

# Environment Act Licence

## Loi sur l'environnement Licence

Manitoba  
Conservation  
Conservation  
Manitoba



Licence No./Licence n° 2650 RR  
Issue Date/Date de délivrance May 20, 2004

Revised: November 3, 2004  
Revised: November 17, 2006

IN ACCORDANCE WITH THE MANITOBA ENVIRONMENT ACT (C.C.S.M. c. E125)  
THIS LICENCE IS ISSUED PURSUANT TO SECTION 11(1) AND 14(1) TO:

**McCain Foods (Canada); "the Licencee"**

for the construction and operation of the Development, being a potato processing plant and associated facilities encompassing but not necessarily limited to:

- expansions and upgrades made to the plant since October 25, 1979;
- associated facilities for the holding, treatment, recycling and disposal or alternative use of solid and liquid wastes; and
- such water supply wells, pumping wells, monitoring wells, observation wells, purge wells, groundwater pumping stations and re-charge trenches as have been installed for the purposes of managing the water supply for the plant, managing the water level of the local aquifer, and for tracking the quality, elevation contours and the direction of flow of the local groundwater; located on, or on parts of, Sections 8, 16, 17, 20, and 23, Township 10, Range 14 WPM, within the R.M. of North Cypress, all in accordance with:
  - the Proposal filed under *The Environment Act* on April 16, 1999;
  - the alteration submitted on October 18, 2000;
  - the alteration submitted on March 20, 2001;
  - the Proposal filed under *The Environment Act* on October 12, 2001;
  - the Proposal Addendum filed under *The Environment Act* on April 30, 2002;
  - the additional information submitted under *The Environment Act* on September 12, 2002, October 16, 2002, November 13, 2002; and March 21, 2003;
  - the Notice of Alteration submitted on February 12, 2004, respecting proposed changes to the Development's environmental management strategies relative to the Proposal submitted on October 12, 2001, most notably referencing the concept of a Feasibility Study, an Implementation Phase and a Demonstration Period respecting wastewater, groundwater and irrigation water; and

subject to the following specifications, limits, terms and conditions:

**\*\* A COPY OF THIS LICENCE MUST BE KEPT ON SITE AT THE DEVELOPMENT AT ALL TIMES \*\***

## DEFINITIONS

In this Licence:

**"accredited laboratory"** means an analytical facility accredited by the Standard Council of Canada (SCC), or accredited by another accrediting agency recognized by Manitoba Conservation to be equivalent to the SCC, or be able to demonstrate, upon request, that it has the quality assurance/quality control (QA/QC) procedures in place equivalent to accreditation based on the international standard ISO/IEC 17025, or otherwise approved by the Director;

**"affected area"** means a geographical area, excluding the property of the Development;

**"approved"** means approved by the Director in writing;

**"aquifer"** means a water saturated geological unit that will yield water to wells or springs at a sufficient rate so that the wells or springs can serve as practical sources of water supply;

**"Demonstration Period"** means a proposed 10-year undertaking, between January 1, 2009 and January 1, 2019, during which the effectiveness of the facilities commissioned during the Implementation Phase is monitored;

**"Director"** means an employee of the department appointed as such by the Minister;

**"effluent"** means wastewater released into the environment;

**"Environment Officer"** means an employee so designated pursuant to *The Environment Act*;

**"extraction well"** means a supply, pumping or purge well;

**"Feasibility Study"** means a proposed 2-year technical study, between January 1, 2004 and January 1, 2006, the details of which are outlined in Appendix 'H' attached to this Licence, to determine the appropriate handling and treatment strategy for all of the Development's raw process wastewater and by-products, as well as for remediating existing impacted groundwater, in order to keep the impacts of the Development on the local groundwater contained on a sustainable level to the degree specified through the provisions of this Licence;

**"filtered"** means passed through a sandy medium;

**“Implementation Phase”** means a proposed 3-year design, construction and commissioning period, between January 1, 2006 and January 1, 2009, to implement approved decisions made by the Licencee in the course of the Feasibility Study;

**“hazardous waste”** means a product, substance or organism that meets the classification criteria set out in *Manitoba Regulation 282/87*, and that is intended for treatment or disposal, and includes recyclable material;

**“odour nuisance”** means a continuous or repeated odour, smell or aroma in an affected area, which is offensive, obnoxious, troublesome, annoying, unpleasant or disagreeable to a person:

- (a) residing in an affected area;
- (b) working in an affected area; or
- (c) present at a location in an affected area which is normally open to the members of the public;

if the odour, smell or aroma

- (d) is the subject of at least 5 written complaints, received by the Director in a form satisfactory to the Director within a 90-day period, from 5 different persons falling within clauses (a), (b) or (c), who do not live in the same household; or
- (e) is the subject of at least one written complaint, received by the Director in a form satisfactory to the Director, from a person falling within clauses (a), (b) or (c), and the Director is of the opinion that if the odour, smell or aroma had occurred in a more densely populated area there would have been at least 5 written complaints received within a 90-day period from 5 different persons who do not live in the same household;

**“opacity”** means the degree to which emissions reduce the transmission of light and obscure the view of an object in the background, as measured by “Standard Reference Methods for Source Testing: Measurement of Opacity of Emissions from Stationary Sources”, Report EPS 1-AP-75-2 (Fisheries and Environment Canada, November 1977);

**“particulate matter”** means finely divided liquid or solid matter other than water droplets;

**“point source”** means any point of emission from the Development where pollutants are emitted to the atmosphere by means of a stack;

**“pollutant”** means a pollutant as defined by *The Environment Act*;

**“proposed”** means proposed by the Licencee;

**“PM”** means particulate matter;

“**PM<sub>10</sub>**” means particulate matter with a mean aerodynamic diameter equal to or less than 10 microns;

“**potato processing**” means the cleaning, the peeling, the cutting, the removal of defects, the blanching, the drying, the frying, the freezing and the packaging of potatoes, or any one of these activities;

“**potato processing plant**” means the main processing plant structure;

“**process wastewater**” means any wastewater stream, excluding sanitary wastewater, containing foreign matter or pollutants related to the undertaking of the potato processing activity of the Development;

“**pumping well**” means a well used to divert groundwater to a recharge trench;

“**purge well**” means a well used to divert impacted groundwater to land by means of irrigation;

“**sanitary wastewater**” means sewage containing human body, toilet, liquid, waterborne culinary, sink or laundry waste, and excluding any process wastewater;

“**sludge**” means accumulated solid material containing large amounts of entrained water, which has separated from wastewater by gravity;

“**solid waste**” means solid waste as defined in *Manitoba Regulation 150/91* respecting waste disposal grounds, or any future amendments thereto;

“**stack**” means a duct, pipe, chimney, vent, opening or other structure through which pollutants are emitted to the atmosphere;

“**Standard Methods for the Examination of Water and Wastewater**” means the most recent edition of Standard Methods for the Examination of Water and Wastewater published jointly by the American Public Health Association, the American Waterworks Association and the Water Environment Federation;

“**supply well**” means a well supplying groundwater directly to the main water tank at the potato processing plant;

“**water table**” means the upper surface of the zone of saturation of a water bearing geological unit;

**“Treatment Zone”** means an area beyond and including the existing wastewater lagoon and the adjacent wetland area, as defined by surveyed perimeter boundary lines within which the “Final Draft - Manitoba Water Quality Standards, Objectives and Guidelines” dated November 22, 2002, or any subsequent amendments thereto, would not apply to the quality of the groundwater;

**“wastewater”** means any liquid waste stream unique to the Development and containing one or more pollutants;

**“wastewater lagoon”** means the existing unlined pond and perimeter dykes located mostly in the south half of section 17-10-14W, and used for the collection and partial treatment of wastewater from the Development;

**“wastewater treatment facility”** means an engineered facility designed to collect, contain and treat wastewater to produce a specified effluent quality; and

**“wetland area”** means the existing flooded area of low lying land located mostly in the south half of section 16-10-14W, immediately east of the existing wastewater lagoon.

