<td>16</td>
<td>CR</td>
<td>PVRV/14.7</td>
<td>NO-UND</td>
</tr>
<tr>
<td>10D-17</td>
<td>UPGR; Sour Water</td>
<td>30.5</td>
<td>11550</td>
<td>CR</td>
<td>PVRV/12</td>
<td>YES – GOB+NB+FR</td>
</tr>
<tr>
<td>53D-100</td>
<td>UPGR; Sour water</td>
<td>30.5</td>
<td>11550</td>
<td>CR</td>
<td>PVRV/12</td>
<td>YES – GOB+NB+FR</td>
</tr>
<tr>
<td>53D-200</td>
<td>UPGR; Amine Solution</td>
<td>3.7</td>
<td>95</td>
<td>CR</td>
<td>PVRV/1</td>
<td>NO</td>
</tr>
<tr>
<td>53D-500</td>
<td>UPGR; Sulphur</td>
<td>12.2</td>
<td>853</td>
<td>CR</td>
<td>ATM/ &lt;1</td>
<td>No</td>
</tr>
<tr>
<td>208D-100</td>
<td>VU; Sour Water (Primary)</td>
<td>36</td>
<td>15,200</td>
<td>CR</td>
<td>PVRV/12</td>
<td>YES – GOB+NB+FR</td>
</tr>
<tr>
<td>208D-700</td>
<td>VU; Sour Water (Secondary)</td>
<td>25</td>
<td>7,950</td>
<td>CR</td>
<td>PVRV/12</td>
<td>YES – GOB+NB+FR</td>
</tr>
<tr>
<td>219D-201</td>
<td>Slop Oil</td>
<td>16.8</td>
<td>3,230</td>
<td>CR</td>
<td>PVRV/8.1</td>
<td>YES – NG+VRU</td>
</tr>
<tr>
<td>219D-202</td>
<td>Slop Oil</td>
<td>16.8</td>
<td>3,230</td>
<td>CR</td>
<td>PVRV/8.1</td>
<td>YES – NG+VRU</td>
</tr>
<tr>
<td>220D-101</td>
<td>ETF; Hot Bitumen</td>
<td>58.8</td>
<td>39,750</td>
<td>CR</td>
<td>PVRV/1</td>
<td>YES – NG+VUC</td>
</tr>
<tr>
<td>220D-102</td>
<td>ETF; Hot Bitumen</td>
<td>58.8</td>
<td>39,750</td>
<td>CR</td>
<td>PVRV/1</td>
<td>YES – NG+VUC</td>
</tr>
<tr>
<td>220D-367</td>
<td>ETF; Blended BIT</td>
<td>58.8</td>
<td>39,764</td>
<td>CR</td>
<td>PVRV/13.3</td>
<td>YES – NG+VUC</td>
</tr>
<tr>
<td>220D-369</td>
<td>ETF; Blended BIT</td>
<td>58.8</td>
<td>39,764</td>
<td>CR</td>
<td>PVRV/13.3</td>
<td>YES – NG+VUC</td>
</tr>
<tr>
<td>220D-368</td>
<td>ETF; Blended BIT</td>
<td>58.8</td>
<td>39,764</td>
<td>CR</td>
<td>PVRV/13.3</td>
<td>YES – NG+VUC</td>
</tr>
<tr>
<td>220D-210</td>
<td>ETF; TBD</td>
<td>58.8</td>
<td>39,764</td>
<td>CR</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>220D-156</td>
<td>ETF; Diluent</td>
<td>45.7</td>
<td>24,019</td>
<td>EFR</td>
<td>ATM/7.5</td>
<td>No-EFR</td>
</tr>
<tr>
<td>220D-152</td>
<td>ETF; Hot BIT</td>
<td>45.7</td>
<td>24,019</td>
<td>CR</td>
<td>PVRV&lt;1</td>
<td>YES – NG+VUC</td>
</tr>
</tbody>
</table>
## TERMS AND CONDITIONS ATTACHED TO APPROVAL

<table>
<thead>
<tr>
<th>Tank ID No.</th>
<th>Description of Tank</th>
<th>Diameter of Tank (M)</th>
<th>Volume of Tank (M$^3$)</th>
<th>Type of Tank</th>
<th>Type of Vapour Pressure (Max) PSIA</th>
<th>Emission Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>220D-151</td>
<td>ETF; Hot BIT</td>
<td>45.7</td>
<td>24,019</td>
<td>CR</td>
<td>PVRV/&lt;1</td>
<td>YES – NG+VCU</td>
</tr>
<tr>
<td>220D-155</td>
<td>ETF; Diluent</td>
<td>58.8</td>
<td>39,764</td>
<td>EFR</td>
<td>ATM/7.5</td>
<td>No-EFR</td>
</tr>
</tbody>
</table>

**STF – South Tank Farm**
- FR - Floating Roof
- NAP – Naphtha
- KER – Kerosene
- VU – Voyageur Upgrader
- EFR-External Floating Roof
- TBD - To Be Determined

**NAP – Naphtha**
- BDS - Diluted Bitumen
- D/B - Diluent or Diluted Bitumen
- Naphtha or
- Kerosene solution

**KER – Kerosene**
- DSL – Diesel
- Naphtha or
- Kerosene solution

**VU – Voyageur Upgrader**
- EFR – East Tank Farm

**EFR-External Floating Roof**

**TBD - To Be Determined**

**UNGR – Upgrading**
- CR – Cone (fixed) roof
- D/B - Diluent or Diluted Bitumen
- N/A

**Solution**
- SAOLN - Diethanolamine
- (i.e., HVGO, LVGO Gasoil or)
- NVGO – Heavy Vacuum Gas Oil

**CR - Cone (fixed) roof**
- N/A
- Kerosene solution

**TERMS AND CONDITIONS ATTACHED TO APPROVAL**

### LIMITS

#### 4.1.25
The Director, may, on his own initiative and where he considers it appropriate to do so, amend, add to, or delete terms or conditions specifying concentrations, emission rates, temperatures and time periods in this section if a significant environmental effect occurs or may occur that was not anticipated by the Director at the time the approval was issued.

#### 4.1.26
Releases of the following substances to the atmosphere shall not exceed the limits specified in TABLE 4.1-B.

### TABLE 4.1-B: EMISSION LIMITS

<table>
<thead>
<tr>
<th>Source of Air Emission</th>
<th>Air Contaminant</th>
<th>LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Main powerhouse stack (31F-7)</td>
<td>Sulphur dioxide</td>
<td>≤ 4700 ppm by volume (one-hour average)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤ 14.2 tonnes per hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤ 259 tonnes per day</td>
</tr>
<tr>
<td></td>
<td>Particulates</td>
<td>≤ 0.20 kg/1,000 kg of effluent adjusted to 50% excess air</td>
</tr>
<tr>
<td>New main powerhouse stack (37F-1)</td>
<td>Nitrogen oxides (expressed as NO$_2$)</td>
<td>≤ 1.8 tonnes per hour</td>
</tr>
<tr>
<td></td>
<td>Particulates</td>
<td>≤ 0.20 kg/1,000 kg of effluent adjusted to 50% excess air</td>
</tr>
<tr>
<td>Thermal oxidation unit 1 exhaust stack (8F-5)</td>
<td>Sulphur dioxide</td>
<td>≤ 2,000 ppm by volume (one-hour average)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤ 1.2 tonnes per hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤ 51 tonnes per day (During time periods when the Tail Gas Treatment Unit 1 is in operation)</td>
</tr>
<tr>
<td></td>
<td>Temperature</td>
<td>≥ 400°C for a one-hour averaging</td>
</tr>
</tbody>
</table>
## TERMS AND CONDITIONS ATTACHED TO APPROVAL

<table>
<thead>
<tr>
<th>Source of Air Emission</th>
<th>Air Contaminant</th>
<th>LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each of the two SCR cogeneration units (input rating turbine 3728 GJ/hr, HRSG 1023 GJ/hr based on HHV) exhaust stacks (27F-2 and 27F-3)</td>
<td>Nitrogen oxides (expressed as NO2)</td>
<td>≤ 219 kg/hr based on a 720-hour rolling average</td>
</tr>
<tr>
<td>Each of Gas turbine GTG-5 and GTG-6 main stacks</td>
<td>Nitrogen oxides (expressed as NO2)</td>
<td>≤ 94 kg/hr</td>
</tr>
<tr>
<td>Thermal oxidation Unit 2 exhaust stack (53F-611)</td>
<td>Sulphur dioxide</td>
<td>≤ 1.7 tonnes per hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤ 28.3 tonnes per day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(During time periods when the Tail Gas Treatment Unit 2 is in operation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤ 4.4 tonnes per hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(During time periods of sulphur recovery plant at U1 or U2 start-up, shut-down, upset and heat soaking of catalyst beds or when the Tail Gas Treatment Unit 2 is bypassed)</td>
</tr>
<tr>
<td></td>
<td>Temperature</td>
<td>≥ 538°C for a one-hour averaging, unless otherwise authorized by the Director.</td>
</tr>
<tr>
<td>Thermal oxidation unit 4 exhaust stack (208F-610)</td>
<td>Sulphur dioxide</td>
<td>≤ 0.7 tonnes per hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤ 14.2 tonnes per day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(During time periods when the Tail Gas Treatment Unit 4 is in operation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤ 6.9 tonnes per hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(During time periods of sulphur recovery plant at Voyageur upgrader start-up, shut-down, upset and heat soaking of catalyst beds or when the Tail Gas Treatment Unit 4 is bypassed)</td>
</tr>
<tr>
<td></td>
<td>Temperature</td>
<td>≥ 538°C for a one-hour averaging, unless otherwise authorized by the Director.</td>
</tr>
<tr>
<td>Millennium coker charger heater stack (52F-302) (Capacity 504 GJinput/hr)</td>
<td>Nitrogen oxides (expressed as NO2)</td>
<td>≤ 20.2 kg/hr per stack (monthly average of CEMS Data)</td>
</tr>
<tr>
<td>Each of two Millennium coker charger heaters stacks (52F-0300 and 52F-0301) (Capacity 456 GJinput/hr)</td>
<td>Nitrogen oxides (expressed as NO2)</td>
<td>≤ 18.2 kg/hr per stack</td>
</tr>
<tr>
<td>Millennium hydrogen reformer furnace stack (54F-102) (Capacity 957 GJinput/hr)</td>
<td>Nitrogen oxides (expressed as NO2)</td>
<td>≤ 38.3 kg/hr per stack</td>
</tr>
<tr>
<td>Each of two Millennium diluent heaters stacks (52F101A/B) (Capacity 168 GJinput/hr)</td>
<td>Nitrogen oxides (expressed as NO2)</td>
<td>≤ 6.7 kg/hr per stack</td>
</tr>
<tr>
<td>Each of two Millennium diluent heaters stacks (57F-1A/B) (Capacity 175 GJinput/hr)</td>
<td>Nitrogen oxides (expressed as NO2)</td>
<td>≤ 7.0 kg/hr per stack</td>
</tr>
<tr>
<td>Each of two Millennium vacuum heaters stacks (57F-2A/B) (Capacity 222 GJinput/hr)</td>
<td>Nitrogen oxides (expressed as NO2)</td>
<td>≤ 8.9 kg/hr per stack</td>
</tr>
</tbody>
</table>
TERMS AND CONDITIONS ATTACHED TO APPROVAL

<table>
<thead>
<tr>
<th>Source of Air Emission</th>
<th>Air Contaminant</th>
<th>LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen Reformer Furnace stack 66F-102(Capacity 408 GJ input/hr)</td>
<td>Nitrogen oxides (expressed as NO2)</td>
<td>≤ 16.3 kg/hr per stack (except for the start-up, shut-down and upset periods)</td>
</tr>
</tbody>
</table>

4.1.27 With regards to the existing gas turbines (GTG-5 and GTG-6), the approval holder shall meet the Clean Air Strategic Alliance document entitled “An Emissions Management Framework for the Alberta Electricity Sector Report to Stakeholders,” November 2003, as amended.

4.1.28 The FGD plant shall operate at least ninety percent of the time when the coke boilers are operational over a two-year averaging period.

4.1.29 The combined emission rate of sulphur dioxide to the atmosphere from all sources at the plant based on a 24-hour rolling average, shall not exceed:

(a) 360 tonnes per consecutive 24-hour period, except during time periods when it is necessary to start-up two or more upgraders simultaneously to prevent freeze-up; and

(b) 500 tonnes per consecutive 24-hour period during time periods when it is necessary to start-up two or more upgraders simultaneously to prevent freeze-up.

4.1.30 The combined emission rate of sulphur dioxide to the atmosphere from all sources at the plant based on a 365-day rolling average, shall not exceed:

(a) 79 t/d;

(b) 55 t/d, commencing on the day after commencement of operations of the cogeneration units and the shutdown of the coke fired boilers; and

(c) 65 t/d, commencing on the day after the start of the Voyageur Upgrader commissioning (i.e. first day of hydrocarbon feed to the new coker drums).

4.1.31 Following a major emissions event which has caused the 365-day rolling average limit to be exceeded, the approval holder may request written authorization from the Director to modify the 365-day rolling average calculation, in accordance with 4.1.32 of this approval.

4.1.32 Following a major emissions event which has caused the 365-day rolling average limit to be exceeded, the approval holder may request written authorization from the Director to modify the 365-day rolling average calculation, which is specified in subsection 4.1.31 of this approval. The Director may issue or refuse to issue a written authorization for any such request that is made by the approval holder. If the
**TERMS AND CONDITIONS ATTACHED TO APPROVAL**

Director issues a written authorization to modify the 365-day rolling average calculation, the modification shall occur in the following manner:

(a) the 365-day rolling average calculation shall not be modified until such time that the major emissions event has been rectified in a manner satisfactory to the Director; and

(b) for the days following the date that the major emissions event has been satisfactorily rectified, the 365-day rolling average calculation shall be modified by considering the 365-day rolling average on the day prior to the start of the major emissions event to be the sulphur dioxide emission rate value for each of the days during the duration of the major emissions event.

4.1.34 Any exceedances of the limits specified in this approval that occur during the duration of the major emissions event shall not in any way be modified as a result of resetting of the 365-day rolling average calculation in the manner described in subsection 4.1.32.

4.1.35 The approval holder shall immediately upon discovery of an emission in excess of an approval limit take steps to reduce the excessive emission.

**MONITORING AND REPORTING**

4.1.36 The approval holder shall monitor the air emission sources as required in TABLE 4.1-C, unless otherwise authorized in writing by the Director.