### GENERAL TERMS AND CONDITIONS

1. Notwithstanding any of the following limits, terms and conditions specified in this Licence, the Licencee shall, upon the request of the Director:
  - (a) sample, monitor, analyze and/or investigate specific areas of concern regarding any segment, component or aspect of pollutant storage, containment, handling, treatment, and disposal, irrigation or emission systems, for such pollutants or ambient quality, aquatic toxicity, leachate characteristics and discharge or emission rates, for such duration and at such frequencies as may be specified;
  - (b) determine the environmental impact associated with the release of any pollutant(s) from the Development; or
  - (c) provide the Director, within such time as may be specified, with such reports, drawings, specifications, analytical data, descriptions of sampling and analytical procedures being used, bioassay data, flow rate, loading rate or air emission rate measurements, and such other information as may from time to time be requested.
  
2. The Licencee shall, unless otherwise specified in this Licence:
  - (a) carry out all preservations and analyses of liquid samples in accordance with the methods prescribed in the Standard Methods for the Examination of Water and Wastewater or in accordance with equivalent preservation and analytical methodologies acceptable to the Director; and
  - (b) have all analytical determinations undertaken by an accredited laboratory.

3. The Licencee shall, where required through the provisions of this Licence:
  - (a) carry out all stack sampling and ambient air sampling in accordance with protocols, procedures and type of equipment acceptable to the Director;
  - (b) have any stack sampling and ambient air sampling undertaken by qualified persons; and
  - (c) have any analytical determinations undertaken by an accredited laboratory.
4. The Licencee shall report all the information requested through the provisions of this Licence in a manner and form acceptable to the Director.
5. The Licencee, by receipt and acceptance of this Licence, accepts all legal and financial environmental liabilities as may result from, or during, the undertaking of the 2-year Feasibility Study, the 3-year Implementation Phase and the 10-year Demonstration Period.

### **SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS**

#### **Respecting Water Supply and Water Use**

6. The Licencee shall, unless otherwise approved or specified by the Director, and subject to Sub-clause 7(a) of this Licence, only operate:
  - (a) the following wells:
    - (i) a series of 16 existing water supply wells on the plant wellfield in Section 20-10-14W;
    - (ii) two existing water supply wells in the east wellfield in SW 23-10-14W;
    - (iii) five existing pumping wells (P1 to P5) west of the plant's wastewater lagoon in SW 17-10-14W, directing water to recharge trench #1;
    - (iv) three existing purge wells (P6 to P8) south of the plant's wastewater lagoon in N 8-10-14W for use in conjunction with the irrigation plan, and one existing purge well (P12) located north of the Development's wastewater lagoon;
    - (v) three existing pumping wells (P9 to P11) in S 8-10-14W, for directing water to recharge trench #2;
    - (vi) four proposed large diameter pumping wells for NE 16-10-14W, to direct water to recharge trench #1;
    - (vii) five proposed purge wells for 8-10-14W for use in conjunction with an Irrigation Plan;
    - (viii) three proposed horizontal purge wells for SE 16-10-14W for use in conjunction with an Irrigation Plan; and
    - (ix) any new extraction well as may be approved by the Director;
  - (b) the approved recharge trenches #1 and #2, located in N 20-10-14W; and
  - (c) those pumps and transfer pipelines used to connect the wells listed in Sub-clause 6(a) of this Licence with the processing plant, the two recharge trenches, and the irrigation equipment.

7. The Licencee shall not:
- (a) operate any supply, pumping or purge well described in Sub-clause 6(a) of this Licence in the absence of, or in contravention of, a Water Rights Licence or written Authorization issued pursuant to the *Water Rights Act* for the diversion of water from such a well;
  - (b) operate either of the two east wellfield water supply wells in SW 23-10-14W unless:
    - (i) the combined volume of water available to the plant through the water supply wells on the plant wellfield is insufficient to satisfy the prevailing water demand at the processing plant; and
    - (ii) the Director has been informed in writing of the circumstance;
  - (c) pump a combined volume of water from the two east wellfield water supply wells in SW 23-10-14W at a rate greater than 2.3 dam<sup>3</sup>/day, unless otherwise approved in writing by the Director;
  - (d) during any consecutive 12-month period, direct a cumulative quantity of water supply to the potato processing plant in excess of 2,000 acre-feet (2,467 dam<sup>3</sup>), unless otherwise specified or approved by the Director;
  - (e) supply water to recharge trench #1 at such a rate as to:
    - (i) cause excessive and persistent mounding of the water table beneath recharge trench #1, relative to the groundwater table elevation at any near off-site location east, northeast or north of recharge trench #1 within sections W 21-10-14W S 28-10-14W or S 29-10-14W to the degree that the groundwater quality of any such off-site location is or could be adversely affected; or
    - (ii) exceed the prevailing rate of recharge capability of the recharge trench to the underlying aquifer; and
  - (f) divert water from any of the three pumping wells (P9, P10, or P11) in S 8-10-14W to recharge trench #2 unless the Licencee is able to demonstrate upon request that:
    - (i) the diversion rates to recharge trench #1 from pumping wells P1, P2, P3, P4, P5 and from the four large diameter pumping wells (once on line), proposed to be installed in NE 16-10-14W, are already maximized to within the constraints of Sub-clause 6(e) of this Licence, but more water is required for the plant wellfield to match the plant's rate of extraction from the plant wellfield; or
    - (ii) surface flooding, or a near surface water table condition, in section 8-10-14W warrants the use of those pumping wells; or
    - (iii) the historic range of the natural water table elevation beyond the draw-down cone at the plant wellfield needs to be maintained so as not to adversely affect the use or yield of any nearby off-site private wells; or
    - (iv) there is a demonstrated temporary or ongoing need to improve, or to maintain, one or more water quality parameters in the water supply being provided to the plant through the plant site's water supply wells.

8. The Licencee shall not discharge water withdrawn from any pumping well identified in this Licence other than to the designated recharge trench as identified in Sub-clauses 6(a)(iii) and 6(a)(v) of this Licence.
9. The Licencee shall draw water from every actively used pumping well (except wells P9, P10 and P11) and purge well, located within any impacted groundwater zone, at such depth or depths which is or are demonstrated to the satisfaction of the Director (through the proposed 3-dimensional groundwater modelling and throughout the Demonstration Period) as offering the most efficient recovery of groundwater impacted by seepage losses from the wastewater lagoon.
10. The Licencee shall:
  - (a) commencing July 1, 2004, install on each actively used extraction well, and on the inlet of the receiving tank at the plant, a flow meter providing cumulative readouts and capable of at least a  $\pm 5\%$  accuracy, to measure the pumping rate and the cumulative volume of water being pumped, such that each flow meter is installed and functional before:
    - (i) January 1, 2006 on:
      - the inlet to the main water tank at the plant;
      - each active well of the existing 16 supply wells on the plant's wellfield;
      - each active well of the existing pumping wells P1, P2, P3, P4, P5; P9, P10, and P11; and
      - each active well of the existing purge wells P6, P7, P8 and P12; and
    - (ii) the date of commissioning respecting:
      - each large diameter pumping well proposed for the wetland area;
      - each horizontal well proposed for the wetland area;
      - each purge well proposed in connection with the irrigation plan; and
      - any additional extraction well as may be proposed to augment the management of groundwater used or impacted by this Development;
  - (b) continually maintain each installed flow meter in proper working order; and
  - (c) render each installed flow meter accessible at any time to an Environment Officer.