4.1.37 The approval holder shall report to the Director the results of the air emission source monitoring as required in TABLE 4.1-C, unless otherwise authorized in writing by the Director.
# TERMS AND CONDITIONS ATTACHED TO APPROVAL

## TABLE 4.1-C: SOURCE MONITORING OF EMISSIONS

<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>PARAMETER</th>
<th>SAMPLING FREQUENCY</th>
<th>METHOD OF MONITORING</th>
<th>REPORTING FREQUENCY</th>
<th>REPORT TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old main powerhouse stack (31F-7)</td>
<td>Sulphur dioxide (concentration)</td>
<td>Continuous</td>
<td>Continuous emission monitor</td>
<td>Special</td>
<td>Director</td>
</tr>
<tr>
<td></td>
<td>Nitrogen oxides (expressed as NO2)</td>
<td></td>
<td></td>
<td>Monthly</td>
<td></td>
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<tr>
<td></td>
<td>Total effluent stream flow rate (volume)</td>
<td></td>
<td></td>
<td>Annually</td>
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<tr>
<td></td>
<td>Temperature In-stack opacity</td>
<td></td>
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<tr>
<td></td>
<td>Sulphur dioxide</td>
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<tr>
<td></td>
<td>Nitrogen oxides (expressed as NO2)</td>
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<tr>
<td></td>
<td>Carbon dioxide</td>
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<td></td>
<td>Caron monoxide</td>
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<td></td>
<td>Polycyclic aromatic hydrocarbons</td>
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<td>Particulates</td>
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<td>Total effluent stream flow rate (volume)</td>
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<td>Temperature In-stack opacity</td>
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<td></td>
<td>Sulphur dioxide (concentration)</td>
<td>Continuous</td>
<td>Continuous emission monitor</td>
<td>Within 30 days</td>
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<tr>
<td></td>
<td>Nitrogen oxides (expressed as NO2)</td>
<td></td>
<td></td>
<td>after the survey</td>
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<td></td>
<td>Carbon dioxide</td>
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<td>is done</td>
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<td></td>
<td>Caron monoxide</td>
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<td>Polycyclic aromatic hydrocarbons</td>
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<td>Total effluent stream flow rate (volume)</td>
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<td></td>
<td>Temperature In-stack opacity</td>
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<tr>
<td></td>
<td>Once every three years at a time when the FGD is not operating, unless</td>
<td>Manual stack survey</td>
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<td></td>
<td>otherwise authorized in writing by the Director.)</td>
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<td>Total effluent stream flow rate (volume)</td>
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<td></td>
<td>Temperature In-stack opacity</td>
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</tr>
<tr>
<td>Thermal oxidation unit 1 (8F-5), Unit 2</td>
<td>Sulphur dioxide (concentration)</td>
<td>Continuous</td>
<td>Continuous emission monitor</td>
<td>Four times per</td>
<td></td>
</tr>
<tr>
<td>(53F-611) and Unit 4 (208F-610) stacks</td>
<td>Nitrogen Oxides (expressed as NO2)</td>
<td></td>
<td></td>
<td>year</td>
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<td></td>
<td>Total effluent stream flow rate (volume)</td>
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<td></td>
<td>Temperature In-stack opacity</td>
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<td></td>
<td>Sulphur dioxide (concentration)</td>
<td>Continuous</td>
<td>Continuous emission monitor</td>
<td></td>
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<tr>
<td>New main powerhouse stack (37F-1)</td>
<td>Nitrogen oxides (expressed as NO2)</td>
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<td></td>
<td>Carbon dioxide</td>
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<td>Caron monoxide</td>
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<td>Polycyclic aromatic hydrocarbons</td>
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<td>Particulates</td>
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<td>Total effluent stream flow rate (volume)</td>
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<td>Temperature In-stack opacity</td>
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<td></td>
<td>Two times per year</td>
<td>Manual stack survey</td>
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<tr>
<td>New main powerhouse stack (37F-1)</td>
<td>Sulphur dioxide (concentration)</td>
<td>Continuous</td>
<td>Continuous emission monitor</td>
<td></td>
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<td></td>
<td>Nitrogen oxides (expressed as NO2)</td>
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<td></td>
<td>Carbon dioxide</td>
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<td></td>
<td>Caron monoxide</td>
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<td></td>
<td>Polycyclic aromatic hydrocarbons</td>
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<td>Particulates</td>
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<td>Total effluent stream flow rate (volume)</td>
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<td></td>
<td>Temperature In-stack opacity</td>
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</tbody>
</table>
## TERMS AND CONDITIONS ATTACHED TO APPROVAL

<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>PARAMETER</th>
<th>SAMPLING FREQUENCY</th>
<th>METHOD OF MONITORING</th>
<th>REPORTING FREQUENCY</th>
<th>REPORT TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main boilers exhaust duct downstream of electrostatic precipitators</td>
<td>In-stack opacity</td>
<td>Continuous</td>
<td>Continuous emission monitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas Turbines GTG-5 and GTG-6 Main Stacks</td>
<td>Nitrogen oxides</td>
<td>Continuous</td>
<td>Continuous emission monitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millennium coker charger heater stack (52F-302)</td>
<td>Flow Rate</td>
<td>Continuous</td>
<td>Continuous emission monitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millennium hydrogen reformer furnace stack (66F-102)</td>
<td>Temperature</td>
<td>Continuous</td>
<td>Continuous emission monitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voyageur hydrogen reformer furnace stack (206F-102),</td>
<td>Nitrogen oxides</td>
<td>Once per year</td>
<td>Manual stack survey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voyageur coker charge heater stack (any one of 205F-300/301/302)</td>
<td>Temperature</td>
<td>Four times per year</td>
<td>Manual stack survey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voyageur boiler package heater stack (any one of 214F-103, 214F-203),</td>
<td>Nitrogen oxides</td>
<td>Once per Year</td>
<td>Manual stack survey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Each of the two SCR cogeneration units (27PE-1 and 27PE-2) exhaust stacks (27F-2 and 27-3)</td>
<td>Temperature</td>
<td>Four times per year</td>
<td>Manual stack survey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millennium coker charger heater stacks(52F-300 and 52F-301)</td>
<td>Nitrogen oxides</td>
<td>Four times per year</td>
<td>Manual stack survey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millennium hydrogen reformer furnace stack (54F-102)</td>
<td>Carbon monoxide</td>
<td>Four times per year</td>
<td>Manual stack survey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voyageur coker charge heater stacks (205F-300/301/302, except for the one that has CEMS installed)</td>
<td>Carbon dioxide</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voyageur boiler package heater stack (214F-103, 214F-203, except for the one that has CEMS installed)</td>
<td>Total effluent stream flow rate (volume)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Millenium diluent heaters stack (52F-101A/B)</td>
<td>Temperature</td>
<td>Four times per year</td>
<td>Manual stack survey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millenium diluent heaters stack (57F-1A/B)</td>
<td>Nitrogen oxides</td>
<td>Once per Year</td>
<td>Manual Stack Survey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millenium vacuum heaters stack (57F-2A/B)</td>
<td>Carbon monoxide</td>
<td></td>
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<tr>
<td></td>
<td>Carbon dioxide</td>
<td></td>
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<tr>
<td></td>
<td>Total effluent stream flow rate (volume)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Temperature</td>
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<td></td>
</tr>
</tbody>
</table>
### TERMS AND CONDITIONS ATTACHED TO APPROVAL

<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>PARAMETER</th>
<th>SAMPLING FREQUENCY</th>
<th>METHOD OF MONITORING</th>
<th>REPORTING FREQUENCY</th>
<th>REPORT TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stacks for all new boilers and heaters with capacities equal to or greater than 10.5 GJ/hr and less than 105 GJ/hr</td>
<td>Nitrogen oxides (expressed as NO2) Total effluent stream flow rate (Volume) Temperature</td>
<td>Initial Verification Test</td>
<td>Manual Stack Survey</td>
<td>SPECIAL MONTHLY ANNUALLY</td>
<td>SPECIAL</td>
</tr>
<tr>
<td>Stacks for all new boilers and heaters with capacities greater than 105 GJ/hr and less than 264 GJ/hr</td>
<td>Nitrogen oxides (expressed as NO2) Carbon monoxide Carbon dioxide Total effluent stream flow rate (Volume) Temperature</td>
<td>Once per Year</td>
<td>Manual Stack Survey</td>
<td>SPECIAL MONTHLY ANNUALLY</td>
<td>SPECIAL</td>
</tr>
<tr>
<td>Flare stacks</td>
<td>Volumetric flow rate of stream that is being flared</td>
<td>Continuous measurement during flaring, or current and accurate calculation</td>
<td>Flow meter, or calculation</td>
<td>SPECIAL MONTHLY ANNUALLY</td>
<td>SPECIAL</td>
</tr>
<tr>
<td>East Tank Farm Vapour Combustion Unit Stacks (220F-202, 220F-791A and 220F-791B), Catalytic Heater (217VE-5)</td>
<td>Volumetric flow rate of stream that is being combusted</td>
<td>Continuous measurement</td>
<td>Flow meter, or calculation</td>
<td>SPECIAL MONTHLY ANNUALLY</td>
<td>SPECIAL</td>
</tr>
</tbody>
</table>

4.1.38 The approval holder shall conduct CEMS tests or manual stack survey tests in the following manners, unless otherwise authorized in writing by the Director:

(a) during periods of scheduled manual stack survey tests or CEMS tests, such as Relative Accuracy Test, the facility shall be operated at a rate of at least 90% of “normal” production. Normal Production is defined in the CEMS Code; and

(b) at least 30 days must elapse between the completion of a satisfactory manual stack survey or a CGA or a RATA, which demonstrates compliance with the approval limits, and the commencement of the next manual stack survey or CGA or RATA for that source.

4.1.39 The approval holder shall notify the Director in writing a minimum of 14 days prior to any manual stack survey that is required to be conducted by this approval, unless otherwise authorized in writing by the Director.

4.1.40 The Approval holder shall monitor liquid streams once each month from the following vessels: 5C-72, 25C-2, 10C-2, 34G-29A/B, 34G-35A/B, 34G-24A/B, 52C-102, 57C-2,
TERMS AND CONDITIONS ATTACHED TO APPROVAL

53C-101, 68C-101, and 16G-1, 219G-202A/B, 208C-101, 208C-701, 212G-501A/B, 212G-503A/B, 212G-513A/B, 212G-529A/B, 205D-300, when the vessel unit is online and operational at least for a consecutive 24 hour period in the calendar month, unless otherwise authorized in writing by the Director.

4.1.41 The sample referred in subsection 4.1.40 shall be analyzed for:

(a) hydrogen sulphide;

(b) total hydrocarbon; and

(c) ammonia.

4.1.42 The approval holder shall monitor the gypsum slurry to Pond 4G-2 by collecting a semi-annual grab sample, separated by a period of at least three months, of the gypsum slurry stream and the recycle water stream.

4.1.43 The sample referred in subsection 4.1.42 shall be analyzed for metals (including Nickel and Vanadium), unless otherwise authorized in writing by the Director.

4.1.44 The approval holder shall submit the monthly CEMS Code data required in 4.1.37 electronically as outlined in the Air Monitoring Directive, Alberta Environment and Parks, 2016, as amended, unless otherwise directed by the Director.

4.1.45 All floating roof tanks identified in Table 4.1-A shall be inspected once per year according to the requirements of Appendix C or D of the Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks, Canadian Council of Ministers of the Environment, PN 1180, 1995, as amended.

4.1.46 The approval holder shall submit a floating roof inspection and maintenance report to the Director on or before March 31, 2020 for the year 2019 and subsequent reports annually, unless otherwise authorized in writing by the Director.

4.1.47 The floating roof inspection and maintenance report referred to in 4.1.46 shall contain, at a minimum, all of the following:

(a) a summary of inspection findings referred to in 4.1.45;

(b) identification of tanks that required maintenance and details of tank vapour control faults;

(c) identification of tanks that require maintenance and details of tank vapour control faults;

(d) repair and replacement details and timeline; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(e) any other information required in writing by the Director.

AMBIENT AIR MONITORING AND REPORTING

4.1.48 The approval holder shall

(a) monitor; and

(b) report

on ambient air quality according to the following:

(i) participate in the regional ambient air monitoring network; and

(ii) submit monthly and annual reports containing the monitoring information collected by the approval holder or through participation in the regional initiative.

FUGITIVE VOC EMISSION MONITORING

4.1.49 Prior to start-up of the Voyageur Upgrader, the approval holder shall submit a Fugitive VOC Emissions and Leak Detection and Repair program for the new facilities associated with the Voyageur Upgrader in accordance with Subsection 4.1.50(b), unless otherwise authorized in writing by the Director.

4.1.50 The approval holder shall monitor annually for fugitive VOC emissions in accordance with the following:

(a) the Fugitive VOC Emissions and Leak Detection and Repair Program, as authorized in writing by the Director; and

(b) the Management of Fugitive Emissions at Upstream Oil and Gas Facilities, BEST MANAGEMENT PRACTICE, CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS, 2007, as amended;

unless otherwise authorized in writing by the Director.

BIOMONITORING

4.1.51 The approval holder shall:

(a) conduct ambient air quality environmental effects monitoring (biomonitoring) through participation and support of regional monitoring; and

(b) support the status and results of the monitoring, that are submitted annually to the Director by regional monitoring;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

in a manner satisfactory to the Director.

4.1.52 The approval holder shall:

(a) participate in, on an ongoing basis, an acid deposition monitoring program for aquatic and terrestrial ecosystems through regional initiatives or another program authorized in writing by the Director;

(b) support the program results of the acid deposition monitoring program referred to in (a), that are reported annually by regional initiatives or another program authorized in writing by the Director; and

(c) support the program design of the acid deposition monitoring program referred to in (a) (including but not limited to monitoring frequency, timing, aerial coverage, and endpoints) to ensure it is sufficiently robust as to detect potential impacts in the receiving environment as determined by periodic peer review conducted by regional initiatives or another program authorized in writing by the Director;

in a manner satisfactory to the Director.

OXIDES OF NITROGEN EMISSIONS

4.1.53 The approval holder shall participate in regional initiatives undertaken to assess the potential effects of oxides of nitrogen emissions.

4.1.54 In addition to the limits specified in TABLE 4.1-B, the approval holder shall strive to meet the NOx emission performance target in TABLE 4.1-D.

TABLE 4.1-D: PERFORMANCE TARGET

<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>SUBSTANCE</th>
<th>PERFORMANCE TARGET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each of the two SCR cogeneration units (input rating turbine 3728 GJ/hr, HRSG 1023 GJ/hr based on HHV) exhaust stacks</td>
<td>Nitrogen Oxides (expressed as NO₂)</td>
<td>85 kg/hr per stack</td>
</tr>
</tbody>
</table>

Note: The NOx emission performance target was determined according to Alberta Environment’s Emission Guidelines for Oxides of Nitrogen (NOx) for New Boilers, Heaters and Turbines Using Gaseous Fuels Based on a Review of Best Available Technology Economically Achievable (BATEA), December 14, 2007, as amended. Kg/hr is on annual average basis.

4.1.55 In the event that the combined emission rate of oxides of nitrogen from all sources (including stationary sources and mine mobile equipment) at the plant is higher than an annual average target of 70.0 tonnes per day prior to the start commissioning of
TERMS AND CONDITIONS ATTACHED TO APPROVAL

the Voyageur Upgrader project or 80.0 tonnes per day after the start commissioning of the Voyageur Upgrader project for any calendar year, the approval holder shall submit a report which shall include:

(a) an inventory of oxides of nitrogen from all sources at the plant, including a description of the calculation or measurement methods that were used to quantify the emissions;

(b) a description of the events and circumstances that led to the combined emission rate being higher than the annual average target;

(c) an outline of the steps and measures which have been taken to minimize emissions of oxides of nitrogen at the plant; and

(d) a description of the most technically feasible and cost-effective reduction steps or measures that could be undertaken:

(i) at the plant to reduce the emission rate of oxides of nitrogen to below the annual average target; or

(ii) at another plant in the region to offset the amount of emissions from the Plant that exceeded the annual average target; and

(e) an estimate of the time that would be required to implement the reduction steps or measures if they were to be required.

4.1.56 The approval holder shall submit the report about oxides of nitrogen emissions referred to in subsection 4.1.55 to the Director on or before April 30 of the year following the year in which the information was collected.

MINE MOBILE EMISSION SOURCES

4.1.57 Until the updated Plan in subsection 4.1.58 is authorized in writing by the Director and implemented, the approval holder shall continue to implement the plan to minimize oxides of nitrogen emissions from all mine mobile equipment, as previously authorized in writing by the Director.

4.1.58 The approval holder shall submit an updated plan to the Director for a program to minimize all oxides of nitrogen emissions from all mine mobile equipment, where practicable.

4.1.59 The plan referred to in subsection 4.1.58 shall be submitted by April 30, 2022 unless otherwise authorized in writing by the Director.

4.1.60 The plan, referred to in subsection 4.1.58, shall include, at a minimum, the following unless otherwise authorized in writing by the Director:
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(a) the methods that will be used to quantify the oxides of nitrogen and all other emissions from the mobile sources;

(b) the procedures that will be undertaken to minimize emissions of particulate matter from road dust;

(c) the procedures that will be implemented to ensure that all new and replacement/refurbished mining vehicles and engines are equipped with effective emission control technology that meets, at a minimum:

   (i) the latest United States Environmental Protection Agency emission standards for off-road heavy-duty diesel vehicles as amended; or

   (ii) the latest Canadian Environmental Protection Act Off-Road Compression-Ignition Engine Emission Regulations and/or Guidelines as amended;

(d) the mining vehicles to be replaced/refurbished, as identified in subsection 4.1.60(c), and timeline of implementation;

(e) an updated mobile equipment inventory summary including power rating, model year, anticipated replacement date and emission tier;

(f) any other procedures that the approval holder proposes to implement to study and minimize emissions from mobile sources; and

(d) any other information as required in writing by the Director.

unless otherwise authorized in writing by the Director.

4.1.61 The approval holder shall implement the plan referred to in subsection 4.1.58, as authorized in writing by the Director.

SPECIAL CONDITIONS

4.1.62 In the event that the combined emission rate of sulphur dioxide to the atmosphere from all sources at the plant is higher than an average of 81 tonnes per day for any year, the approval holder shall submit a detailed written report on sulphur dioxide emissions to the Director on or before April 30 following the year in which the information was collected.

4.1.63 The report referred to in subsection 4.1.62 shall be in a level of detail acceptable to the Director and shall contain the following information:

(a) a description of the events and circumstances that lead to the combined emissions being higher than an average of 81 tonnes per day;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(b) an outline of the steps or procedures which were taken to minimize emissions during the events and circumstances described above; and

c) a description of any long-term measures or actions that are required to prevent or minimize such occurrences in the future and a schedule of implementation for these measures or actions.

4.1.64 In the event that the combined emission rate of sulphur dioxide to the atmosphere from the acid gas flare stack (19F-2), the two hydrocarbon flare stacks (19F-1 and 19F-3), the Millennium and Millennium Coker Unit H2S/HC flare stacks (59F-101 and 59F-102), the Millennium SWAG flare stack (53F-612) and the Voyageur H2S/HC flare stack (206F-103) at the plant (excluding the continuous flaring from Units 5C18, 52C-311, and the Plant 7 compressor seals) is higher than:

(a) an average of 5.0 tonnes per day during any year prior to the start commissioning of the Voyageur Upgrader project (i.e. first day of hydrocarbon feed to the new coker drums); or

(b) an average of 10.0 tonnes per day during any year after the start commissioning of the Voyageur Upgrader project (i.e. first day of hydrocarbon feed to the new coker drums);

the approval holder shall submit a written report on the flaring to the Director on or before April 30 following the year in which the information was collected.

4.1.65 The report referred to in subsection 4.1.64 shall contain the following information:

(a) a listing of all of the flaring events (excluding the continuous flaring from Units 5C18, 52C-311, and the Plant 7 compressor seals) that resulted in sulphur dioxide being emitted to the atmosphere, including the start time, duration, source (origin plant), the stack that was used, and the tonnes of sulphur dioxide emitted;

(b) a description of the events and circumstances that lead to the combined emissions being higher than the annual average specified in subsection 4.1.64;

(c) an outline of the steps or procedures which have been taken to minimize emissions from these sources;

(d) a description of any long-term measures or actions that are required to prevent or minimize such occurrences in the future and a schedule of implementation for these measures or actions; and

(e) any other information required in writing by the Director.

MONTHLY REPORT
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.1.66 The approval holder shall submit, or cause to be submitted, a monthly air emissions summary report to the Director, unless otherwise authorized in writing by the Director.

4.1.67 The monthly air emissions summary report referred to in subsection 4.1.66 shall contain the following:

(a) the amount (in tonnes) of sulphur dioxide emitted to the atmosphere during the month, from the following:
   (i) the old main powerhouse stack (31F-7);
   (ii) the new main powerhouse stack (37F-1);
   (iii) the thermal oxidation unit 1 stack (8F-5);
   (iv) the thermal oxidation unit 2 stack (53F-0610);
   (v) the thermal oxidation unit 4 stack; and
   (vi) the flare stacks;

(b) the monitoring results collected in accordance with TABLE 4.1-C;

(c) an assessment of the emissions of air contaminants relative to the limits specified in TABLE 4.1-B of this approval;

(d) an assessment of the performance of the air emission control and monitoring equipment, and an interpretation of significant variations in equipment performance;

(e) the results of any manual stack survey;

(f) with respect to continuous emission monitoring:
   (i) a summary of the quality assurance/quality control checks carried out on each continuous emission monitoring system;
   (ii) explanation for any downtime;
   (iii) the percent operational time for each continuous emission monitor; and
   (iv) the results for each continuous emission monitor system;

(g) with respect to the in-stack opacity continuous emission monitor, the frequency distribution of all in-stack opacity readings:
   (i) between 0 to 20 level;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(ii) between 21 to 40 level; and

(iii) above 40 percent levels;

(h) with respect to, for each flaring event:

(i) the start time;

(ii) the duration;

(iii) source (origin plant);

(iv) the stack that was used;

(v) the amount of sulphur dioxide released to the atmosphere in tonnes; and

(vi) the amount of gas flared in cubic metres;

(i) with respect to the sulphur recovery units, the daily amounts of:

(i) sour water acid gas and acid gas processed for each unit;

(ii) total liquid sulphur recovered;

(iii) sulphur remaining in each of the sulphur recovery units tail gas;

(iv) a summary of the performance of the tail gas treatment units describing:

(A) the percentage sulphur recovery that was achieved for each unit; and

(B) operability (expressed in terms of hours that the tail gas treatment unit was online divided by the hours that the sulphur recovery unit was operating);

(v) for each period that the tail gas treatment unit was bypassed, provide the following:

(A) the time;

(B) the duration; and

(C) the reason for the bypass;

(j) with respect to the FGD plant, a summary of the performance of the FGD plant describing:
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(i) the percentage sulphur dioxide removal that was achieved;

(ii) operability (expressed in terms of hours that the FGD plant was online divided by hours that the powerhouse main boilers were operating); and

(iii) for each period that the FGD plant was bypassed, provide the following:

(A) the time;

(B) the duration; and

(C) the reason for the bypass;

(k) the results of the monitoring of potentially odorous liquid streams directed to the tailings ponds as required in subsection 4.1.40;

(l) a summary of contraventions reported pursuant to subsection 2.1.1; and

(m) any other information required in writing by the Director.

ANNUAL REPORT

4.1.68 The approval holder shall submit, or cause to be submitted, an annual air emissions summary and evaluation report to the Director, unless otherwise authorized in writing by the Director.

4.1.69 The annual air emissions summary and evaluation report referred to in subsection 4.1.68 shall contain the following information:

(a) a summary of the number of continuous ambient air monitoring readings, for sulphur dioxide and hydrogen sulphide, which were greater than the Alberta Ambient Air Quality Guidelines and were attributed to the approval holder per month for each continuous ambient monitoring station;

(b) a discussion of the likely reasons, and any mitigative measures taken, for ambient air quality readings of sulphur dioxide and hydrogen sulphide which were greater than the Alberta Ambient Air Quality Guidelines and that were attributed to the approval holder at all continuous ambient air monitoring stations, and a comparison with the previous five years on a year-to-year basis;

(c) a summary of source monitoring conducted in accordance with TABLE 4.1-C;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(d) an overview of the operation and performance of air emissions control equipment, and a summary of plant modifications and operational changes that may affect atmospheric emissions;

(e) a summary of the results of manual stack surveys;

(f) a summary of any readings from source emission monitoring (manual stack surveys and continuous emission monitoring) that exceeded approval limits and a discussion of the causes and remedial actions taken;

(g) an inventory of sulphur dioxide emissions from all significant release points;

(h) an inventory of NOX emissions from all significant sources, including mobile sources and a description of the calculation or measurement methods that were used to quantify the emissions;

(i) an inventory of total hydrocarbons (THC)/volatile organic compounds (VOC) emissions and the results of fugitive VOC emissions monitoring for the year that fugitive VOC monitoring (including tailings facilities and mineface) was completed;

(j) a summary of the performance of the NRUs in reducing naphtha losses to the tailings ponds, and therefore VOC emissions from the tailings ponds;

(k) a summary of the performance of the FGD, including at a minimum all of the following:
   (i) SO₂ recovery efficiency;
   (ii) percent uptime relative to a 95% uptime target when any of coke boilers is operational on coke fuel source;
   (iii) approval holder’s effort to improve recovery and uptime during the reporting year; and
   (iv) plans to improve recovery and uptime for the next year;

(l) with respect to TABLE 4.1-A: a summary of the events when true vapour pressure were exceeded, including:
   (i) date;
   (ii) time;
   (iii) duration;
   (iv) source; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(v) measures taken to rectify the exceedance;

(m) the result of the monitoring of the gypsum slurry to pond 4G-2 as required in subsection 4.1.42;

(n) a summary of the approval holder’s effort and performance in managing greenhouse gases on both an intensity and an absolute basis;

(o) a summary of the approval holder’s efforts to minimize and reduce all atmospheric emissions, and in addition for sulphur compounds (expressed as tonnes of sulphur dioxide equivalent), if the total sulphur compound emissions during the year were higher than the average of emissions for the previous three years:

(i) a summary of the events and circumstances that lead to the combined sulphur emissions being higher than the average of the preceding three years; and

(ii) an outline of steps or procedures which have been taken or will be taken to minimize future emissions;

(p) the status and results of the environmental effects monitoring (biomonitoring) required in subsections 4.1.51 and 4.1.52 including:

(i) a summary of the data and the results of any ecological effects monitoring related to acidification, eutrophication or direct effects on terrestrial receptors that was conducted during the previous year after the approval holder has been operating the plant for one year;

(ii) a description of the monitoring program planned for the present year; and

(iii) a description of the approval holder’s plans for consultation with other stakeholders during the present year regarding the design and results of the biomonitoring program;

(q) a summary of the status and the results of any special ambient air quality studies and related health studies that the approval holder either participated in or conducted independently;

(r) a summary of the status and the results of any non-confidential atmospheric emissions reduction reports and studies that the approval holder either participated in or conducted independently;

(s) a description of the approval holder’s consultation with the community of Fort McKay in establishing, monitoring and reporting of community based air quality notification levels;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(t) the status of any sulphur block activity;
(u) a summary of the results of any other air related monitoring that was conducted to fulfil the requirements of this approval;
(v) a summary of comparison of actual SCR Cogeneration Units NOx emissions to the performance target referred to in TABLE 4.1-D;
(w) a summary of the following information, if the NOx performance target referred to in TABLE 4.1-D is not achieved:
   (i) an explanation of why the performance target was not met;
   (ii) the proposed steps and measures that will be implemented to meet the NOx performance target; and
(x) any other information as required in writing by the Director.

STUDY OF VOC AND RSC EMISSIONS

4.1.70 The approval holder shall submit an updated monitoring plan to the satisfaction of the Director to quantify and characterize the emissions of VOCs and RSC from fugitive and point sources on or before September 30, 2020, unless otherwise authorized in writing by the Director.

4.1.71 The VOC (including PAHs) and RSC monitoring plan referred to in subsection 4.1.70 shall include detailed methodology to quantify and characterize monitoring of the following source:

(a) slurry preparation units;
(b) extraction process vents;
(c) froth de-aerator vents;
(d) froth treatment tailings outlets;
(e) NRU outlets;
(f) tank vents;
(g) tailings management and storage facilities;
(h) exposed oil sands mining areas;
(i) mobile sources;
(j) any other significant fugitive or point sources; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(k) any other sources identified in writing by the Director.

4.1.72 The VOC and RSC monitoring plan referred to in subsection 4.1.70 shall include a proposed approach in improving and implementing measurement methodologies for tailings facilities and exposed oil sands mining areas.

4.1.73 The approval holder shall implement the plan referred to in subsection 4.1.70, as authorized in writing by the Director.

4.1.74 The approval holder shall submit a report summarizing the results of the implemented plan referred to in subsection 4.1.70 to the Director on or before March 31, 2022 for the year 2021 and subsequent reports annually, unless otherwise authorized in writing by the Director.

DUST MANAGEMENT

4.1.75 The approval holder shall submit a Dust Management and Mitigation Plan to the satisfaction of the Director on or before September 30, 2020, unless otherwise authorized in writing by the Director.

4.1.76 The Dust Management and Mitigation Plan referred to in subsection 4.1.75 shall include, at a minimum, all of the following:

(a) a discussion on existing dust control practices and their effectiveness;

(b) list of all dust exposure areas or locations of concern;

(c) list of all dust generation activities of concern;

(d) list of all dust suppressants applied;

(e) measures to control and mitigate dust from the locations referred to in subsection 4.1.76 (b);

(f) measures to control and mitigate dust from the activities identified in subsection 4.1.76 (c);

(g) quantitative criteria and thresholds to trigger control/mitigative measures identified in subsection 4.1.76 (e) and subsection 4.1.76 (f);

(h) dust monitoring;

(i) contingency plans to respond to dust issues from operations; and

(j) any other dust management specified in writing by the Director.

unless otherwise authorized in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.1.77 The approval holder shall implement the Dust Management and Mitigation Plan referred to in subsection 4.1.75 as authorized in writing by the Director.

4.1.78 The approval holder shall not apply dust suppressant or any other chemicals for the purpose of dust management on the roads or lands, unless otherwise authorized in writing by the Director.

DECOMMISSIONING OF FGD PLANT AND COKE BOILERS

4.1.79 The approval holder shall submit a decommissioning plan and apply for an amendment to this approval to decommission the FGD plant, coked fired boilers (#1 and #2) and associated facilities 24 months after commencing operations of the cogeneration units referred to in Subsection 3.1.2, unless otherwise authorized in writing by the Director.

4.1.80 The decommissioning plan referred to in Subsection 4.1.79 shall include, at a minimum, the following:

(a) list of equipment and associated infrastructures to be decommissioned;

(b) list of equipment and associated infrastructures to be repurposed and reused;

(c) a detailed description of how the FGD plant, coke fired boilers and associated facilities will be decommissioned and demolished if applicable;

(d) a detailed description of how the industrial wastewater system associated with the FGD plant and coke fired boilers will be decommissioned, repurposed and reused, including but not limited to:

   (i) FGD water supply and discharge pipelines;

   (ii) Pond 4G/4G2;

   (iii) Ash Pond;

   (iv) Gypsum Stockpiles; and

   (v) Pond E;

(e) a description of how the new main powerhouse stack 37F-01 will be isolated and decommissioned;

(f) a detailed decommissioning timelines;

(g) a description of all emission sources routed to the old main powerhouse stack 31F-07 and projected air emissions, including but not limited to:

   (i) Boilers 4, 12, 13, 14 and 15; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(ii) Boiler 3 (previous CFB #3) on mixed fuel gas;

(h) a summary of discussion about SO2 emission update post CFB replacement and associated changes to the applicable approval clauses and limits; and

(i) an update of long term coke management plan referred to in Subsection 3.6.2.

unless otherwise authorized in writing by the Director.

REGIONAL INITIATIVES

4.1.81 The approval holder shall participate in any regional odour and air quality management initiatives, to the satisfaction of the Director, when requested in writing by the Director.

4.1.82 The approval holder shall participate in any regional initiatives as a result of management actions from the Lower Athabasca Region Air Quality Management Framework, Government of Alberta, August 2012, as amended, to the satisfaction of the Director, when requested in writing by the Director.

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 under this approval.

4.2.2 The approval holder shall manage industrial wastewater and industrial runoff systems as described in the application, unless otherwise specified in this approval or authorized in writing by the Director.

4.2.3 The approval holder is authorized to export industrial wastewater to the Suncor Firebag Enhanced Recovery In-Situ Oil Sands Plant and the Husky Oil Operations Limited Sunrise Thermal Project for alternate uses as described in the application from the following wastewater sources:

(a) Reverse Osmosis (RO) reject wastewater;

(b) Pond B wastewater;

(c) Tailings Pond Wastewater from Pond 7, Pond 8B and South Tailings Pond;

(d) on spec stripped sour water; and

(e) other industrial wastewater as authorized by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.2.4 The approval holder shall measure the volume of the industrial wastewaters exported for alternate uses and include a summary of water volume and typical water quality of each exported wastewater in the annual industrial wastewater report referred to in Subsection 4.2.26.

4.2.5 Effective on the commencement of the Base Plant Treated Water Return Operation as described in application No. 78-94, the approval holder shall manage the Base Plant Treated Water Return Operation in the following manner, unless otherwise authorized in writing by the Director:

(a) notify the Director in writing, at a minimum, 14 days prior to the commencement of the Base Plant Treated Water Return Operation;

(b) conduct the operational control (non-regulatory compliance) monitoring as described in application No. 78-94;

(c) provide a summary of annual results of the operational control (non-regulatory compliance) sampling points including any upsets and the resultant, toxicity reduction actions in the annual industrial wastewater report;

(d) conduct a validation study within the boundary of the regulatory mixing zone to confirm and validate the Athabasca River Model (ARM) prediction as described in application No. 78-94 and the validation study shall include the low river flow season; and

(e) provide the above validation study results within 18 months of the commencement of the Base Plant Treated Water Return Operation.

4.2.6 Prior to modifying the industrial wastewater system, the approval holder shall apply to the Director for an amendment to this approval, or a written authorization to proceed with the modifications.

4.2.7 The approval holder shall conduct dredging operation of the fresh water pond only during the months of June, July and August, unless otherwise authorized in writing by the Director.