**Respecting Wastewater, Groundwater and Surface Runoff**

11. The Licencee shall:
  - (a) direct all process wastewater streams from the plant into the existing wastewater lagoon;
  - (b) minimize the routing of unpolluted surface runoff towards the existing wastewater lagoon; and
  - (c) manage the water level within the existing wastewater lagoon, and maintain the constructed dikes on the periphery of the wastewater lagoon in sound condition in a manner consistent with good engineering practice, to prevent the occurrence of any spill



or washout of wastewater from the wastewater lagoon due to a failure of the perimeter dikes.

12. The Licencee shall, no later than January 1, 2006, submit to the Director, for approval, a functional overview (with implementation details to be addressed through Clause 13 of this Licence) of:
  - (a) a sustainable Wastewater and Groundwater Management Plan to address the quantification, characterization, recycling, minimization, treatment, disposal, recovery, and irrigation of fluids as it would relate to:
    - (i) process water requirements;
    - (ii) process wastewater generation;
    - (iii) process wastewater handling (treatment, recycling, irrigation); and
    - (iv) groundwater protection; and
  - (b) a Groundwater Remediation Plan to address the delineation and remediation of polluted or adversely impacted zones of groundwater having resulted from seepage losses and discharges from the unlined wastewater lagoon, and historical excessive irrigation onto irrigation fields west of the wastewater lagoon, whereby this Plan shall include:
    - (i) the tracking of groundwater improvements made through the implementation of the Plan, with the goal of remediating; and
    - (ii) protecting the groundwater resources beyond the boundary of a proposed Treatment Zone (see "Definitions"); and
  - (c) environmental assessment of the impacts that may result from each of the Wastewater and Groundwater Management Plan and the Groundwater Remediation Plan;  
whereby each Plan identifies all such new engineering works as may be proposed to be constructed to implement the respective Plan.
  
13. The Licencee shall no later than January 1, 2006, submit to the Director, for approval, a proposed program for the 3-year Implementation Phase and for the 10-year Demonstration Period, that incorporates a monitoring program and 3-dimensional modelling of groundwater directional movement and groundwater quality alteration over time and distance, to assess and demonstrate the practicality and sustainability of continuing to use the existing wastewater lagoon, adjacent wetland area, and the immediate underlying aquifer, as key elements in the Wastewater and Groundwater Management Plan, the Groundwater Remediation Plan, and the Expanded Irrigation Plan, whereby the 10-year Demonstration Period would have to demonstrate and verify:
  - (a) the ongoing characterization and quantification of groundwater and pollutant movement due to continuous seepage losses from the wastewater lagoon and wetland area;
  - (b) the ongoing fate of the wastewater pollutants being transported in the affected aquifer;
  - (c) the ongoing delineation of the extent of all the pollutant specific zones of adversely impacted groundwater having resulted from ongoing seepage losses or past excessive irrigation practices;

- (d) the short-term containment of pollutants within such a proposed perimeter boundary of a Treatment Zone, as approved or otherwise defined by the Director, beyond which the groundwater quality cannot:
    - (i) exceed the drinking water and irrigation water quality criteria laid out in the "Final Draft of the Manitoba Water Quality Standards, Objectives and Guidelines", dated November 22, 2002, or any subsequent amendments thereto, with the caveat that total nitrogen (as N) in the groundwater shall not exceed 10 milligrams per litre; or
    - (ii) be rendered any worse than the natural background water quality in the case where any background water quality parameter naturally exceeds the above referenced drinking water or irrigation water quality criteria;
  - (e) the long-term remediation of adversely impacted groundwater beyond the perimeter boundaries of an approved Treatment Zone;
  - (f) the long-term sustainability of satisfactorily containing all pollutants within the boundaries of an approved Treatment Zone, to that level described in Sub-clause 13(d) of this Licence; and
  - (g) the adequacy of the degree of treatment proposed for the process wastewater following the 2-year Feasibility Study in maintaining a sustainable Wastewater and Groundwater Management Plan and a sustainable Expanded Irrigation Plan for the protection of the groundwater beyond an approved Treatment Zone;
14. The Licencee shall, no later than January 1, 2006:
- (a) (i) identify to the Director, in writing, that the Licencee has sufficient confidence in carrying through with the full term of the 10-year Demonstration Period; and
  - (ii) commence the construction and operation of such engineering works and new extraction and monitoring wells as may be proposed for the 3-year Implementation Phase and subsequently evaluated during the 10-year Demonstration Period; or
  - (b) submit to the Director a new Proposal for the Development under Section 11(1) of *The Environment Act*.
15. If, upon completion of the 5<sup>th</sup> year into the 10-year Demonstration Period, the Director is not satisfied with the degree of environmental progress based on the analysis of the monitoring data collected up to that point in time, the Licencee shall, upon the written request of the Director:
- (a) augment the 10-year Demonstration Period with the implementation of such additional wastewater treatment, or wastewater containment provisions plus wastewater treatment, as deemed necessary by the Director to further mitigate the impacts on the affected aquifer; or
  - (b) terminate the 10-year Demonstration Period, and file a new *Environment Act* proposal for the construction and operation of an engineered wastewater treatment facility together with a new Wastewater and Groundwater Management Plan.

16. If, upon the completion of the 10-year Demonstration Period, the Director is not satisfied that the proposed Wastewater and Groundwater Management Plan has demonstrated, with at least a 95% statistical certainty, based on the analysis of the complete data set compiled during the last 5 years of the 10-year Demonstration Period, that:

- (a) pollutants can be kept contained within the boundaries of the approved treatment zone; or
- (b) pollutants can be kept contained on a sustainable basis within the boundaries of the approved treatment zone;

the Licencee shall, upon the written request of the Director, and by a date to be specified, submit a new proposal under Section 11(1) of *The Environment Act* that would incorporate the design, construction and operation of an engineered wastewater treatment facility together with a new Wastewater and Groundwater Management Plan for the protection of the local groundwater, and that would incorporate the remediation of any groundwater impacted by the Development prior to and during the undertaking of the 10-year Demonstration Period.

17. The Licencee shall:

- (a) submit to the Director, for approval, design drawings and the design pumping rate for each of:
  - (i) the proposed three "horizontal wells", as well as the four "large diameter pumping wells", as proposed for the affected wetland area east of the wastewater lagoon;
  - (ii) the proposed five new "plume purge wells" proposed for the delineated seepage plume south of the wastewater lagoon; and
  - (iii) any other extraction wells as may be proposed by the Licencee upon completion of the 2-year Feasibility Study or any time thereafter;before their construction is commenced, with emphasis placed on their depth of withdrawal relative to the vertical distribution of impacted groundwater in their respective location;
- (b) install the approved wells (subject to their compliance with the *Water Rights Act* and any regulations governing the installation of wells) whereby the wells are taken to such depths as demonstrated to the Director to provide the most efficient recovery of impacted groundwater for groundwater remediation and ongoing pollution mitigation purposes; and
- (c) decommission any unused wells in accordance with prevailing regulations respecting the proper manner of decommissioning a well, and record such decommissioned wells with the Director.

**Respecting Irrigation**

18. The Licencee shall, no later than January 1, 2006, submit to the Director, for approval, a sustainable Expanded Irrigation Plan, compiled in consultation with Manitoba Agriculture, Food and Rural Initiatives, outlining:

- (a) the locations, the suitability, and the adequacy of each irrigation field proposed to be used in the short-term and the long-term for the disposal of treated wastewater and impacted groundwater;
  - (b) how the proposed irrigation plan will logistically remain in-step with the Wastewater and Groundwater Management Plan and the Groundwater Remediation Plan;
  - (c) contingency plans for periods of excessive moisture in the soil, or other circumstances that would render scheduled irrigation fields inaccessible for irrigation;
  - (d) the irrigation field selection process, and the methodology to be employed to evaluate the most limiting factor (moisture, nutrients, metals, salinity, soil classification, crop type, etc.) that would govern the amount of irrigation water to be applied to any field at any time;
  - (e) an integrated pest management plan to limit the risk of a potential transfer of disease to crops being irrigated;
  - (f) a monitoring program, satisfactory to the Director, for baseline data and ongoing audit purposes;
  - (g) a mechanism and annual schedule for consulting with Manitoba Agriculture, Food and Rural Initiatives, in advance of each year's irrigation season, as to the acceptability of the proposed irrigation fields as well as the volumes and quality of water proposed to be applied to each of the targeted fields during each such irrigation season; and
- carry out the approved Expanded Irrigation Plan and the related baseline and auditing monitoring programs as approved, or as may be amended from time to time, by the Director.

19. The Licencee shall not irrigate any area of land:

- (a) between the 30<sup>th</sup> day of September of any year and April 30<sup>th</sup> of the following year, unless otherwise approved by the Director;
- (b) at such a rate, of such quality, or in such quantity as being in excess of the prevailing agronomic requirements of the crop being grown on the affected irrigation field, or causing excess nutrients or other pollutants to be forced past the root zone of the crop, or otherwise being inconsistent with any conditions outlined by Manitoba Agriculture, Food and Rural Initiatives in Appendix 'G' attached to this Licence to assure the sustainability of the irrigation program;
- (c) with any water exhibiting a Sodium Adsorption Ratio in excess of 6.0;
- (d) where there is evidence of standing water, or the subsurface water table is within the root zone of the crop growing on that land;
- (e) where there is evidence that the irrigation is causing an accumulation of salts, metals, nutrients or excessive water in the soil that is approaching a threshold level which the Director, in consultation with Manitoba Agriculture, Food and Rural Initiatives, deems detrimental to the crop or the fertility of the affected agricultural land, unless the Licencee is able to reverse the trend through a plan acceptable to the Director;
- (f) where there is evidence that additional irrigation would adversely impact the quality of groundwater under that field relative to drinking water criteria as laid out in the "Final Draft - Manitoba Water Quality Standards, Objectives and Guidelines" dated November

- 22, 2002, or any subsequent amendments thereto, with the caveat that total nitrogen (as N) in the groundwater shall not be increased to a level in excess of 10 milligrams per litre; or
- (g) that the Director specifies to be a non-candidate field on a permanent or temporary basis.

**Respecting Sanitary Wastewater**

20. The Licencee shall:
- (a) direct all sanitary wastewater generated at the Development into the on-site sewage treatment plant;
  - (b) ensure that the sewage treatment plant is operated by a person trained and qualified to operate the plant;
  - (c) regularly monitor and maintain the sewage treatment plant for optimum performance;
  - (d) operate and manage the sewage treatment plant, such that:
    - (i) the daily hydraulic loading of influent does not exceed a rate of 66.2 cubic metres per day;
    - (ii) the daily organic loading in the influent does not exceed a rate of 15.9 kilograms of 5-day biochemical oxygen demand per day;unless otherwise specified by the Director on the basis of actual and valid performance data;
  - (e) not release any effluent from the sewage treatment plant whereby the quality of any 24-hour sample composite sample of such effluent collected from the final clarification chamber at or near the point of exit from the final clarification chamber, is such that:
    - (i) the concentration of the 5-day biochemical oxygen demand is in excess of 30 milligrams per litre of sample; or
    - (ii) the concentration of total suspended solids is in excess of 30 milligrams per litre of sample;
  - (f) install and maintain a suitable flow meter with a cumulative readout on the sewage treatment plant to facilitate the verification of compliance with Sub-clause 20(d) of this Licence;
  - (g) before commencing construction of the proposed disposal field for the on-site sewage treatment plant effluent:
    - (i) prepare and submit to the Director an environmental assessment report, complete with appropriate baseline, on the potential groundwater quality impact(s) of a continual use of the proposed disposal field; and
    - (ii) demonstrate, to the satisfaction of the Director, that a continual use of the proposed disposal field, at the proposed site, will not adversely impact any well water at the nearby MacLaren Farm Ventures property, or at any other off-site private well used for drinking purposes;
  - (h) upon and after the installation of the proposed disposal field for the treated sewage effluent, direct and release all effluent from the on-site sewage treatment plant into the disposal field, unless otherwise specified or approved by the Director;

- (i) dispose of all sludge extracted from either the on-site sewage treatment plant or from the associated sludge holding tank into an off-site facility licenced to accept such sludge; and
- (j) if necessary, and upon the written request of the Director, implement disinfection of the treated sewage effluent to the degree as may be specified so as to protect groundwater impacted by treated sewage effluent, but used for drinking purposes, to the extent as laid out in the "Final Draft of the Manitoba Water Quality Standards, Objectives and Guidelines", dated November 22, 2002, or any subsequent amendments thereto.

21. The Licencee shall, direct all wastewater from the mechanic's garage building (except any sanitary wastewater captured in a separate sewer line and addressed through Sub-clause 20(a) of this Licence), into an on-site holding tank, and dispose of the contents of that holding tank to a licenced off-site wastewater treatment facility.

#### **Respecting Air Emissions**

22. The Licencee shall not cause or permit an odour nuisance to be created as a result of any construction, operation or alteration of the Development, and shall take such steps as the Director may require to eliminate or mitigate an odour nuisance.

23. The Licencee shall not undertake any open burning of solid waste on the property of the Development.

24. The Licencee shall not emit from the Development:

- (a) particulate matter from any point source that:
  - (i) exceeds 0.23 grams per dry standard cubic metre calculated at 25 degrees Celsius and 760 millimetres of mercury, corrected to 12 percent carbon dioxide for processes involving combustion;
  - (ii) exhibits a visible plume with an opacity of greater than 5 percent at any point beyond the property line of the Development; or
  - (iii) results in the deposition of visible particulate matter at any time beyond the property line of the Development; and
- (b) particulate matter from any point source with an opacity that equals or exceeds:
  - (i) 20 percent as the average of any 24 consecutive opacity observations taken at 15 second intervals;
  - (ii) 20 percent for more than 16 individual opacity observations within any 1 hour period; or
  - (iii) 40 percent for any individual opacity observation.

25. The Licencee shall:

- (a) continually maintain all air emission control equipment in proper functioning order, and exercise due diligence during any breakdown or maintenance of such equipment;

- (b) install such provisions as may be required to access and monitor point source air emissions from any air emission source; and
- (c) install such air emission control equipment as may be requested in writing by the Director to be installed for the protection of the environment and environmental health.