4.2.8 The approval holder shall only release industrial wastewater and industrial runoff to the Athabasca River watershed from the following locations, unless otherwise authorized in writing by the Director:

West of the Athabasca River – Suncor Base Plant Operations

(a) the Pond C / E combined multiport diffuser outfall;

(b) the Pond C and Pond E Duckpond via a common pipe outfall when the multiport diffuser outfall is unavailable;

(c) Mid-Plant drainage outfall Weir #10 (WEIR_10);
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(d) North Mine drainage outfall Weir #7 (N_MNE_DRAN);
(e) South Mine drainage outfall Weir #1 (S_MNE_DRAN);

East of the Athabasca River – the Steepbank/Millennium Mine

(f) Pond R outfall (MINE_RPOND);
(g) Pond A East outfall (MINE_SBM1);
(h) McLean Creek Wetland runoff pond outfall (MCLN_CRK);

West of the Steepbank River – the North Steepbank Extension (NSE)

(i) North Steepbank Extension - outfall (NS_SED_01);
(j) North Steepbank Extension - outfall (NS_SED_02);

East of the Steepbank River – the North Steepbank Extension

(k) North Steepbank Extension - outfall (NS_SED_03);
(l) North Steepbank Extension - outfall (NS_SED_04);
(m) North Steepbank Extension - Unnamed Creek outfall (NS_OF_01);

Voyageur Upgrader Operations

(n) Voyageur Upgrader- Voyageur Upgrader Borrow Pit (VU_SED_01);
(o) Voyageur Upgrader - West Temporary Settling Pond (VU_SED_02);
(p) Voyageur Upgrader - Permanent Sedimentation Pond (VU-SED_03);
(q) Voyageur Upgrader Camp Settling Pond outfall (VU_CSP_01);
(r) Voyageur Upgrader – East Tank Farm Retention Pond (VU_ETF_01);
(s) Voyageur Upgrader East Tank Farm Borrow Pit (VU_ETF_02); and
(t) Voyageur Upgrader East Tank Farm TBG Borrow Pit (VU_ETF_03).

4.2.9 The approval holder shall only release the following to the tailing ponds, unless otherwise authorized in writing by the Director:

(a) extraction plant tailings;
(b) seepage collected from the dyke drainage collection system;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(c) wastewater generated as a result of mine depressurization;
(d) select liquid waste as described Table 5.7-1 in Section 5.7.3.3 of EPEA Renewal Application 077-94;
(e) API diversion water;
(f) condensate water;
(g) DRU overhead water;
(h) On-spec stripped sour water;
(i) dredge spoil from dredge operations;
(j) liquid waste from the Enbridge Pipelines Athabasca Terminal bulk petroleum storage facility;
(k) industrial runoff as required;
(l) Voyageur upgrader industrial wastewater;
(m) produced water from the Suncor operated facility;
(n) Landfill Expansion Leachate;
(o) Spills and clean ups which are compatible with tailings; and
(p) non-hazardous drilling waste (<8% bitumen) from Suncor’s owned or controlled facilities, that is compatible with tailings.

4.2.10 Areas of potential spills or leaks shall be dyked or contained in a manner that will protect the surrounding watershed, soils, and groundwater from contamination.

4.2.11 The approval holder shall manage the industrial wastewater and industrial runoff in the following manner:

(a) industrial wastewater shall be contained in the industrial wastewater control system for use as recycle water or treated to release to the environment unless otherwise specified in this approval;

(b) plant developed area runoff (including plant site drainage, drainage and seepage control at the External Tailings Area, drainage at mine pits and in-pits tailings storage areas) shall be contained in the industrial wastewater control system for use as recycle water or treated to release to the environment unless otherwise specified in this approval;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(c) industrial runoff from muskeg dewatering, overburden dewatering, and drainage from overburden storage areas and reclamation material storage area shall be directed to sedimentation ponds, or the industrial wastewater control system for use as recycle water;

(d) sedimentation ponds shall not receive industrial wastewater, plant developed runoff or domestic wastewater;

(e) surface water from a permanently reclaimed area shall be directed to sedimentation ponds for release to the environment, or the industrial wastewater control system for use as recycle water; and

(f) in accordance with the approved Suncor’s Base Plant Surface Water Management Plan (SWMP);

unless an amendment or a written authorization is obtained from the Director

LIMITS

4.2.12 Release of industrial wastewater from the combined Pond C/DAF and Pond E effluents shall not exceed the limits specified in TABLE 4.2-A.
### TERMS AND CONDITIONS ATTACHED TO APPROVAL

#### TABLE 4.2-A: LIMITS - INDUSTRIAL WASTEWATER RELEASES

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute lethality test using rainbow trout <em>(Oncorhynchus mykiss)</em></td>
<td>50% or greater survival in 100% industrial wastewater sample</td>
</tr>
<tr>
<td>pH</td>
<td>≥ 6.0 and ≤ 9.5 pH units</td>
</tr>
<tr>
<td>Flows from Pond E (FGD, BFWTP Rejects) and Pond C Effluents</td>
<td>Must not exceed the maximum flow objectives set in the proposed Pond C/Pond E flow management plan as described in the SIR response of March 18, 2011 of the Application 059-94, unless otherwise authorized by the Director</td>
</tr>
<tr>
<td>Maximum Monthly Average Mass Loadings (kg/day)</td>
<td>Maximum Daily Average Mass Loadings (kg/day)</td>
</tr>
<tr>
<td>Chemical Oxygen Demand</td>
<td>3000</td>
</tr>
<tr>
<td>Phenols</td>
<td>2.0</td>
</tr>
<tr>
<td>Sulphide</td>
<td>3.8</td>
</tr>
<tr>
<td>Ammonia-Nitrogen</td>
<td>25</td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>10</td>
</tr>
<tr>
<td>Total Nitrogen</td>
<td>680</td>
</tr>
<tr>
<td>Total Chloride</td>
<td>20000</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>150</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>1250</td>
</tr>
</tbody>
</table>

4.2.13 Releases from the Pond E shall be limited to cooling water, Boiler Feed Water Treatment Plant (BFWTP) Wastewater and Flue Gas Desulphurization (FGD) wastewater from ponds 4G/4G2, unless otherwise authorized by the Director.

4.2.14 Releases of industrial wastewater from Pond 4G2 to Pond E shall not exceed a flow rate of 6.82 cubic meters per minute, measured continuously at the flow meter on the FGD wastewater discharge pipeline from Pond 4G2 to Pond E.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.2.15 The continuous pH and flow measurement devices on Pond C / Pond E outfall shall operate at least for ninety percent of the time during periods when the outfall is being utilized, based on an annual average.

4.2.16 Releases of industrial runoff from the industrial runoff control system shall comply with the limits specified in TABLE 4.2-B.

4.2.17 Releases of industrial runoff from the industrial runoff control system shall not have total suspended solids (TSS) concentrations greater than 10% above the upstream sample of the receiving stream if the TSS in the receiving stream is higher than the limit specified in TABLE 4.2-B.

<table>
<thead>
<tr>
<th>TABLE 4.2-B: LIMITS-INDUSTRIAL RUNOFF RELEASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARAMETER</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Chemical Oxygen Demand</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
</tr>
<tr>
<td>Oils and Grease</td>
</tr>
<tr>
<td>PH</td>
</tr>
<tr>
<td>Acute Lethality Test Using Rainbow Trout (Oncorhynchus mykiss)</td>
</tr>
</tbody>
</table>

MONITORING AND REPORTING

4.2.18 The approval holder shall monitor the release of industrial wastewater and industrial runoff as following, unless otherwise authorized in writing by the Director.

(a) as specified in TABLE 4.2-C and TABLE 4.2-D;

(b) sampling location A is defined as the sampling location for compliance monitoring of Upgrader industrial wastewater at the Pond E outfall;

(c) sampling location B is defined as the sampling location for compliance monitoring of industrial runoff discharges as described in Subsection 4.2.8; and

(d) sampling location C is defined as the sampling locations upstream of the discharge point to the Athabasca River, downstream of the discharge point to the Athabasca River at the boundary of the Regulatory Mixing Zone and upstream of the Peter Lougheed Bridge within the influence of west bank flows at the plant.
4.2.19 The approval holder shall report the release of industrial wastewater and industrial runoff as specified in TABLE 4.2-C and TABLE 4.2-D, unless otherwise authorized in writing by the Director.

### TABLE 4.2-C METALS AND OTHER PARAMETERS

<table>
<thead>
<tr>
<th>Total Recoverable and Dissolved Metals and Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
</tr>
<tr>
<td>Antimony</td>
</tr>
<tr>
<td>Arsenic</td>
</tr>
<tr>
<td>Barium</td>
</tr>
<tr>
<td>Beryllium</td>
</tr>
<tr>
<td>Bismuth</td>
</tr>
<tr>
<td>Boron</td>
</tr>
<tr>
<td>Cadmium</td>
</tr>
<tr>
<td>Calcium</td>
</tr>
<tr>
<td>Chromium</td>
</tr>
<tr>
<td>Chromium (hexavalent)</td>
</tr>
<tr>
<td>Cobalt</td>
</tr>
<tr>
<td>Copper</td>
</tr>
<tr>
<td>Iron</td>
</tr>
<tr>
<td>Lead</td>
</tr>
<tr>
<td>Lithium</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Conductivity</td>
</tr>
<tr>
<td>Alkalinity</td>
</tr>
<tr>
<td>Hardness</td>
</tr>
<tr>
<td>Total Dissolved Solids (TDS)</td>
</tr>
<tr>
<td>Cyanides</td>
</tr>
<tr>
<td>Sulphate</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
# TERMS AND CONDITIONS ATTACHED TO APPROVAL

## TABLE 4.2-D: INDUSTRIAL WASTEWATER AND INDUSTRIAL RUNOFF CONTROL SYSTEMS MONITORING AND REPORTING

<table>
<thead>
<tr>
<th>Parameter, Test, Event, Study Proposal or Reporting Requirement</th>
<th>Monitoring</th>
<th>Reporting</th>
<th>Report to</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flow (m³/d)</strong></td>
<td>Daily, during release</td>
<td>Totalizer</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Calculated or estimated</td>
<td>B</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>Continuous</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>Continuous</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grab</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td><strong>Oil and Grease</strong></td>
<td>Composite</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grab</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td><strong>Total Suspended Solids (TSS)</strong></td>
<td>Composite</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grab</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td><strong>Chemical Oxygen Demand (COD)</strong></td>
<td>Composite</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grab</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td><strong>Phenols</strong></td>
<td>Daily, during release</td>
<td>Composite</td>
<td>A</td>
</tr>
<tr>
<td><strong>Sulphide</strong></td>
<td>Monthly, during release</td>
<td>Grab</td>
<td>B</td>
</tr>
<tr>
<td><strong>Ammonia-Nitrogen (NH₃-N)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Phosphorus (TP)</strong></td>
<td>Weekly, during release</td>
<td>Composite</td>
<td>A</td>
</tr>
<tr>
<td><strong>Total Nitrogen (TN)</strong></td>
<td>Monthly, during release</td>
<td>Grab</td>
<td>B</td>
</tr>
<tr>
<td><strong>Chloride</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Naphthenic Acids</strong></td>
<td>Weekly, during release</td>
<td>Composite</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Monthly, during release</td>
<td>Grab</td>
<td>B</td>
</tr>
<tr>
<td><strong>CCME F1, F2, F3 hydrocarbons (Characterize alkyl and parent PAHs if detected in F1-F3)</strong></td>
<td>Weekly, during release</td>
<td>Composite</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Monthly, during release</td>
<td>Grab</td>
<td>B</td>
</tr>
<tr>
<td><strong>Metals and Other parameters listed on TABLE 4.2-C</strong></td>
<td>Weekly, during release</td>
<td>Composite</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Monthly, during release</td>
<td>Grab</td>
<td>B</td>
</tr>
<tr>
<td><strong>96-Hour Multiple Concentration Acute Lethality Test Using Rainbow Trout</strong></td>
<td>Every two months, during release</td>
<td>Grab</td>
<td>A/B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note**: The reporting requirements for some parameters are specified as Yes (as required by 2.1.10) or Yes (as required by 2.1.11).
TERMS AND CONDITIONS ATTACHED TO APPROVAL

<table>
<thead>
<tr>
<th>Parameter, Test, Event, Study Proposal or Reporting Requirement</th>
<th>Frequency</th>
<th>Sample Type</th>
<th>Sampling Location</th>
<th>Monthly</th>
<th>Annually</th>
<th>Report to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic toxicity test using Ceriodaphnia and fathead minnows  (including Microtox IC metric)</td>
<td>Every two months, during release</td>
<td>Grab</td>
<td>A/B</td>
<td>Yes</td>
<td>Yes</td>
<td>Director</td>
</tr>
</tbody>
</table>

**Monitoring of the Athabasca River**

| pH, TSS, Phenols, Sulphide, NH3-N, TP, TN, Chloride, CCME F1, F2, F3, & F4 hydrocarbons (NAs and PAHs), Metals and other parameters in TABLE4.2-C | Every three months during open water and once during ice covered periods | Grab        | C     | Yes (as required by 2.1.10) | Yes (as required by 2.1.11) | Director |

4.2.20 If the acute lethality test using rainbow trout as required in Table 4.2-D is equal to or less than 70% survival, the approval holder shall provide the following to the Director:

(a) confirmation of test results;
(b) evaluation of potential sources of toxicity;
(c) a proposal on a course of action to mitigate toxicity; and
(d) any other information as requested in writing by the Director.

4.2.21 If the proposal referred to in subsection 4.2.20(c) is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director, within the timeline specified in writing by the Director.

4.2.22 The approval holder shall implement the proposal referred to in subsection 4.2.20(c) as authorized in writing by the Director.

4.2.23 If chronic toxicity of the combined Pond C/Pond E effluent is observed to average more than 20 Toxic Units Chronic (TUc) on an annual basis, the approval holder shall initiate a toxicity reduction evaluation to determine the causes of the toxicity and to reduce or eliminate the source of the toxicity. The evaluation report shall be included in the annual industrial wastewater report until the Chronic Toxicity of the combined Pond C/Pond E effluent is managed below 20 TUc on an annual average basis, unless otherwise authorized in writing by the Director.

MONTHLY REPORT
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.2.24 The approval holder shall submit a monthly Industrial Wastewater and Industrial Runoff Report to the Director, unless otherwise authorized in writing by the Director.

4.2.25 The monthly report required in subsection 4.2.24 shall include, at a minimum, all of the following information:

(a) the monitoring results collected in accordance with TABLE 4.2-D, including an assessment of data relative to the limits specified in TABLE 4.2-A and TABLE 4.2-B;

(b) the daily minimum and maximum of pH recorded for the release of industrial wastewater to the Athabasca River from Pond C /Pond E outfall and the duration of any deviation from the range of 6.0 to 9.5 standard pH units;

(c) in addition to reporting pursuant to subsection 2.1.1, a summary of any approval wastewater contraventions;

(d) an assessment of the performance of the industrial wastewater control system, the industrial runoff control system, pollution control equipment and monitoring equipment, including the following:
   (i) type of monitoring equipment installed;
   (ii) calibration dates and procedures;
   (iii) inspection schedule;
   (iv) repair dates and nature of repair undertaken; and
   (v) names of equipment installer, calibrator, inspector and repair person in respect of (i), (ii), (iii), and (iv); and

(e) any other information as required in writing by the Director.

ANNUAL REPORT

4.2.26 The approval holder shall submit an annual Industrial Wastewater and Industrial Runoff Report to the Director, unless otherwise authorized in writing by the Director.