26. The Licencee shall:

- (a) within 60 days of the date of issuance of this Licence, commence consultations with Manitoba Conservation respecting the undertaking of another but more advanced air dispersion modelling of all the air emissions being released by the Development, whereby:
  - (i) the methodology shall utilize either the U.S. EPA Industrial Source Complex (ISC3) or the AerMod air dispersion model;
  - (ii) meteorological data representative of the area shall be used;
  - (iii) emission factors shall be based on source sampling of the Midwest facility, or on known emission factors from other similar facilities;
  - (iv) the assessment of concentrations shall focus on off-site receptors within 5 kilometres of the potato processing plant;
  - (v) the pollutants to be modeled shall include: PM<sub>10</sub>; individual volatile organic compounds (VOC's); nitrogen oxides (i.e. NO+NO<sub>2</sub>, expressed as NO<sub>2</sub>); and odour (including cooking odours);
  - (vi) a more complete assessment of background air quality levels is undertake, where necessary; and
  - (vii) Ontario air quality criteria for VOC's and PM<sub>10</sub>, are used for those air pollutants for which Manitoba has no criteria;
- (b) complete the air dispersion modelling within a timeframe determined by the Director; and
- (c) submit a report, that is satisfactory to the Director, within 90 days of the completion of the modelling exercise, outlining descriptions of:
  - (i) the air dispersion modelling methodology utilized;
  - (ii) all the air emission sources (including odour);
  - (iii) the receptors (i.e. a listing of residences and other potential receptors within a 5 km radius of the potato processing plant);
  - (iv) the local meteorology;
  - (v) any modelling assumptions made;
  - (vi) assessed background air quality levels; and
  - (vii) the modelling results versus the applicable air quality criteria;together with recommendations, and a proposed implementation schedule, for mitigating, or for further evaluating, those air pollutants determined to be in non-conformance with applicable air quality criteria.

**Respecting Pipeline Trench Construction**

27. The Licencee shall install buried pipelines on cultivated land or land in its natural state, in accordance with the methodology illustrated in Figures 1 and 2, attached to this Licence.
28. The Licencee shall revegetate areas disturbed by the construction at the Development, with a mixture of native (where native species existed prior to construction) or introduced grasses or legumes, as quickly as possible following construction to prevent soil erosion and the establishment of noxious weeds.

**Respecting Solid and Sludge Wastes**

29. The Licencee shall, no later than January 1, 2006, submit to the Director for approval:
- (a) a Solids and Sludge Management Plan respecting the handling, storage, re-use and disposal of all solid and sludge wastes resulting from the operation of the potato processing plant, the wastewater lagoon and any other associated treatment systems; and
  - (b) an environmental assessment of any impacts associated with implementing the Solids and Sludge Management Plan.
30. The Licencee shall not deposit any solid waste (excepting mud and potato wastes) from the Development into the environment except into a waste disposal ground operating under the authority of:
- (a) a permit issued pursuant to *Manitoba Regulation 150/91*, or any future amendment thereto; or
  - (b) a Licence issued pursuant to *The Environment Act*.
31. The Licencee shall not apply any mud, removed from potatoes received at the plant, onto agricultural land used for growing potatoes unless the mud management practice adopted by the Licencee has been approved, in writing, by Manitoba Agriculture, Food and Rural Initiatives as being acceptable for the purposes of preventing the transmission of potential soil borne diseases that could adversely affect a potato crop on the recipient land.
32. The Licencee shall not store in the open outdoors or field apply raw potato waste, including culls, during the growing season (typically mid-May to the end of September).

**Respecting Recyclable Wastes and Food Wastes**

33. The Licencee shall not deposit bulky metallic wastes, used tires, used oil or other fluid lubricants, hydraulic fluids, or any other class of recyclable waste substances as may be specified by the Director, into the environment except into:
- (a) a facility or infrastructure which accepts such materials for recycling; or
  - (b) a waste disposal ground operating under the authority of:
    - (i) a permit issued pursuant to *Manitoba Regulation 150/91*, or any future amendment thereto; or



(ii) a Licence issued pursuant to *The Environment Act*;  
where these recyclable substances are kept segregated from each other and are not buried  
(unless otherwise specified by the Director) so as to facilitate their future recycling.

34. The Licencee shall continually strive to minimize and recycle organic wastes resulting from the handling and processing of potatoes.
35. The Licencee shall, with respect to by-product solid food wastes resulting from the processing of potatoes:
  - (a) store them in such a manner, and for such limited time, as not to cause an odour nuisance; and
  - (b) continually maintain a program of supplying these wastes to one or more clients who are able to use them as a supplementary source of animal feed.
36. The Licencee shall collect all the waste cooking oil for transfer to a facility capable of recycling the used oil as animal feed, or for refining the waste cooking oil.

**Respecting Dangerous Goods or Hazardous Wastes**

37. The Licencee shall comply with all the applicable requirements of:
  - (a) *Manitoba Regulation 188/2001* or any future amendment thereto, respecting the storage and handling of petroleum products and allied products; and
  - (b) *The Manitoba Dangerous Goods Handling and Transportation Act*, and regulations issued thereunder, respecting the handling, transport, storage and disposal of any dangerous goods brought onto or generated at the Development.
38. The Licencee shall store any petroleum product or allied product not captured under *Manitoba Regulation 188/2001*, or any other liquid chemical potentially dangerous to human health and the environment, within a diked or curbed storage holding area designed to contain a volume of liquid equal to 110% of the volume of the largest storage tank located therein plus the effective displacement volume of all other tanks and structures located therein, and maintain the integrity of the facility by regularly removing precipitation accumulations (if located outdoors).
39. The Licencee shall, with respect to any used petroleum based oil or hydraulic fluids removed from on-site machinery, collect, transport and store these substances in secure, properly labeled, non-leaking containers and regularly send them to a recycling facility or to a facility approved to accept hazardous wastes.
40. The Licencee shall ensure that spill recovery equipment is available on-site at all times.

41. The Licencee shall make every reasonable provision to preclude the possibility for any liquid dangerous goods or hazardous wastes from being released into the on-site sewage treatment system or the onsite process wastewater collection system.

**Emergency Response Plan**

42. The Licencee shall:
- (a) within six months of the date of issuance of this Licence, submit to the Director, for approval, a proposed Emergency Response Plan consistent with the departmental "*Industrial Emergency Response Planning Guide (MIAC, September, 1996)*" to address contingency measures and emergency responses to such matters as: fires; spills of chemicals, dangerous goods or hazardous wastes; and any other kind of foreseeable incident that can pose a potential risk to human health or the environment; and
  - (b) continually maintain the approved Emergency Response Plan in a current status for the duration of the Development.

**Respecting Monitoring, Record Keeping and Reporting**

43. The Licencee shall immediately notify Manitoba Conservation District Office staff in Carberry of any wildlife death observed to occur in the vicinity of the plant's wastewater lagoon.
44. The Licencee shall:
- (a) not less than twice annually, convene a meeting with representatives of the Rural Municipality of North Cypress and interested residents to:
    - (i) review the operation of the water supply system since the previous meeting;
    - (ii) project the future operation of the water supply wells;
    - (iii) review the findings of the preceding year's groundwater monitoring results; and
    - (iv) discuss any operational problems or concerns identified by the municipality, the residents, or the Licencee; and
  - (b) submit a written report to the Director on each semi-annual meeting, within 30 days of the date of the respective meeting, outlining therein all the items of concern identified or raised at the meeting by the municipality, the residents or the Licencee, along with the action items proposed to address the raised operational problems concerns.
45. The Licencee shall at the end of each month determine and record:
- (a) the total quantity of water (in cubic metres) pumped to:
    - (i) recharge trench #1 from each of pumping wells P1, P2, P3, P4, P5;
    - (ii) recharge trench #1 from each of the five wide diameter pumping wells (once on line) proposed for the wetland area;
    - (iii) recharge trench #2 from each of pumping wells P9, P10, and P11;
    - (iv) the processing plant from each of the 16 plant wellfield water supply wells; and
    - (v) the processing plant from each of the 2 water supply wells in the east wellfield;