4.2.27 The annual report referred to in subsection 4.2.26 at a minimum, all of the following:

(a) with respect to sedimentation pond releases:
   (i) a description of all sedimentation ponds and outfalls;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(ii) a table including pond size (m³), latitude and longitude coordinates, catchment areas, types of discharge, discharge routes, discharge frequency and volumes, and pond status;

(iii) a drainage map indicating all sedimentation ponds, catchment area boundaries, outfalls, drainage routes, flow direction, ultimate discharge locations and receiving streams;

(iv) all data collected in accordance with subsection 4.2.18, submitted in digital file when requested in writing by the Director;

(v) a description of quality assurance and quality control measures that were implemented and the data related to the implementation of those measures;

(vi) the results of toxicity testing and water quality monitoring including:

(A) for applicable parameters in TABLE 4.2-C and 4.2-D, a summary of the annual average and monthly average mass release rates to the receiving stream in kg per day, including a description of the calculation or measurement methods that were used to quantify the mass release rate;

(B) a summary of each water quality parameter listed in TABLE 4.2-C and 4.2-D including the minimum and maximum annual values, the mean annual value, the median annual value, the standard deviation, the standard error, and a comparison with relevant guidelines and approval limits;

(C) a trend analysis of annual values (median and mean annual values) for water quality parameters that exceed approval limits or relevant guidelines;

(D) appropriate charts and graphs to describe the data, demonstrate historical performances of applicable parameter and a comparison with relevant guidelines; and

(vii) an interpretation of the results of the monitoring;

(b) with respect to industrial wastewater:

(i) a description of all industrial wastewater ponds including enclosed industrial wastewater drainage system, recycle ponds, tailings ponds and any other industrial wastewater ponds;

(ii) a table including pond size (m³), site coordinates, types of wastewater, sources of wastewater, pumps and pipe or drainage
TERMS AND CONDITIONS ATTACHED TO APPROVAL

connection routes, liners, groundwater monitoring wells, seepage collection and mitigation, and pond status;

(iii) a map indicating all industrial wastewater ponds, pumps and pipe or drainage connection routes, catchment area boundaries if applicable, flow direction, ultimate discharge locations, potential spill ways and containment/mitigation measures if applicable;

(iv) a statement on the performance of the industrial wastewater and industrial runoff control system during the previous year;

(v) a record of the quantity of substances which have been added to, or consumed in the plant's industrial process. The National Pollutant Release Inventory regulation shall be used as a guide to which substances to record and report;

(vi) a record of the quantity of substances which may have an effect on the quality of the industrial wastewater generated. The National Pollutant Release Inventory regulation shall be used as a guide to which substances to record and report;

(vii) the volume of liquid (including non-tailings industrial wastewater, waste streams and solids fraction) discharged to the tailings ponds during each month;

(viii) the volume of liquid recycled to the extraction plant from the tailings ponds during each month;

(ix) the free water level in the tailings pond at the end of each calendar month;

(x) a water characterization summary update of the recycle water pond and each of tailings ponds; and

(xi) a water characterization summary update of non-tailings industrial wastewater or waste streams disposed to the tailings ponds; and

(c) a loading assessment for the Athabasca River and other affected receiving streams, by comparing changes in constituent loadings to the receiving streams, including identification and quantification of contaminant seepage to surface water, if any, considering modelled contaminant transport in groundwater;

(d) a discussion of water quality conditions at sampling location C as compared to water quality triggers and limits for the Athabasca River at Old Fort as specified in the Lower Athabasca Region Surface Water Quality Management
TERMS AND CONDITIONS ATTACHED TO APPROVAL

Framework and the Muskeg River Interim Management Framework for Water Quantity and Quality by Government of Alberta;

(e) the aquatic environmental effects monitoring data collected in accordance with subsection 4.2.28;

(f) a summary of any approval contraventions; and

(g) any other information as required in writing by the Director.

AQUATIC ENVIRONMENTAL EFFECTS MONITORING

4.2.28 The approval holder shall conduct ongoing aquatic environmental effects monitoring to monitor potential effects from the operation of the plant, including atmospheric emissions, on:

(a) water and sediment quality;

(b) resident aquatic biota, including, but not limited to, all of the following:
   (i) fisheries;
   (ii) benthos;
   (iii) aquatic habitat; and

(c) any other information as required in writing by the Director.

4.2.29 The monitoring required in subsection 4.2.28 shall be conducted by the approval holder, or alternatively another regional program, unless otherwise authorized in writing by the Director.

4.2.30 The approval holder shall ensure that the monitoring program referred to in subsection 4.2.28 is designed to sufficiently detect potential effects in the receiving environment, to the satisfaction of the Director.

4.2.31 The approval holder shall submit a plan to the Director describing the actions to be implemented in order to mitigate any adverse effects detected by the aquatic environmental effects monitoring implemented under subsection 4.2.28.

4.2.32 The plan referred to in subsection 4.2.31 shall be submitted to the Director within 6 months of any adverse effects being determined to be attributed to activities authorized by the approval, unless otherwise authorized in writing by the Director.

4.2.33 The approval holder shall implement the plan required in subsection 4.2.31 as authorized in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

REGIONAL INITIATIVES

4.2.34 The approval holder shall participate in any regional initiatives as a result of management actions from the Lower Athabasca Region Surface Water Quality Management Framework for the Lower Athabasca River, Government of Alberta, August 2012, as amended, to the satisfaction of the Director, when requested in writing by the Director.

SECTION 4.3: WASTE MANAGEMENT

OPERATIONS

4.3.1 Except as permitted in subsection 4.3.2 the approval holder shall not landfill any liquid waste or any hazardous waste.

4.3.2 The following wastes generated at the plant shall only be landfilled at the plant as follows:

(a) hydrocarbon contaminated solids in accordance with the Interim Guideline for Handling and Disposal of Petroleum-Contaminated Soil, October, 1993, Alberta Environmental Protection, as amended;

(b) sulphur contaminated solids in accordance with Guidelines for Landfill Disposal of Sulphur Waste and Remediation of Sulphur Containing Soils, September, 2011, Alberta Environment, as amended;

(c) asbestos waste in accordance with Guidelines for the Disposal of Asbestos Waste, August, 1989, Alberta Environment, as amended; and

(d) general non-hazardous refuse generated at the plant.

4.3.3 The approval holder shall not receive or dispose of the following wastes at plant landfill sites:

(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) biomedical wastes as defined in the Waste Control Regulation (Alberta).

4.3.4 The approval holder shall operate the landfills in accordance with the Standards for Landfills in Alberta (Standards), Government of Alberta, February 2010, as amended,
TERMS AND CONDITIONS ATTACHED TO APPROVAL

except for the variances previously approved under this approval, unless otherwise authorized in writing by the Director.

4.3.5 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.

4.3.6 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 prevent incompatible substances from coming into direct contact with one another.

4.3.8 A sign stating “HAZARDOUS WASTE YARD” shall be posted at each entrance to the waste storage area.

4.3.9 All hazardous waste shall be transferred to the hazardous waste storage area.

4.3.10 Hazardous wastes shall only be transferred at designated transfer areas designed to contain spills and leaks.

4.3.11 The approval holder shall store hazardous waste or hazardous recyclables stored in containers or tanks in accordance with the Hazardous Waste Storage Guidelines, June 1988, Alberta Environment, as amended.

4.3.12 All full containers that hold hazardous waste or any empty un-rinsed containers that held hazardous waste shall be stored in the hazardous waste storage area.

4.3.13 The approval holder shall not accept any wastes which have been generated outside the plant, except:

(a) non-hazardous industrial waste which has been generated as the result of the decommissioning or clean-up of the Lynton or Boyle rail sidings;

(b) solid or liquid non-hazardous industrial wastes generated at facilities in Alberta which are owned or controlled by the approval holder;

(c) non-hazardous spill clean-up material including sulphur, coke, and hydrocarbon contaminated soils;

(d) solid non-hazardous waste from the Enbridge Pipelines Athabasca Terminal bulk petroleum storage facility; and

(e) any other wastes approved in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.3.14 The approval holder is authorized to accept used lubricating oil for processing at the plant.

4.3.15 The used lubricating oil received from outside the plant shall meet the specifications and monitoring requirements of Table 4.3-A.

<table>
<thead>
<tr>
<th>TABLE 4.3-A: USED LUBRICATING OIL SPECIFICATIONS AND MONITORING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parameter</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Flash point</td>
</tr>
<tr>
<td>Total arsenic</td>
</tr>
<tr>
<td>Total cadmium</td>
</tr>
<tr>
<td>Total halogens</td>
</tr>
<tr>
<td>Total chromium</td>
</tr>
<tr>
<td>Total lead</td>
</tr>
<tr>
<td>Total polychlorinated biphenyls</td>
</tr>
<tr>
<td>Total zinc</td>
</tr>
</tbody>
</table>

MONITORING

4.3.16 Prior to the consignment or storage of any waste generated at the plant, the approval holder shall:

(a) identify;

(b) characterize; and

(c) classify

the waste but not including industrial runoff and air effluent streams, in accordance with the:

(i) *Industrial Waste Identification and Management Options*, Alberta Environment, May 1996, as amended; and


4.3.17 The approval holder shall measure or, when not practical to measure, estimate the quantity of waste generated at the plant each year.

4.3.18 The approval holder shall maintain an inventory of waste stored in the waste storage area supported by weekly inspections.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.3.19 The approval holder shall notify the Director in writing at least 14 days before the commencing operations of the landfill expansion.

REPORTING

4.3.20 The approval holder shall compile all the information required by subsections 4.3.15, 4.3.16 and 4.3.17 in an Annual Waste Management Summary Report:

(a) as indicated in TABLE 4.3-B; and

(b) in accordance with:

   (i) *Industrial Waste Identification and Management Options*, Alberta Environment, May 1996 as amended; and


**TABLE 4.3-B ANNUAL WASTE MANAGEMENT SUMMARY**

<table>
<thead>
<tr>
<th>Waste Name</th>
<th>Uniform Waste Code</th>
<th>Quantity (kg or L)</th>
<th>Stored</th>
<th>Recycled</th>
<th>Disposed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WC PIN Class Mgmt</td>
<td>Hazardous Non-</td>
<td>On-site</td>
<td>On-site</td>
<td>Off-site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>hazardous</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>On-site</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off-site</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>On-site</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off-site</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL**

4.3.21 The approval holder shall submit the Annual Waste Management Summary Report referred to in subsection 4.3.20 to the Director.

4.3.22 The approval holder shall include in the Annual Waste Management Summary Report a summary of recycling, repurposing, or disposal of scrap tires associated with the mine fleet.

TAILINGS MANAGEMENT

4.3.23 The Director may amend this approval to add additional limits, targets or other requirements for managing tailings disposal, if further regulatory direction is provided in accordance with the following requirements:

(a) the *Lower Athabasca Region Tailings Management Framework for the Mineable Athabasca Oil Sands*, March 2015, Alberta Government, as amended; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL


SECTION 4.4: DOMESTIC WASTEWATER OPERATIONS

WASTEWATER COLLECTION AND TREATMENT

4.4.1 The approval holder shall not release any substances from the domestic wastewater system to the surrounding watershed except as authorized under this approval.

4.4.2 The approval holder shall operate and maintain a domestic wastewater (sanitary sewer) system at the plant as described in the application, which shall include:

(a) on the West Bank Plant Site:

(i) a wastewater (sanitary sewage) collection system;

(ii) a wastewater (sanitary sewage) treatment system:

(A) one (1) anaerobic/settlement cell;

(B) two (2) mechanically aerated cells;

(C) one (1) polishing cell;

(D) anaerobic sewage pond number 2; and

(E) anaerobic sewage pond number 2a;

(iii) a treated wastewater outfall to Athabasca River through the mid-plant outfall ditch; and

(b) on the East Bank Plant Site:

(i) a wastewater (sanitary sewage) collection system;

unless otherwise authorized in writing by the Director.

4.4.3 The approval holder shall not utilize screening, grit and sludge from the wastewater (sanitary sewer) treatment systems for reclamation purposes, unless otherwise authorized in writing by the Director.

4.4.4 The approval holder is authorized to receive domestic sewage from the Enbridge Pipelines Athabasca Terminal bulk petroleum storage facility to the domestic wastewater (sanitary sewer) treatment system and the domestic wastewater collection system.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

CERTIFIED OPERATOR REQUIREMENTS

4.4.5 At all times, the operation of the wastewater system shall be performed by, or under the direction of a person who holds a valid Level II (or higher) Wastewater Treatment Operator certificate in the province of Alberta.

SLUDGE DISPOSAL

4.4.6 The approval holder shall only dispose of screening, grit and sludge solids to an approved sewage lagoon at the West Bank Plant Site or to a landfill site holding a current approval or registration under the Act, unless otherwise authorized in writing by the Director.

CHEMICALS USED

4.4.7 The approval holder shall use only the chemicals stated in the application in the wastewater treatment process, unless otherwise authorized in writing by the Director.

LIMITS

4.4.8 Releases from the domestic wastewater system (sanitary sewer) discharge into the Athabasca River from the West Bank Plant Site shall not exceed the limits specified in TABLE 4.4-A.

TABLE 4.4-A: DOMESTIC WASTEWATER LIMITS

<table>
<thead>
<tr>
<th>PARAMETERS FOR TREATED DOMESTIC WASTEWATER</th>
<th>LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBOD</td>
<td>≤ 25 mg/L monthly arithmetic mean of weekly samples</td>
</tr>
</tbody>
</table>

MONITORING AND REPORTING

4.4.9 The approval holder shall monitor the domestic wastewater systems as required in TABLE 4.4-B, unless otherwise authorized in writing by the Director.

4.4.10 The approval holder shall report the monitoring results of the domestic wastewater systems as required in TABLE 4.4-B, unless otherwise authorized in writing by the Director.
## TERMS AND CONDITIONS ATTACHED TO APPROVAL

### TABLE 4.4-B: DOMESTIC WASTEWATER MONITORING AND REPORTING

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Frequency (Minimum)</th>
<th>Sample Type</th>
<th>Sampling Location</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNTREATED WASTEWATER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOD₅</td>
<td>Once per week</td>
<td>Grab</td>
<td>Untreated wastewater prior to any treatment</td>
</tr>
<tr>
<td>TSS</td>
<td>Once per week</td>
<td>Grab</td>
<td>Untreated Wastewater entering the wastewater treatment plant</td>
</tr>
<tr>
<td>Volume</td>
<td>Continuous, recorded daily</td>
<td>Calculated</td>
<td>Untreated Wastewater entering the wastewater treatment plant</td>
</tr>
<tr>
<td><strong>TREATED WASTEWATER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBOD₅</td>
<td>Once per week</td>
<td>Grab</td>
<td>Treated wastewater being discharged from the polishing cell</td>
</tr>
<tr>
<td>TSS</td>
<td>Continuous, recorded daily</td>
<td>Continuous</td>
<td>Treated wastewater being discharged from the polishing cell</td>
</tr>
<tr>
<td>Volume</td>
<td>Continuous, recorded daily</td>
<td>Continuous</td>
<td>Wastewater bypassing the wastewater (sanitary sewage) treatment plant</td>
</tr>
<tr>
<td>Volume</td>
<td>Recorded daily</td>
<td>Continuous or calculated</td>
<td>Treated wastewater being discharged from the polishing cell to the Athabasca River through the mid plant outfall ditch</td>
</tr>
<tr>
<td>Volume</td>
<td>Recorded daily</td>
<td>Continuous or calculated</td>
<td>Treated wastewater being reused to the cokers for quenching and other industrial reuses.</td>
</tr>
<tr>
<td>Total Coliform counts</td>
<td>Once per week</td>
<td>Grab</td>
<td>Treated wastewater being released to the environment</td>
</tr>
<tr>
<td>Faecal Coliform counts</td>
<td>Once per week</td>
<td>Grab</td>
<td>Treated wastewater being released to the environment</td>
</tr>
<tr>
<td><strong>UNAUTHORIZED RELEASES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Release Volume</td>
<td>Total Volume</td>
<td>Estimated</td>
<td>Wastewater bypassing the wastewater treatment plant, accidental spills or overflows</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wastewater bypassing the lift station(s), accidental spills or overflows</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wastewater bypasses, accidental spills or overflows from the wastewater collection system</td>
</tr>
<tr>
<td>BOD₅</td>
<td>During the unauthorized discharge to environment</td>
<td>Grab</td>
<td>At the release point</td>
</tr>
<tr>
<td>TSS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phosphorus</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Ammonia-Nitrogen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SLUDGE DISPOSAL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TERMS AND CONDITIONS ATTACHED TO APPROVAL

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Frequency (Minimum)</th>
<th>Sample Type</th>
<th>Sampling Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sludge Volume</td>
<td>Total Volume</td>
<td>Estimated</td>
<td>Amount of sludge hauled offsite</td>
</tr>
</tbody>
</table>

#### 4.4.11
The approval holder shall compile and submit a monthly domestic wastewater summary, which shall include the following:

(a) all of the monitoring information collected as required in TABLE 4.4-A and TABLE 4.4-B;

(b) the type and quantity per day of any chemicals added to the wastewater during the wastewater treatment process;

(c) summary of the unauthorized releases, including any corrective or remedial actions undertaken;

(d) a summary of sludge disposal; and

(e) any other information as required in writing by the Director.

#### 4.4.12
The approval holder shall compile and submit an annual domestic wastewater summary, which shall include the following:

(a) the monthly arithmetic mean, including maximum and minimum values, of the results of the monitoring requirements of 4.4.9;

(b) the type and quantity per day of any chemicals added to the wastewater during the wastewater treatment process;

(c) the name of the supervising operator responsible for the operation of the wastewater system;

(d) a summary of any incidents which required reporting in accordance with 2.1.1;

(e) a summary of any operational problems; and

(f) any other information as required in writing by the Director.

### SECTION 4.5: DEDICATED DISPOSAL AREAS - OPERATION, CLOSURE, MONITORING AND REPORTING
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.5.1 The approval holder shall only use the following chemicals for treatment of any fluid tailings or in fluid or treated tailings deposits in this approval:

(a) the flocculants identified in application 056-94;
(b) the coagulants and flocculants identified in applications 075-94 and 077-95; and
(c) the chemicals as previously authorized by the Director under this approval, unless otherwise authorized in writing by the Director.

4.5.2 The approval holder shall not place treated tailings in areas other than the following:

(a) DDA3; and
(b) DDA1, co-disposal cells of MD9;

unless otherwise authorized in writing by the Director.

4.5.3 The approval holder shall not place any water, which includes industrial wastewater, above treated or untreated tailings for the purpose of creating an aquatic closure landscape, except in accordance with any research plans authorized under SECTION 5.4: of this approval.

4.5.4 The approval holder shall:

(a) Notify the Director of any proposed on-site fluid tailings pilots, prototypes or demonstrations at least 6 months, or such other time as authorized in writing, prior to any proposed construction or implementation; and
(b) Not construct or implement any of the proposed on-site fluid tailings pilots, prototypes or demonstrations unless written authorization or approval amendment is obtained from the Director.

4.5.5 The approval holder shall apply for an amendment to this Approval to align with any applicable government policy, including, but not limited to:

(a) tailings water release; and
(b) placement of any water above treated or untreated tailings to create pit lakes; and
(c) reclamation criteria.

DDA3 OPERATION
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.5.6 The approval holder shall conduct fluid tailings treatment and operate DDA3 as described in applications No. 075-94, 077-94 and related OSCA applications 1857274 and 1890348.

PIT LAKES WATER RETURN

4.5.7 The approval holder shall obtain written authorization from the Director prior to the commencement of any water release from Upper Pit Lake to Millennium Pit Lake.

4.5.8 The approval holder shall not conduct phase 2, 3, and 4 activities in DDA3 identified in Application No. 1890348 in DDA3, unless an approval amendment is granted by the Director.

SECTION 4.6: GROUNDWATER

4.6.1 The approval holder shall implement the Groundwater Monitoring Program for the plant as described in Application 077-94, dated April 2018, and the associated SIR Response, dated 31 Jan 2019, unless otherwise authorized in writing by the Director.

4.6.2 The samples extracted from the groundwater monitoring wells shall be collected using scientifically acceptable purging or non-purging method, sampling and preservation procedures so that a representative groundwater sample is obtained.

4.6.3 All groundwater monitoring wells shall be:

(a) protected from damage; and

(b) locked individually or enclosed in locked area, except when being sampled; unless otherwise authorized in writing by the Director.

4.6.4 If a representative groundwater sample cannot be collected because the groundwater monitoring well is damaged or is no longer capable of producing a representative groundwater sample:

(a) the groundwater monitoring well shall be cleaned, repaired or replaced; and

(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.

4.6.5 In addition to the sampling information recorded in subsection 2.2.2, the approval holder shall record the following sampling information for all groundwater samples collected:

(a) a description of purging and sampling procedures;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(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.

4.6.6 The approval holder shall participate in regional groundwater initiatives supporting the Groundwater Management Framework for the Lower Athabasca Oil Sands Region, that will include at a minimum all of the following:

(a) regional groundwater quality assessment studies;

(b) development and implementation of a regional groundwater monitoring network;

(c) continuous monitoring of the network; and

(d) assessments of potential groundwater quality impacts to groundwater resources in the region.

on an ongoing basis and to the satisfaction of the Director.

4.6.7 The approval holder shall carry out remediation of the groundwater in accordance with the following:

(a) *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*, Alberta Government, January 2019, as amended; and


4.6.8 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 completed Record of Site Condition Form, Alberta Energy Regulator, March 2019, as amended;

(b) a legal land description and a map illustrating the project boundaries;

(c) a topographic map;

(d) a description of the industrial activity and processes;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(e) a map showing the location of all surface and groundwater users and, a listing describing surface water and water well use details, within a 5 kilometre radius of the plant;

(f) a general hydrogeological characterization of the region within a 5 kilometre radius of the plant;

(g) a detailed hydrogeological characterization of the project area, including an interpretation of groundwater flow patterns;

(h) a detailed cross-section(s) showing depth to water table, patterns of groundwater movement and hydraulic gradients;

(i) completion details of all groundwater monitoring wells and borehole logs of new groundwater monitoring wells installed since the last groundwater report;

(j) a map showing locations of all known buried channels within a 5 kilometre radius of the plant;

(k) a map of surface drainage within the plant and surrounding area to include nearby water bodies;

(l) a map of groundwater monitoring well locations and a description of the existing groundwater monitoring program;

(m) a summary of any changes to the groundwater monitoring program made since the last groundwater monitoring report;

(n) analytical data recorded as required in subsections 4.6.1 and 4.6.5;

(o) a summary of fluid elevations recorded as required in subsection 4.6.5(b) and an interpretation of changes in fluid elevations;

(p) an interpretation of QA/QC program results;

(q) an interpretation of the analytical results including the following:

(i) diagrams indicating the location and extent of any contamination;

(ii) a description of probable sources of contamination; and

(iii) a site map showing the location and type of current and historical potential sources of groundwater contamination;

(r) a summary and interpretation of the data collected since the groundwater monitoring program began including, at a minimum:
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(i) control charts which indicate trends in concentrations of parameters; and

(ii) the migration of contaminants;

(s) 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;

(t) a proposed sampling schedule for the following year;

(u) recommendations, including at a minimum, the following:

(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;

(v) a summary of participation undertaken in accordance with subsection 4.6.6; and

(w) any other information as required in writing by the Director.

4.6.9 The approval holder shall include groundwater quality results from internal South Tailings Pond monitoring wells shown in Application 077-94, Appendix G, Fig. 36 as part of the 2019 Annual Groundwater Monitoring Report, unless otherwise authorized in writing by the Director.

4.6.10 The approval holder shall provide an update on the integrated groundwater-surface water model presented in Appendix M of Application 077-94 to the Director, on or before September 30, 2023, unless otherwise authorized in writing by the Director.

4.6.11 The model update referred to in subsection 4.6.10 shall include modelled concentrations of potential contaminants of concern in groundwater aquifers.

SECTION 4.7: FISH, WILDLIFE AND BIODIVERSITY

GENERAL
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.7.1 The approval holder shall remove floating or emergent vegetation from the tailings storage areas.

4.7.2 The approval holder shall have mitigation measures in place and shall take reasonable necessary steps to prevent wildlife from coming into contact with industrial wastewater.

4.7.3 The approval holder shall maintain a setback distance from the Athabasca River and its tributaries for new activities within the project area, as per Government of Alberta policy, or as directed by the Director.

BIRD PROTECTION, MONITORING AND REPORTING

4.7.4 Until the updated Bird Protection Plan in subsection 4.7.5 is authorized in writing by the Director and implemented, the approval holder shall continue to implement the existing approved Waterfowl Protection Plan, as previously authorized in writing by the Director.

4.7.5 The approval holder shall submit an updated Bird Protection Plan (previously submitted Waterfowl Protection Plan) to the Director on or before March 31, 2021, unless otherwise authorized in writing by the Director.

4.7.6 The updated Bird Protection Plan referred to in subsection 4.7.5 shall include the following unless otherwise authorized in writing by the Director:

(a) techniques and procedures, using the Best Available Technology Economically Achievable (BATEA), research and monitoring results, to prevent bird contact with industrial wastewater and to prevent bird mortalities associated with industrial wastewater, including but not limited to:

(i) reducing the attractiveness of ponds to birds through design, construction and operational measures;

(ii) prevention of and elimination of floating or emergent vegetation from the ponds;

(iii) minimizing the presence of floating bitumen from the ponds;

(iv) minimizing the bird nesting habitat around the ponds;

(v) minimizing habituation of birds to the ponds;

(vi) a description of the bird deterrent technology;

(vii) a description of bird deterrent locations, including a map;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(viii) a schedule for implementation of the bird deterrent program including initial start-up and annual deployment; and

(ix) a description of how adaptive management principles will be used to foster continuous improvement of the bird deterrent program;

(b) a plan for monitoring and documenting:

(i) avian mortality;

(ii) avian contacts;

(iii) timing of incidents; and

(iv) bird species affected;

which is consistent with the Oil Sands Bird Contact Monitoring Program, or any other initiative deemed acceptable to the Director;

(c) a plan to facilitate research into long-term effects of contact with industrial wastewater on bird health and survivorship; and

(d) any other information as required in writing by the Director.

4.7.7 If the updated Bird Protection Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

4.7.8 The approval holder shall implement the updated Bird Protection Plan referred to in subsection 4.7.5 as authorized in writing by the Director.

4.7.9 The approval holder shall submit an annual report on the Bird Protection Plan to the Director, unless otherwise authorized in writing by the Director.

4.7.10 The Bird Protection Plan annual report shall include, at a minimum, all of the following:

(a) summary of activities related to the implementation of the Bird Protection Plan for the previous year;

(b) summary of the results of monitoring and research conducted;

(c) proposed adjustments to the Bird Protection Plan for the upcoming year;

(d) maps and figures as needed to illustrate (a) to (c) above; and

(e) any other information requested in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

WILDLIFE MITIGATION, MONITORING AND REPORTING

4.7.11 Until the updated Wildlife Mitigation and Monitoring Plan in subsection 4.7.13 is authorized in writing by the Director and implemented, the approval holder shall continue to implement the existing approved Wildlife Mitigation and Monitoring Plan (previously approved Fish and Wildlife Habitat Enhancement Plan, Waterfowl Protection Plan), as authorized in writing by the Director.

4.7.12 In addition to any other requirements specified in this approval, the approval holder shall conduct wildlife mitigation in accordance with the Master Schedule of Standards and Conditions (MSSC), Alberta Energy Regulator and Government of Alberta, November 22, 2018, as amended, unless otherwise authorized in writing by the Director.

4.7.13 The approval holder shall submit a Wildlife Mitigation and Monitoring Program proposal to the Director by December 31, 2020, unless otherwise authorized in writing by the Director.

4.7.14 The Wildlife Mitigation and Monitoring Plan referred to in subsection 4.7.13 shall include, at a minimum, all of the following:

(a) a description of the strategies that will be implemented to meet the desired outcomes as stated in the MSSC, as amended;

(b) strategies for identifying wildlife features to meet MSSC requirements;

(c) a description of how the achievement of desired outcomes will be measured, and demonstrated;

(d) a description of the strategies and actions that will be implemented, considering the mitigation hierarchy, to mitigate project and site-specific effects on fish and wildlife species at risk and of cultural significance throughout the life of the project that may occur through:

(i) direct habitat loss,

(ii) indirect habitat loss,

(ii) habitat fragmentation and effects on fish and wildlife movement, and

(iii) mortality;

(e) detailed descriptions of mitigation measures to minimize project-induced impacts to fisheries and aquatic habitat at a Hydrologic Unit Class 8 scale;

(f) a description of the adaptive management approach that will be used to assess and improve the effectiveness of mitigations;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(g) a description of how the wildlife monitoring will align with and support regional monitoring, consistent with provincially recognized priorities;

(h) a description of methods that will be implemented to prevent habituation of nuisance wildlife, consistent with Alberta Bear Smart Guidelines, 2011, as amended;

(i) methods to prevent bird collisions with project infrastructure, including towers and transmission lines;

(j) measures to maintain and facilitate habitat connectivity throughout the life of the project, within the project area, and between the project area and adjacent lands;

(k) avoidance of wildlife species at risk habitat and migrating bird nests and application of appropriate setbacks to key wildlife habitat features and nests;

(l) identification of areas of potential risks for wildlife;

(m) measures to prevent wildlife from coming into contact with areas of risk for wildlife as identified in 4.7.14 (i) including, but not limited to, disturbed areas that may contain process affected waters or bitumen; and

(n) a plan and schedule to conduct research and monitoring to address at minimum, the following:

(i) the presence, general abundance and distribution of wildlife in the local study area;

(ii) early successional wildlife establishment including habitat; and

(iii) the specific habitat requirements of species at risk for the purposes of reclamation planning;

(o) progress in achieving the wildlife habitat levels as outlined in subsection 7.4.11;

(p) wildlife habitat use on the reclaimed land; and

(q) any other information as required in writing by the Director.

4.7.15 If the Wildlife Mitigation and Monitoring Plan referred to in subsection 4.7.13 is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

4.7.16 The approval holder shall implement the Wildlife Mitigation and Monitoring Plan referred to in subsection 4.7.13 as authorized in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.7.17 The approval holder shall submit a Comprehensive Wildlife Report to the Director according to the following schedule:

(a) for the first Comprehensive Wildlife Report, on or before July 15, 2022;
(b) for the second Comprehensive Wildlife Report, on or before July 15, 2025; and
(c) for the third Comprehensive Wildlife Report, on or before July 15, 2028; unless otherwise authorized in writing by the Director.

4.7.18 The Comprehensive Wildlife Report referred to in subsection 4.7.17 shall include, at a minimum, all of the following:

(a) the methods and results of the monitoring conducted in the Wildlife Mitigation and Monitoring Program;
(b) the mitigations implemented in the Wildlife Mitigation and Monitoring Program;
(c) discussion of the effectiveness of the mitigation implemented in the Wildlife Mitigation and Monitoring Program relative to measurable outcomes as identified in the approved Wildlife Mitigation and Monitoring Program;
(d) adaptive management measures taken or planned;
(e) changes in habitat availability and habitat conditions for species at risk and of cultural significance, which have been identified in the application, stakeholder consultation, and Wildlife Sensitivity Maps, as amended;
(f) changes proposed to the Wildlife Mitigation and Monitoring Program;
(g) a summary of methods used and results obtained through the regional wildlife monitoring initiatives below:
   (i) Oil Sands Bird Contact Monitoring Program in subsection 4.7.6(b); and
   (ii) any other regional wildlife monitoring initiative the approval holder participates in;
(h) a summary of methods used and results obtained for project specific monitoring conducted pursuant to Bird Protection Plan in subsection 4.7.4; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(i) proposed changes to any of the regional or project specific initiatives described in subsection 4.7.18 (g) and (h); and

(j) any other information as required in writing by the Director.

4.7.19 The approval holder shall implement the proposed changes to the mitigation and monitoring programs outlined in the Comprehensive Wildlife Report referred to in subsection 4.7.17 as authorized in writing by the Director.

REGIONAL INITIATIVES

4.7.20 The approval holder shall actively participate in the Oil Sands Bird Technical Team (OSBTT), and OSBTT directed research projects to support the Oil Sands Bird Contact Monitoring Program and to provide the information described in subsection 4.7.6, to the satisfaction of the Director.

4.7.21 The approval holder shall participate in regional initiatives that assess wildlife and fish resources, to the satisfaction of the Director, to accomplish the following:

(a) analysis of regional data sets, supplemented by additional field data where necessary, to validate fish and wildlife habitat suitability index (HSI) models; and

(b) long-term monitoring of specifically selected species and species at risk to quantify cumulative impacts on wildlife and fish populations in the region; unless otherwise authorized in writing by the Director.

4.7.22 The approval holder shall monitor the long-term cumulative effects on biodiversity and wildlife in the region, through regional initiative, to the satisfaction of the Director.

4.7.23 The approval holder shall participate in regional biodiversity initiatives supporting for the development of the Biodiversity Management Framework, to the satisfaction of the Director.

PART 5: ENVIRONMENTAL MONITORING, RESEARCH AND DEVELOPMENT

SECTION 5.1: TAILINGS

5.1.1 The approval holder shall support and participate in regional tailings research, including the development of performance criteria and targets, to the satisfaction of the Director.

5.1.2 The approval holder shall submit or cause to be submitted to the Director a Tailings Environmental and Reclamation Research Report according to the following schedule:
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(a) for the first Tailings Research Report, on or before April 30, 2021; and

(b) subsequent Tailings Research Reports every three years thereafter;

unless otherwise authorized in writing by the Director.