- (b) the total quantity of process wastewater directed to the wastewater lagoon; and
  - (c) the total quantity and quality of groundwater pumped to the irrigation fields from:
    - (i) each of the 5 purge wells (once on line) proposed for section 8-10-14W;
    - (ii) each of the purge wells P6, P7 and P8;
    - (iii) each of the 3 horizontal purge wells (if and when installed) proposed for the wetland area; and
    - (iv) any other approved pumping or purge well that may be installed or set into operation;with the reported irrigated quantities and qualities delineated by the particular fields which received the irrigation water.
46. The Licencee shall:
- (a) as a minimum, monitor the water level, the physical, chemical and biological characteristics of the groundwater and surface wastewater at such "Sources", such "Locations", such "Frequency" and for such "Type" parameters as identified in Appendices 'A', 'B', 'C', 'D', 'E' and 'F' attached to this Licence in accordance with the monitoring program approved by the Director on December 15, 2000, unless otherwise requested or approved by the Director subsequent to the date of issuance of this Licence in the interests of better environmental management;
  - (b) review the wastewater and groundwater monitoring program, approved on December 15, 2000, with Manitoba Conservation within 12 months following the date of issuance of this Licence, and at least once every 12 months thereafter, with the objective of updating the program to reflect: any new evidence, new wells, decommissioned wells, or more pertinent data which may need to be incorporated into the monitoring program; and
  - (c) submit to the Director any proposed updated monitoring program, if modified from a previously approved program, for approval by the Director.
47. The Licencee shall, by March 31<sup>st</sup> of each year commencing in 2005, submit to the Director:
- (a) 4 hard copies, and one electronic copy in PDF format, of an annual report, compiled in a manner satisfactory to the Director, and including:
    - (i) the findings and interpretation of all the data collected in the preceding calendar year pursuant to Clauses 45 and 46 of this Licence; and
    - (ii) progress charts, based on data collected through the approved groundwater monitoring program, of key indicators of the groundwater quality in all zones of the aquifer impacted by seepage losses from the wastewater lagoon, and by over irrigation on the irrigation fields west of the wastewater lagoon; and
  - (b) electronic spreadsheets of all the data tables presented in the submitted annual report, in an Excel format satisfactory to the Director.
48. The Licencee shall, by January 31<sup>st</sup> of each year commencing in 2005, submit to the Director 4 hard copies and one electronic copy in PDF format of the annual irrigation report based on

the monitoring program of an approved irrigation plan as carried out in the preceding calendar year, and including:

- (a) the total irrigation water pumped from each of the five purge pumps proposed for Section 8-10-14W, the three horizontal purge pumps proposed for the wetland area, the wastewater treatment facility, and other specified sources;
  - (b) the identification of all the irrigated fields, the total area irrigated on each field, the period when each field was irrigated, and the crop grown on each irrigated field;
  - (c) the quantity and quality of irrigation water applied to each irrigated field;
  - (d) the most limiting factor in the soil of each irrigated field, or relating to the crop, which governed the amount of irrigation water that could be applied to each candidate field;
  - (e) the baseline soil sampling data collected on each irrigated field versus the annual follow-up soil sampling data;
  - (f) the extent of compliance achieved with Clause 19 of this Licence;
  - (g) the extent of compliance achieved with the requirements laid out by Manitoba Agriculture, Food and Rural Initiatives in Appendix 'G' attached to this Licence; and
  - (h) interpretations of the data and findings as related to the ongoing management of the irrigation plan and its impact on the soil, the crops and the underlying aquifer;
- supplemented with electronic spreadsheets, in an Excel format satisfactory to the Director, of all the data tables presented in the annual irrigation report.

49. The Licencee shall, with respect to the on-site sewage treatment plant:

- (a) collect a 24-hour composite sample, once every seven days, of the effluent being released from the final clarifier of the plant, and have the collected composite sample analyzed for:
  - (i) the concentration of total suspended solids expressed as milligrams per litre;
  - (ii) the concentration of the five-day biochemical oxygen demand, expressed as milligrams per litre; and
  - (iii) the concentration of total nitrogen, expressed as milligrams of N per litre;
- (b) measure and record the daily volumes of treated effluent released from the sewage treatment plant (or by inference, the total volume of influent directed into the plant);
- (c) submit a monthly report on:
  - (i) the analytical values determined each week pursuant to Sub-clause 49(a); and
  - (ii) the daily and total monthly volume of effluent released from the plant as determined pursuant to Sub-clause 49(b) of this Licence;to the Director, in writing and in an electronic format acceptable to the Director, no later than 30 days after the end of the month during which the information was collected; and
- (d) undertake such monitoring of the groundwater at or beyond the treated sewage disposal field, if and when so requested by the Director, to verify the impact of the releases from the disposal field relative to the initial environmental assessment report undertaken pursuant to Sub-clause 20(g) of this Licence.

50. The Licencee shall:

- (a) upon a written request from the Director:
  - (i) undertake such point source stack sampling of air emissions, or such air quality sampling activities, as may from time to time be requested, or as may be deemed advisable based on the results arising from the air dispersion modelling carried out pursuant to Clause 26 of this Licence, and submit such data and such reports and at such frequency as may be specified by the Director; and
  - (ii) submit to the Director annual reports on the total annual emission loadings into the atmosphere of such air pollutants as specified by the Director, whereby such determinations may require actual air emission monitoring data or may be based upon emission factors acceptable to the Director; and
- (b) maintain an on-site log book of the most recent 24 months of downtime of any air emission control equipment due to breakdown or maintenance events for inspection by an Environment Officer upon request, and record in that log book:
  - (i) the identification of the affected air emission control equipment and the process(es) it serves;
  - (ii) the date and time of the log entry;
  - (iii) the nature of the down time event;
  - (iv) the duration of the event;
  - (v) the accumulated downtime of the equipment for the events for each calendar year;
  - (vi) the number of complaints received during each downtime event; and
  - (vii) the name and signature of the person who logged the event.

**Respecting the Administration of this Licence**

51. The Licencee shall, within 60 days of the date of this Licence, provide to the Director, in writing, the name of a designated and qualified employee, assigned with the responsibility for the corporate administration of this Licence, including the collection and interpretation of all required operating and monitoring data, and serving as the primary contact with Manitoba Conservation, whereby these duties shall be the primary duties of the designated employee.

**Respecting Financial Assurance**

52. The Licencee shall within four months of the date of this Licence, post with the Manitoba Department of Conservation in the amount of \$1 million Cdn:

- (a) a permit bond issued by a surety company licenced to do business in the Province of Manitoba;
- (b) an irrevocable letter of credit; or
- (c) another acceptable security satisfactory to the Director.

This permit bond, irrevocable letter of credit, or other security and renewals thereof shall remain in place for the duration of the operation of the Development. The Director may order forfeiture of the permit bond, irrevocable letter of credit, or other security, either in

whole or in part, by giving written notice to that effect to the Licencee, upon the Director being satisfied that the Licencee is in breach of any specifications, limits term or condition of this Licence, or for reimbursement of any costs or expenses incurred by the Province of Manitoba in rectifying environmental damage caused, or contributed to, by the operation of the Development.

**Respecting Decommissioning and Closure**


53. The Licencee shall:

- (a) by January 1, 2007, compile and submit to the Director, a preliminary Closure Plan to address any existing and potential environmental issues that would need to be addressed upon the closure of the Development, whereby all the necessary decommissioning, surface rehabilitation and subsurface groundwater remediation measures are identified and associated with their approximate by professionals competent in this field, for the consideration, possible amendment and approval of the Director;
- (b) implement progressive rehabilitation measures wherever practical during the operation of the Development;
- (c) compile and submit an updated Closure Plan to the Director, for approval, once every five years thereafter, until the Director is satisfied that no further material change is expected or required in the Closure Plan;
- (d) provide the Director with written notice, at least three months in advance of an imminent closure of the Development, and within one month following such a notice, arrange to have a qualified consultant undertake a site audit of the affected operational areas and impacted groundwater zones;
- (e) within three months of the written notification submit to the Director the findings of the audit, as well as a detailed Closure Plan for the Development, whereby the detailed Closure Plan should be developed in consultation with the regional office of Manitoba Conservation as well as Manitoba Water Stewardship; and
- (f) upon the closure of the Development, but before the site of the Development is abandoned, take all necessary steps to carry out the approved Closure Plan to the satisfaction of the Director, and within the time interval specified or accepted by the Director.