5.1.3 The Tailings Environmental and Reclamation Research Report referred to in subsection 5.1.2 shall report on the environmental aspects of tailings research and development with specific reference to the tailings technology used by the approval holder and shall include all of the following:

(a) for general:

(i) The information required in subsection 5.4.14, which may reference other tailings research reports submitted to the Director; and

(ii) planned tailings research and development activities for the next five year period;

(b) for terrestrial ecosystem research:

(i) time required for tailings to consolidate to a trafficable surface;

(ii) capping research that identifies capping objectives in addition to rooting-zone protection for tailings deposits and defines the capping requirements to fulfill these objectives;

(iii) capping materials required to cover tailings deposits;

(iv) geotechnical stability of reclaimed tailings and their surfaces over time;

(v) settlement rate over reclaimed tailings deposit and its potential impacts to terrestrial ecosystem;

(vi) characterization of tailings release water and any treatment required;

(vii) movement of salts from tailings release water during deposition or seepage and its impact on plant development due to the uptake of organic compounds, heavy metals and salts from tailings release water;

(viii) techniques required to isolate tailings waters from terrestrial lands, such that terrestrial and aquatic vegetation can develop into healthy, self-sustaining ecosystems;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(ix) identification of local native vegetation species suitable for re-establishment on terrestrial lands affected by tailings waters;

(x) seepage of tailings release water into groundwater, including:
   (A) expected volumes of water entering the groundwater regimes;
   (B) flow regimes of the groundwater;
   (C) impacts of affected groundwater; and
   (D) any proposed mitigation that may be implemented;

(c) for wetland ecosystem research:
   (i) hydrologic models to create treatment wetlands or other wetland types associated with tailings in the reclaimed landscape;
   (ii) capping objectives in addition to rooting-zone protection for wetland ecosystems on tailings deposits;
   (iii) suitable capping materials and depth of reclamation materials required to cover tailings deposits;
   (iv) chemical characterization (composition, concentration, toxicity) and rate of pore water release and surface runoff from tailings deposits;
   (v) environmental fate, including degradation rates of substances of concern in tailings release waters, their partitioning and modelling of sediment-water column interactions;
   (vi) stability of reclaimed tailings surfaces over time, the implications to the size and type of wetland ecosystems and the ability to create self-sustaining, locally common boreal forest wetlands;
   (vii) impact of all potentially released waters on aquatic ecosystems, including the impact on sediments;
   (viii) identification of suitable soils, site preparation and soil placement for wetlands constructed on tailings deposits or those affected by tailings water inflows;
   (ix) wetland revegetation including:
      (A) identification of local native wetland vegetation species suitable to inhabit the tailings affected wetlands; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(B) revegetation techniques for target wetland vegetation species suitable to inhabit the tailings wetlands;

(x) seepage of tailings release water into groundwater or surface water, including:

(A) expected volumes of water release into either groundwater or surface runoff;

(B) flow regimes of the groundwater and surface waters;

(C) impacts to groundwater or surface waters and subsequent down gradient or downstream effects; and

(D) any proposed mitigation that may be implemented;

(xi) validation of expected scenarios with field-collected data that describes hydrology and water quality of tailings seepage within the receiving environment;

(xii) identification of seepage water released from tailings, placed coversoil, subsoil or overburden into groundwater or surface water, and

(xiii) validation that developing wetlands are from surface drainage and not breakthrough to the surface from the thickened tailings deposits.

(d) for human health risk assessment:

(i) an assessment of human receptor exposure to industrial wastewaters and tailings material stored at the plant site, as well as the impacts from reclamation activities;

(ii) the chemicals to be evaluated in the human health risk assessment shall include, but not limited to:

(A) dust (PM2.5);

(B) salts;

(C) naphthenic acids (acid extractable organics);

(D) acrylamide and polyacrylamide or any applied coagulants and flocculants in the dried tailings, in-pit treated tailings deposit and the associated pore water, expressed water or throughflow;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(E) reduced sulphur compounds; and

(F) naturally occurring radioactive material;

(e) for long-term chemistry and mineralogy:

(i) assessment of the long-term chemistry and mineralogy of treated tailings deposit including the buffering capacity of tailings material and associated pore water, expressed water, or throughflow in Mine tailings deposits, and changes in their chemical and mineralogical composition under varying reduction-oxidation conditions;

(ii) detailed examination of the biogeochemical processes and probable geochemical end points of processes occurring within the products resulting from the tailings process, with specific attention to reduction-oxidation processes under water saturated and unsaturated conditions;

(iii) a description of a water monitoring program that includes mass balance, sampling procedures, sampling frequency and chemical composition analysis of the water within and resulting from the bitumen extraction process;

(iv) detailed evaluation of concentrations of acrylamide and polyacrylamide or any applied coagulants and flocculants in the dried tailings, in-pit treated tailings deposit and the associated pore water, expressed water, or throughflow;

(v) examination of whether the monitoring and research results alter the conclusions put forth in the application with respect to ecological or human health effects;

(vi) investigation of long term stability, physical and chemical, of materials added to tailings, such as coagulants and flocculants, and their influence on geotechnical stability, settlement rate and water holding capacity of treated tailings; and

(f) an analysis of the risk to reclamation presented by the chemical attributes of tailings sand, with specific attention to:

(i) substance identification, along with any environmental quality guidelines for soil, groundwater and surface water;

(ii) substance load;

(iii) influence of fines content on physical or chemical risks;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(iv) proposed placement depth and location relative to reclamation materials, and

(v) terrestrial versus aquatic outcomes (including wetlands); and

(g) any other information as required in writing by the Director;

unless otherwise authorized in writing by the Director.

SECTION 5.2: END PIT LAKES (EPL)

5.2.1 The approval holder shall participate in regional end pit lake research initiatives, to the satisfaction of the Director.

5.2.2 The approval holder shall support and participate in the development of end pit lake performance criteria and targets through regional initiatives, to the satisfaction of the Director.

5.2.3 The EPL research referred to in subsections 5.2.1 and 5.2.2 shall include all of the following:

(a) research concerning storing froth treatment tailings untreated, treated or covered tailings within a lake;

(b) examines the

(i) feasibility and capability of pit lakes, and

(ii) the viability of pit lakes storing fluid, treated, or covered tailings, as self-sustaining boreal forest lake ecosystems and resolves uncertainties about the effects of lake design features, and physical, chemical and biological processes on the environmental and human health;

(c) confirms or contradicts the predicted behavior and resolves uncertainties about the behavior of tailings within a pit lake;

(d) determines the short term and long term environmental and human health effects from:

(i) storing froth treatment tailings, untreated, treated, or covered tailings within a lake;

(ii) storing process affected waters within a lake;

(iii) receiving surface water runoff and groundwater from deposits and reclaimed areas; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(iv) water released from the lake to various expected receiving environments;

(e) tests and confirms the appropriateness of response variables to be measured to demonstrate the viability of pit lakes and pit lakes storing froth treatment tailings, untreated, treated, or covered tailings, including measures of:

(i) tailings characteristics and performance;

(ii) lake sustainability (water quality and quantity);

(iii) sediment quality;

(iv) littoral zone function;

(v) ecological function;

(vi) traditional use;

(vii) human and ecological health; and

(viii) biodiversity; and

(f) explores the full capabilities to identify the design requirements and constraints and limitations of pit lakes to meet reclamation outcomes, to store tailings, and to allow for unlimited types of uses of the lake; unless otherwise authorized in writing by the Director.

5.2.4 The approval holder shall submit an End Pit Lake Research and Development Report to the Director on or before April 30, 2021, and every three years thereafter, unless otherwise authorized in writing by the Director.

5.2.5 The End Pit Lake Research and Development Report referred to in subsection 5.2.4 shall address all of the following with specific reference to the tailings technology used by approval holder:

(a) the information required by subsection 5.4.14 addressing the results of the research described in subsection 5.1.3, and 5.2.5 (d) which may reference other tailings research reports submitted to the Director;

(b) an interpretation of the conclusions for:

(i) feasibility and capability of pit lakes;

(ii) the viability of pit lakes storing fluid, treated, or covered tailings, and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(iii) key performance measures and indicators for each stage of lake development;

(c) a proposed schedule for all EPL research and development undertaken, including a mechanism to track progress towards meeting the schedule over time;

(d) detailed discussion of the design and methodology for the EPL research, which shall:

(i) demonstrate that the proposed research is capable of validating the design and performance expectations for the commercial scale pit lake or the lake storing froth treatment tailings, untreated, treated, or covered tailings proposed by the approval holder;

(ii) Identify and validate the design, operation and performance assumptions for each type of lake and stage of lake development and an estimate of timelines for each stage of lake development;

(iii) Identify and assess the adequacy of proposed research to resolve risks and uncertainties for pit lakes and lakes storing froth treatment tailings, untreated, treated, or covered tailings, including at a minimum:

(A) the ability to provide a sustainable boreal forest lake ecosystem under a range of future climate change scenarios;

(B) the ability to achieve ancillary functions (e.g. shoreline protection and flood buffering);

(C) lake design features;

(D) physical and chemical functions for lake types and their potential to maintain and enhance biodiversity, such as mixing and redox potential;

(E) geotechnical stability; and

(F) any other uncertainties identified by the Director;

(iv) identify the constraints or limitations that water quality of a lake may have on establishing self-sustaining locally common lake aquatic ecosystems and its use:

(v) identify research for each type of lake, to address the following:
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(A) the treatment capacity and efficiency of the pit lake to maintain suitable water and sediment quality;

(B) physical, chemical and biological performance measures and criteria for pit lakes including measures of aquatic ecosystem and habitat sustainability, ecological function, traditional use, biodiversity and human health and from long-term chemistry research issues identified in subsection 5.1.3;

(C) physical, chemical and biological performance measures and criteria for water quality release;

(D) best practices for design, site preparation and suitable materials for the littoral zone;

(E) seepage of lake water and mobility of substances of concern in groundwater;

(F) how wetlands, riparian habitat and littoral zone create continuity between the reclaimed landscape and the lakes;

(G) watershed hydrologic connections and associated closure goals and targets for fish and fish habitat;

(H) the effect of potential elevated contaminant influences on fish ecology, health, palatability and consumption safety; and

(I) the effects of long-term shoreline regression and related effects on littoral zone, adjacent wetlands, landforms, water budget and solute mass balances (especially in relation to evaporation);

(e) Proposed assessment of the use of pit lakes to store froth treatment tailings, untreated, treated or covered tailings which shall address the following:

(i) the time required for tailings to achieve maximum consolidation to achieve a consistent rate of pore water expression;

(ii) the functions the lake is intended to perform when storing froth treatment tailings, untreated, treated or covered tailings, and the key factors contributing to the adequacy of those functions;

(iii) treatment capacity and efficiency required for the pit lakes that store froth treatment tailings, untreated, treated or covered tailings to maintain suitable water and sediment quality;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(iv) hydrological models for the creation of sustainable pit lakes that store froth treatment tailings, untreated, treated or covered tailings, which are capable of use for a range of future climate change scenarios; and

(v) the risks and uncertainties associated with the design and performance assumptions for each stage of lake development and type of lake;

(f) water budgets and solute mass balances for the EPLs including quantities, sources and quality of water to be used to fill the lake, and including groundwater recharge and seepage rates and quality;

(g) estimates of water quality concentrations at closure for end pit lakes for parameters identified as substances of concern by the Director, including assumptions on decay rates and partitioning;

(h) confirmation of the assumptions and expectations for water quality release outlined in the application, including refinement, update, and validation of the predictive models;

(i) identification of key uncertainties in the water budget and solute mass balances and proposed research to address these uncertainties with particular attention to the hydrology of the effective catchment area, uncertainty due to potential climate change and connectivity with groundwater;

(j) an indication of treatment efficiency required for the EPLs to maintain suitable water quality given the quality of the source waters identified in 5.2.5 ((f)) and the research;

(k) lake design features which:

(i) promote natural biodegradation and detoxification rates for toxic parameters;

(ii) minimize erosion and protect shorelines;

(iii) promote recreational and domestic fisheries potential; and

(iv) optimise water residence time with particular consideration of salinity;

(l) biodegradation, detoxification and dilution of parameters identified as substances of concern by the Director;

(m) adaptive incorporation of any guidelines prepared or provided by the Director related to EPLs;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(n) data submission and reporting schedule;

(o) applicability, uncertainties/risks assessment, learnings and lessons of other end pit lake research projects including, but not limited to, Syncrude Canada Limited’s Base Mine Lake (BML) research and Suncor Energy Inc.’s Demonstration Pit Lake (DPL) research;

(p) the research related to human health risk assessment and long term chemistry and minerology for end pit lakes; and

(q) any other information as required in writing by the Director;

unless otherwise authorized in writing by the Director.

SECTION 5.3: WETLANDS

5.3.1 The approval holder shall participate in the activities of regional wetland research initiatives, to the satisfaction of the Director.

5.3.2 The approval holder shall undertake, or participate in, a study on reclamation techniques that examines the viability of creating peat forming wetland for a portion of the final landscape.

5.3.3 The approval holder shall submit a Wetland Research Plan update to the Director on or before February 27, 2020, unless otherwise authorized in writing by the Director.

5.3.4 The plan referred to in subsection 5.3.3 shall consider the objectives of the Mine Reclamation Plan referred to in subsection 7.3.5 and shall include the following:

(a) a five year plan and schedule to conduct wetland research through regional initiatives or approval holder led initiatives;

(b) one site specific pilot wetland;

(c) provide opportunities for monitoring, model validation, and other wetland research initiatives, and incorporation of findings into the update of the Guidelines for Wetland Establishment on Reclaimed Oil Sands Leases, Cumulative Environmental Management Association (CEMA), 2014, as amended;

(d) expected criteria and performance measures for reclaimed wetlands including measures of wetland sustainability (including water quality and quantity), ecological function, traditional use, and biodiversity;

(e) development of hydrology models for the creation of sustainable wetlands;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(f) reclamation material salvage and placement techniques including consideration for vegetative propagule retention;

(g) vegetation establishment techniques;

(h) development of tools and techniques to manage source and availability of target vegetation species over time;

(i) assessment of ecological function of wetland types and potential to maintain and enhance biodiversity;

(j) for wetlands specifically designed for treatment, demonstration of predicted wetland treatment efficacy, including but not limited to an assessment of the following:
   (i) identification of input and output water quality required;
   (ii) water retention times;
   (iii) capacity for treatment;
   (iv) needs for active management;
   (v) additional criteria for these treatment wetlands;
   (vi) targeted vegetation species and their density; and
   (vii) long-term plans for the treatment wetlands, including plans for vegetation management, decommissioning, and/or conversion to wetlands with other uses and functions;

(k) a plan for dissemination of results of any research undertaken;

(l) data submission and reporting schedule; and

(m) any other information as required in writing by the Director.

5.3.5 If the Wetland Research Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

5.3.6 The approval holder shall implement the Wetland Research Plan referred to in subsection 5.3.3 as authorized in writing by the Director.

5.3.7 The approval holder shall submit an updated Wetland Monitoring Program proposal to the Director on or before September 30, 2020, unless otherwise authorized in writing by the Director.
5.3.8 The Wetland Monitoring Program proposal referred to in subsection 5.3.7 shall include, at a minimum, all of the following:

(a) a summary of any wetland and water body monitoring conducted to date; 
(b) an analysis of the results from monitoring conducted in (a); 
(c) a plan to monitor natural undisturbed wetlands for natural variability to serve as reference conditions for comparing against potentially impacted or reclaimed wetlands; 
(d) a plan to monitor and understand the effects of mine development on wetlands potentially impacted by oil sands mining, including but not limited to the following: 
(i) direct and indirect hydrological alterations including surface water and groundwater withdrawals; 
(ii) seepage, drainage, dewatering and industrial runoff; 
(iii) roads or other infrastructure constructed within wetlands; and 
(iv) any other disturbances that may affect wetlands. 
(e) corrective measures and a schedule of implementation, where appropriate, to protect oil sands mine affected wetlands outside of the project area; 
(f) reporting schedule; and 
(g) any other information as required in writing by the Director.

5.3.9 The approval holder may participate in regional initiative(s) to develop a consistent approach to gathering the information described in subsection 5.3.8.

5.3.10 If the Wetland Monitoring Program proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

5.3.11 The approval holder shall implement the Wetland Monitoring Program referred to in subsection 5.3.7 as authorized in writing by the Director.

SECTION 5.4: TAILINGS RESEARCH AND/OR IMPLEMENTATION PLANS

GENERAL

5.4.1 All research plans in this approval shall include the following:
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(a) an explanation of and rationale for:

(i) the research objectives;

(ii) the hypotheses to be tested;

(iii) the models to be developed;

(iv) the experimental controls;

(v) key performance measures and criteria;

(vi) the applicability of each objective to addressing the risks and uncertainties identified in subsections 5.1.3, 5.2.3 and 5.2.5;

(vii) the applicability of each objective to achieving reclamation outcomes consistent with requirements in PART 7 of this approval;

(viii) the incorporation of existing research results to date (both general and site specific) into the research plan;

(ix) detailed discussion of the design and methodology for the research, model or technique;

(x) research monitoring plans and methodologies, and

(xi) the approach to incorporating research results into site specific implementation designs and plans;

(b) identification of milestones that will ensure that results can be incorporated into milestones identified in the OSCA Approval and this approval, including:

(i) a rationale for the sequence of research;

(ii) timing of initiation and completion of research; and

(iii) key activities;

(c) proposed schedule for research results and data submission, with a mechanism to track progress over time; and

(d) any other information requested in writing by the Director;

unless otherwise authorized in writing by the Director.