**REVIEW AND REVOCATION**

- A. This Licence replaces Environment Act Licence No. 2650 R which is hereby rescinded.
- B. If, in the opinion of the Director, the Licencee has exceeded or is exceeding or has or is failing to meet the specifications, limits, terms, or conditions set out in this Licence, the Director may, temporarily or permanently, revoke this Licence.
- C. This Licence may be revised, if necessary, and as deemed appropriate, following:

- (a) the receipt and review of any of:
    - (i) the Wastewater and Groundwater Management Plan;
    - (ii) the Groundwater Remediation Plan;
    - (iii) the Expanded Irrigation Plan;
    - (iv) the Solids and Sludge Management Plan; and
    - (v) any new air dispersion modelling results; or
  - (b) the findings of:
    - (i) the 2-year Feasibility Study;
    - (ii) the 5-year or the 10-year reviews of the 10-year Demonstration Period, and
    - (iii) any environmental impact assessments requested through the provisions of this Licence; or
    - (iv) any monitoring programs respecting groundwater or soils as impacted by past, present and future activities of this Development.
- D. If, in the opinion of the Director, new evidence warrants a change in the specifications, limits, terms or conditions of this Licence, the Director may require the filing of a new proposal pursuant to Section 11(1) of *The Environment Act*.
- E. The Financial Assurance requirements of Clause 52 of this Licence shall be reviewed by the Director every three years.

  
**Tracey Braun, M.Sc.**  
**Director**  
**Environment Act**

**File: 264.1**

**APPENDIX 'A'**

**[Monitoring Program]**

Sources	Locations of Wells	Water Level Monitoring Frequency	Water Quality Monitoring Type and Frequency		
			Type 1	Type 3	Type 4
<b>Monitoring Wells</b>					
MW-1	NW1/4 11-10-14W	Quarterly			
MW-2A	NE1/4 24-10-14W	Quarterly			
MW-2B	NE1/4 24-10-14W	Quarterly			
MW-2C	NE1/4 24-10-14W	WR Recorder			
MW-3	SW1/4 14-10-14W	Quarterly			
MW-4A	NE1/4 17-10-14W	Quarterly			
MW-4B	NE1/4 17-10-14W	Quarterly			Annually
MW-5A	SW1/4 17-10-14W	Quarterly			Annually
MW-5B	SW1/4 17-10-14W	Quarterly			Annually
MW-6	SW1/4 17-10-14W	Quarterly			Annually
MW-7	SE1/4 20-10-14W	Quarterly			Annually
MW-8	NE1/4 17-10-14W	Quarterly			Annually
MW-9	NE1/4 16-10-14W	Quarterly			Annually
MW-10	NW1/4 16-10-14W	Quarterly			
MW-11	SW1/4 24-10-14W	Monthly			
MW-12	SW1/4 23-10-14W	Monthly			
MW-13	SW1/4 23-10-14W	Monthly			
MW-14	SW1/4 23-10-14W	Monthly			
MW-15A	NW1/4 16-10-14W	Quarterly			Annually
MW-15B	NW1/4 16-10-14W	Quarterly			Annually
MW-16	NE1/4 8-10-14W	Monthly			Quarterly
MW-17A	NE1/4 8-10-14W	Monthly			Quarterly
MW-17B	NE1/4 8-10-14W	Monthly			Quarterly
MW-18	SW1/4 17-10-14W	Quarterly			Quarterly
MW-19	SW1/4 17-10-14W	Quarterly			Quarterly
MW-20	SW1/4 17-10-14W	Quarterly			Quarterly
MW-21	NE1/4 20-10-14W	Monthly			Quarterly
MW-22	NE1/4 20-10-14W	Monthly			Quarterly
MW-23	NE1/4 20-10-14W	Monthly			Quarterly
MW-24	SW1/4 17-10-14W	Quarterly			Quarterly
MW-25	SW1/4 17-10-14W	Quarterly			Quarterly
Lagoon	By Irrig. Pumphouse	Monthly			Quarterly
MW 26	NE1/4 20-10-14W	Monthly			
MW 27	NE1/4 20-10-14W	Monthly			
MW 28	NE1/4 20-10-14W	Monthly			
MW29	SW1/4 8-10-14W	Quarterly			
MW30	SW1/4 8-10-14W	Quarterly			
MW31	SW1/4 8-10-14W	Quarterly			
MW 32	NW1/4 5-10-14W	Monthly			
MW 33	SE1/4 8-10-14W	Monthly			

**NOTE:** This Appendix is subject to revision at any time by the Director.



**APPENDIX 'B'**

**[Monitoring Program] Cont'd**

Sources	Locations of Wells	Water Level Monitoring Frequency	Water Quality Monitoring Type and Frequency		
			Type 1	Type 3	Type 4
<b>Plant Wellfield</b>					
Plant 3-83	NW1/4 20-10-14W	Monthly			Annually
Plant 1-86	NW1/4 20-10-14W	Monthly			Annually
Plant 2-86	NW1/4 20-10-14W	Monthly			Annually
Plant 11-86	NW1/4 20-10-14W	Monthly			Annually
Plant 12-86	NE1/4 20-10-14W	Monthly			Annually
Plant 13-86	NE1/4 20-10-14W	Monthly			Annually
Plant 2-83	NW1/4 20-10-14W	Monthly			Annually
Plant 11-85	NE1/4 20-10-14W	Monthly			Annually
Plant 1-97	SW1/4 20-10-14W	Monthly			Annually
Plant 2-97	SW1/4 20-10-14W	Monthly			Annually
Plant 3-97	SW1/4 20-10-14W	Monthly			Annually
Plant 1-95	NE1/4 20-10-14W	Monthly			Annually
Plant 2-95	NW1/4 20-10-14W	Monthly			Annually
Plant 7-85	NE1/4 20-10-14W	Monthly			Annually
Plant 9-85	NE1/4 20-10-14W	Monthly			Annually
Plant 10-85	NE1/4 20-10-14W	Monthly			Annually
<b>Pumping Wells by Lagoon</b>					
PW LD	NE1/4 17-10-14W	Quarterly			Screening only if trench results warrant
P1	SW1/4 17-10-14W	Quarterly			
P2	SW1/4 17-10-14W	Quarterly			
P3	SW1/4 17-10-14W	Quarterly			
P4	SW1/4 17-10-14W	Quarterly			
P5	SW1/4 17-10-14W	Quarterly			
<b>Plant Wellfield</b>					
1 active well by Trench 1					Quarterly
1 active well by Trench 2					Quarterly
<b>Trenches</b>					
Trench 1	20-10-14W		Annually		Monthly + Weekly conductivity
Trench 2	20-10-14W		Annually		Monthly + Weekly Conductivity