5.4.2 If any plan in this section is found deficient by the Director, the approval holder shall correct all deficiencies by the date specified in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

5.4.3 The approval holder shall implement the research plans in this section as authorized in writing by the Director.

5.4.4 The approval holder shall only implement corrective measures or research design changes for any research required by this approval as authorized in writing by the Director.

5.4.5 The approval holder shall not implement any implementation plan unless written authorization or approval amendment for that plan is granted by the Director.

5.4.6 The approval holder shall implement the following research plans:

(a) the Wetland and Shallow Lake Viability research plan for Pond 5, Pond 6, and Pond 7, dated June 29, 2018;

(b) the updated Demonstration Pit Lake Pilot Test research plan, dated November 30, 2017;

(c) the DDA3 Terrestrial Research and Implementation Plan, dated September 28, 2018; and

(d) the DDA3 Aquatic Research and Implementation Plan, dated September 26, 2018;

unless otherwise specified in this approval or authorized in writing by the Director.

5.4.7 The approval holder shall provide updates of the research progress and results of the research plans referred to in subsection 5.4.6 to the Director, in accordance with schedule outlined in subsections 5.4.8 and 5.4.13, unless otherwise authorized in writing by the Director.

5.4.8 The approval holder shall submit an interim report on DDA3 Terrestrial Research and Implementation Plan to the Director by September 30, 2020, unless otherwise authorized in writing by the Director.

5.4.9 The interim report referred to in subsection 5.4.8 shall include, at a minimum, the following:

(a) the information required by subsection 5.4.1

(b) the results of the research of the Terrestrial Research and Implementation Plan of September 28, 2018:

(c) the results of any other relevant research;

(d) identification of any remaining uncertainties and an explanation, justification and timelines for how the uncertainties will be addressed; and
5.4.10 If any research reports referred to in subsections 5.4.7, 5.4.8 and 5.4.13 are found deficient by the Director, the approval holder shall correct all deficiencies identified by the date specified in writing by the Director.

5.4.11 The approval holder shall submit an updated DDA3 Tailings Treatment and Target Ecosite Development Plan to the Director by September 30, 2023, unless otherwise authorized in writing by the Director.

5.4.12 The plan referred to in subsection 5.4.11 shall include, at a minimum, the following:

(a) description of the management of volume of fluid tailings to be placed in DDA3;

(b) results from the DDA3 research and implementation design and planning;

(c) explanation of how tailings management has been adapted based on learnings from DDA3 and DPL operation and research to date;

(d) proposal for the final closure and reclamation of DDA3 with supporting justification and implementation design and plan;

(e) justification of the required activities, materials and timelines to achieve reclamation outcomes and milestones for the proposed final closure and reclamation landscape;

(f) update the information set out in Sections 4.4 to 4.8 of Directive 085: Fluid Tailings Management for Oil Sands Mining Projects, as amended;

(g) an assessment of the cost to complete the tailings management work from now until reclamation is complete (to be provided only via MFSP annual reporting referred to in subsection 6.1.1);

(h) explanation of outstanding risks and uncertainties, and their nature and magnitude;

(i) explanation and justification for how risks and uncertainties will be addressed;

(j) assessment of cost to implement mitigation options (to be provided only via MFSP reporting referred to in subsection 6.1.1); and

(k) any other information requested in writing by the Director.
5.4.13 The approval holder shall include tailings research updates in the annual tailings performance report for the research plans as required by section 5.4 to the Director on or before April 30 of every year, unless otherwise authorized by the Director.

5.4.14 The tailings research updates shall include the following information, at a minimum:

(a) a summary of the research programs and research plans conducted to date, that includes the following:

   (i) an analysis of the monitoring and research results including successes and failures;

   (ii) how corrective measures were identified and implemented for research monitoring and data collection;

(b) an interpretation of the research conclusions, including:

   (i) a description of the progress towards completing outstanding research objectives, or developing models;

   (ii) identification of any emerging issues affecting the ability to achieve research objectives in accordance with the schedule and timelines for resolving the emerging issues;

   (iii) identification of any new uncertainties and timelines for resolving the new uncertainties;

   (iv) a description and assessment of potential impacts to research objectives and timelines from emerging issues and uncertainties;

   (v) identification of any resolved uncertainties and new learnings; and

   (vi) how the data or techniques trialed will be used in future operations and reclamation;

(c) any proposed changes to the research design, methodologies or milestones for existing projects;

(d) any proposed changes to the research design, methodologies or milestones for subsequent or related research projects; and

(e) any other information requested in writing by the Director.

PART 6: FINANCIAL SECURITY

6.1.1 The approval holder shall:
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(a) calculate;
(b) report; and
(c) submit financial security in accordance with the:
   (i) *Mine Financial Security Program Standard*, Alberta Energy Regulator, March 2014, as amended; and

PART 7: RECLAMATION

SECTION 7.1: GENERAL

7.1.1 The approval holder shall conduct reclamation as described in the application unless otherwise:
   (a) specified in this approval; or
   (b) authorized in writing by the Director.

SECTION 7.2: DECOMMISSIONING

7.2.1 The approval holder shall apply for an amendment to this approval to reclaim the plant by submitting a:
   (a) Decommissioning Plan; and
   (b) Land Reclamation Plan

to the Director.

7.2.2 The approval holder shall submit the:
   (a) Decommissioning Plan; and
   (b) Land Reclamation Plan

referred to in subsection 7.2.1 at least one year prior to the plant ceasing operation, except for repairs and maintenance, unless otherwise authorized in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

7.2.3 The approval holder shall submit a detailed final landfill closure plan to the Director at least 6 months prior to an industrial landfill ceasing operations, unless otherwise authorized in writing by the Director.

7.2.4 The approval holder shall implement the plan referred to in 7.2.3 for the industrial landfill, as authorized in writing by the Director.

7.2.5 The approval holder shall submit plans to the Director for the decommissioning of each of the dams associated with the following infrastructure by the date specified to the Director, unless otherwise authorized in writing by the Director:

(a) Pond 6 on or before October 31, 2022;

(b) Pond 1A, Pond 2/3, Pond 4, Pond 7 and Pond 8B on or before October 31, 2028; and

(c) STP and DDA3 on or before October 31, 2033.

7.2.6 If any plan referred to in subsection 7.2.5 is found deficient by the Director, the approval holder shall correct all deficiencies identified by the date specified in writing by the Director;

7.2.7 The approval holder shall not implement any plan referred to in subsection 7.2.5 unless written authorization or approval amendment for that plan is granted by the Director.

POND 5, POND 6 AND POND 7

7.2.8 The approval holder shall:

(a) complete coke capping and vertical strip drain installation of Pond 5 on or before December 31, 2019; and

(b) commence reclamation of Pond 5 on or before May 1, 2024;

unless otherwise authorized in writing by the Director.

7.2.9 The approval holder shall not implement the mitigation plans for Pond 6 or Pond 7 required by the OSCA Approval, unless:

(a) the approval holder has provided the information required by the OSCA Approval; and

(b) an approval amendment or written authorization is granted by the AER.

SECTION 7.3: RECLAMATION AND LIFE OF MINE CLOSURE PLANNING
TERMS AND CONDITIONS ATTACHED TO APPROVAL

7.3.1 The approval holder shall reclaim disturbed land to a self-sustaining, locally common boreal forest ecosystem, integrated with the surrounding area, unless otherwise authorized in writing by the Director.

7.3.2 The approval holder shall participate in any regional multi-stakeholder forum that may be developed for end land use planning, to the satisfaction of the Director.

7.3.3 Using the pre-disturbance landscape as a reference for mine reclamation and closure planning, the approval holder shall return an acceptable distribution of upland ecosite phases and wetland classes on the post-disturbance landscape, as presented and updated through Mine Reclamation Plans, Life of Mine Closure Plans, and approval amendment applications.

7.3.4 The approval holder shall submit a Mine Reclamation Plan to the Director according to the following schedule:

(a) on or before December 31, 2019;
(b) on or before September 30, 2022;
(c) on or before September 30, 2025; and
(d) on or before September 30, 2028;

unless otherwise authorized in writing by the Director.

7.3.5 The approval holder shall prepare each Mine Reclamation Plan referred to in subsection 7.3.4 in accordance with Specified Enactment Direction 003: Direction for Conservation and Reclamation Submissions Under an Environmental Protection and Enhancement Act Approval for Mineable Oil Sands Sites, December 2018, as amended, unless otherwise directed in writing by the Director.

7.3.6 If the Mine Reclamation Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

7.3.7 The approval holder shall implement the Mine Reclamation Plan referred to in subsection 7.3.4, as authorized in writing by the Director.

7.3.8 The approval holder shall submit an updated Life of Mine Closure Plan to the Director in the next renewal application, unless otherwise authorized in writing by the Director.

7.3.9 The approval holder shall prepare the Life of Mine Closure Plan referred to in subsection 7.3.8 in accordance with Specified Enactment Direction 003: Direction for Conservation and Reclamation Submissions Under an Environmental Protection and Enhancement Act Approval for Mineable Oil Sands Sites, December 2018, as amended, unless otherwise directed in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

7.3.10 In addition to the requirements specified in subsection 7.3.9, the Life of Mine Closure Plan referred to in subsection 7.3.8 shall include, at a minimum, all of the following forest resource information:

(a) strategies to minimize and mitigate any impacts to the Annual Allowable Cut by the plant; and

(b) a description of the following, related to the Growth and Yield Program referred to in subsection 7.3.13(c);

(i) the schedule for establishment of relevant permanent and temporary sample plots,

(ii) a description of how these plots meet the objectives of monitoring forest yield and forest ecosystem development, and of providing trend information on silvicultural strategies and treatments, and reclamation success, and

(iii) a description of the sampling protocols for varying types of plots;

unless otherwise directed in writing by the Director.

7.3.11 If the Life of Mine Closure Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

7.3.12 The information provided in the Life of Mine Closure Plan referred to in subsection 7.3.8 and the Mine Reclamation Plan referred to in 7.3.4 regarding harvesting, clearing and reforestation shall be suitable for integration into the applicable Forest Management Plan, unless otherwise directed in writing by the Director.

7.3.13 The approval holder shall:

(a) complete and submit vegetation surveys on all reclaimed areas using survey systems in compliance with the *Alberta Regeneration Standards for the Mineable Oil Sands*, Alberta Environment and Sustainable Resource Development, 2013, as amended, and any other applicable standards approved by the Government of Alberta for use at oil sands mines;

(b) submit records of activity and performance, in a format and following protocols acceptable to the Government of Alberta, related to the revegetation of reclaimed lands;

(c) establish a Growth and Yield Program as approved by the Government of Alberta for reclaimed lands, consistent with the requirements of the *Alberta Forest Management Planning Standard*, Alberta Sustainable Resource Development, 2006, as amended;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(d) comply with the requirements of the *Alberta Forest Genetic Resource Management and Conservation Standards*, Alberta Agriculture and Forestry, December 2016, as amended; and

(e) comply with any Government of Alberta policy related to the deployment of propagules for use in reclamation;

unless otherwise authorized in writing by the Director.

7.3.14 In addition to the requirements specified in subsections 7.3.4 and 7.3.8, the Life of Mine Closure Plan and the Mine Reclamation Plans shall each:

(a) be consistent with the values and objectives in the *Fort McMurray-Athabasca Oil Sands Subregional Integrated Resource Plan*, Alberta Sustainable Resource Development, 2002, as amended;


(d) be consistent with *Lower Athabasca Region Tailings Management Framework for the Mineable Athabasca Oil Sands*, Government of Alberta, 2015, as amended, and *Directive 085 Fluid Tailings Management for Oil Sands Mining Projects*, AER, 2016, as amended; and

(e) ensure that reclaimed features have natural appearances characteristic of the region.

unless otherwise authorized in writing by the Director.

SECTION 7.4: PROGRESSIVE RECLAMATION

MATERIALS PLACEMENT, BACKFILLING AND CONTOURING

7.4.1 The approval holder shall not bury snow, ice, or other material, which causes instability or unacceptable settlement in tailings sand and overburden disposal areas or mined out pits.

7.4.2 The approval holder shall recontour all final slopes no steeper than 3 horizontal to 1 vertical (18°), over the total height of any engineered structure, unless otherwise authorized in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

7.4.3 The approval holder shall construct all structures and slopes to be geotechnically stable with minimal erosion.

7.4.4 The approval holder shall design all landforms to have self-sustaining and integrated surface drainage systems to convey surface runoff to adjacent watercourses, waterbodies, or wetlands.

7.4.5 Subject to 4.2.11, the approval holder shall establish surface drainage on disturbed land that is integrated with undisturbed land.

PLACEMENT OF RECLAMATION MATERIAL IN UPLAND ECOSYSTEMS

7.4.6 The approval holder shall use all coversoil and subsoil salvaged according to SECTION 3.5: of this approval for the purpose of reclamation.

7.4.7 Prior to placement of reclamation material as per subsection 7.4.8, the approval holder shall provide rooting-zone protection by capping the following materials and locations with a minimum average depth of 1.0 m of suitable overburden or tailings sand which meets the chemical criteria for suitable overburden:

(a) impervious material such as rock;
(b) Clearwater overburden;
(c) reject from oil sands processing;
(d) the following types of tailings as described in the application:
   (i) Consolidated tailings,
   (ii) treated tailings,
   (iii) froth treatment tailings, and
   (iv) Tailings in South Tailings Pond;
(e) coke;
(f) the plant developed area; and
(g) landfills;

unless written authorization or an approval amendment is obtained from the Director.

7.4.8 The approval holder shall place a minimum average depth of 0.2 m (20 cm) of coversoil on:

(a) the materials and locations referred to in subsection 7.4.7; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(b) substrate which meets the chemical criteria for suitable overburden;

unless otherwise authorized in writing by the Director.

7.4.9 Notwithstanding subsection 7.4.8, the Director may authorize in writing a reduction of the minimum average depth of reclamation material in consideration of the following:

(a) underlying substrate, slope-position, aspect and the revegetation target; or

(b) limitations in the volume of reclamation material available.

7.4.10 The approval holder shall conduct a survey of reclamation material after placement to assess the following parameters as they affect establishment of vegetation:

(a) depth;

(b) physical properties; and

(c) chemical properties;

using standard protocols found acceptable to the Director.

BIODIVERSITY ON THE RECLAIMED LAND

7.4.11 The approval holder shall re-establish wildlife habitat levels for the North Steepbank Extension and the Voyageur Upgrader project areas as per applications 35-94 and 45-94.

7.4.12 The approval holder shall re-establish a diversity of fish, moose and other wildlife habitat levels on the reclaimed land, at a minimum, similar to that which existed prior to disturbance, in appropriate proportions relative to the current Life of Mine Closure Plan required by subsection 7.3.8, to the satisfaction of the Director.

7.4.13 The approval holder shall demonstrate, through monitoring, progress in achieving a diversity of fish, moose and other wildlife habitats levels on the reclaimed land as outlined in subsection 7.4.12, to the satisfaction of the Director.

RECLAMATION MONITORING

7.4.14 The approval holder shall submit a Reclamation Monitoring Program proposal to the Director, when notified in writing by the Director.

7.4.15 The approval holder shall prepare the Reclamation Monitoring Program proposal referred to in subsection 7.4.14 as directed in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

7.4.16 If the Reclamation Monitoring Program proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

7.4.17 The approval holder shall implement the Reclamation Monitoring Program referred to in subsection 7.4.14, as authorized in writing by the Director.

RECLAMATION PROGRESS TRACKING

7.4.18 The approval holder shall submit an Annual Reclamation Progress Tracking Report to the Director.

7.4.19 The approval holder shall prepare and submit the Annual Reclamation Progress Tracking Report referred to in subsection 7.4.18 in accordance with Specified Enactment Direction 003: Direction for Conservation and Reclamation Submissions Under an Environmental Protection and Enhancement Act Approval for Mineable Oil Sands Sites, December 2018, as amended, unless otherwise directed in writing by the Director.

Hannah LaPlante
Approvals Manager, Authorizations Branch
Alberta Energy Regulator

June 12, 2019