**NOTE:** This Appendix is subject to revision at any time by the Director.

**APPENDIX 'C'**

**[Monitoring Program] Cont'd**

Sources	Locations of Wells	Water Level Monitoring Frequency	Water Quality Monitoring Type and Frequency		
			Type 1	Type 3	Type 4
<b>Res. Observation Wells</b>					
South MW29					Quarterly
South MW30					Quarterly
South MW31					Quarterly
MW32 McMillan					Quarterly
MW33 Watterson					Quarterly
MW16 Loney					Quarterly
<b>Tap Water</b>					
R&K Baron	SW1/4 21-10-14W			Annually	
Elmhirst Shop	SE1/4 16-10-14W			Annually	
Don McClaren	SW 18-10-14W			Annually	
James Dickson	SW1/4 8-10-14W			Annually	
Bill Loney	SW1/4 9-10-14W			Annually	
Dan Udey	SW1/4 9-10-14W			Annually	
Irwin Udey	SW1/4 9-10-14W			Annually	
John Watterson	SE1/4 8-10-14W			Annually	
McMillan	NE1/4 5-10-14W			Annually	
Max Orr	SE1/4 29-10-14W			Annually	
McLaren Farm Ventures	SW1/4 20-10-14W				
<b>Wastewater</b>					
SS1 at Discharge area			Annually		Quarterly
<b>Lagoon</b>					
SS2	SE1/4 17-10-14W		Annually		Quarterly
SS3	SE1/4 17-10-14W		Annually		Quarterly
SS4	SE1/4 17-10-14W		Annually		Quarterly
SW-1-98	SE1/4 17-10-14W		Annually		Quarterly
SW Corner of Lagoon	SE1/4 17-10-14W		Annually		Quarterly
Lagoon 1 (Composite)			Annually		Quarterly
<b>Wet Area E. of Lagoon</b>					
SS5	SW1/4 16-10-14W		Annually		Quarterly
SS6	SW1/4 16-10-14W		Annually		Quarterly
SW-2-98 (Composite)	SW1/4 16-10-14W		Annually		Quarterly
Pond 1 (Composite)			Annually		Quarterly

**NOTE:** This Appendix is subject to revision at any time by the Director.

## APPENDIX 'D'

### TEST DEFINITION: TYPE 1

**Applicable Program:** Water Monitoring Program

**Applicable Samples:** Waste Water, Lagoon and Surface Water Quality

**Criteria that Define a Type 1 Test:**

#### Microbiology:

- Coliform Fecal
- Coliform Total

#### Inorganics:

- pH
- Specific Conductivity
- Alkalinity as CaCO<sub>3</sub>
- Alkalinity as Bicarbonate
- Alkalinity as Carbonate
- Alkalinity as Hydroxide
- Calcium
- Magnesium
- Sodium
- Potassium
- Chloride
- Sulphate
- Phosphorus (Total)
- Phosphorus (Dissolved)
- Nitrate Nitrite-N
- TKN (Total Kjeldahl Nitrogen)
- Ammonia
- Fluoride
- Hardness
- BOD
- COD
- Dissolved Carbon (Organic)
- Dissolved Carbon (Inorganic)
- Dissolved Carbon (Total)
- TSS
- Total Anions
- Total Cations
- Copper
- Iron
- Manganese
- Zinc

#### Organics:

- Mineral Oil & Grease

NOTE: This Appendix is subject to revision at any time by the Director.

## APPENDIX 'E'

### TEST DEFINITION: TYPE 3

**Applicable Program:** Water Monitoring Program

**Applicable Samples:** Local Domestic Water Wells

**Criteria That Define a Type 3 Test:**

#### **Microbiology:**

- Coliform Fecal MF
- Coliform Total MF

#### **Inorganics:**

- |                                   |                 |
|-----------------------------------|-----------------|
| • PH                              | • Fluoride      |
| • Specific Conductivity           | • Hardness      |
| • Alkalinity as CaCO <sub>3</sub> | • Copper        |
| • Alkalinity as Bicarbonate       | • Iron          |
| • Alkalinity as Carbonate         | • Manganese     |
| • Alkalinity as Hydroxide         | • Zinc          |
| • Calcium                         | • Total Anions  |
| • Magnesium                       | • Total Cations |
| • Sodium                          |                 |
| • Potassium                       |                 |
| • Chloride                        |                 |
| • Sulphate                        |                 |
| • Nitrate Nitrite-N               |                 |

NOTE: This Appendix is subject to revision at any time by the Director.

**APPENDIX 'F'**

**TEST DEFINITION: TYPE 4**

**Applicable Program:** Water Monitoring Program

**Applicable Samples:** Water Quality Monitoring Program – Screening

**Criteria That Define a Type 4 Test:**

**Screening:**

- Conductivity
- PH
- Chlorides
- Nitrates
- Dissolved Organic Carbon (DOC)

**NOTE:** This Appendix is subject to revision at any time by the Director.

**APPENDIX 'G'**

(Provided by Manitoba Agriculture, Food and Rural Initiatives)

The following requirements must be met, through the duration of the proposed irrigation program, by the Licencee to the satisfaction of both Manitoba Conservation and Manitoba Agriculture, Food and Rural Initiatives.

**Part 1 – Currently Defined Criteria**

When agricultural fields are proposed to be used in the irrigation program, the following ratings must be identified for each field (for all mapped soil polygons). As an initial screening, the ratings for at least the dominant and first subdominant polygons within a field must fall within the range listed in order for a field to be considered for inclusion in the irrigation program. If this is not the case for a particular field, the Licencee must make a strong technical case for inclusion in the irrigation program. This case may be based on special mitigative, monitoring and reporting measures that will be implemented in order to make the use of such lands sustainable.

**Landbase Suitability Criteria**

Rating Category	Rating
Agriculture Capability	1, 2, 3, 4 or 5M
General Irrigation Suitability	E, G or F
Potential Environmental Impact	Minimal, low or moderate
Potato Production Suitability	1, 2 or 3

**Loading Limits for Soil Nitrate-Nitrogen**

The Licencee must demonstrate that nitrogen is being properly managed by annually monitoring soil nitrate-nitrogen (NO<sub>3</sub>-N) to 1.2 m (4 feet). Residual soil NO<sub>3</sub>-N in an irrigation field is not to exceed the following maximum allowable levels, in the entire sampling depth, according to the corresponding Canada Land Inventory (CLI) Rating for Agriculture Capability. Residual soil N above these levels would indicate that nitrogen is not being managed properly and that there is an elevated risk of nitrate leaching below the root zone before the subsequent growing season.

Soils Rating (According to CLI Agriculture Capability)	Class 1 Class 2 Class 3 <u>except</u> 3M and 3MW	Class 3M, 3MW Class 4	Class 5	Class 6 Class 7 Organic Soils
Maximum NO <sub>3</sub> -N (lb/ac)	140	90	30	N/A

**APPENDIX 'G' (Cont'd)**  
 (Provided by Manitoba Agriculture, Food and Rural Initiatives)

**Part 2 – Protocol for Review of Future Proposed Irrigation Activity and Future Criteria to be Defined**

Further Information requirements and defined criteria, when the latter can be established, are listed below and must be met by the Licencee on an annual or otherwise appropriate and acceptable basis for review and approval by Manitoba Conservation and Manitoba Agriculture, Food and Rural Initiatives.

In terms of the issues identified below, acceptability of proposed and previously approved irrigation practices and fields in the irrigation program can only be determined when the information is provided by the Licencee, be that field-specific information or newly gathered knowledge from literature or field investigations.

**Landbase Suitability**

<b>General Type of Information Required</b>	<b>Specific Information Required</b>	<b>Specific Criteria that may be Defined in the Future</b>
Field Identification	Legal location	
Soils Identification	Soil series	
Soil Properties	Moisture retention Benchmark levels of soil nutrients, metals, cations and soluble salts	Exchangeable Sodium Percentage Sodium Adsorption Ratio Potassium Adsorption Ratio
Suitable acreage for irrigation	Estimate of suitable acres for each proposed field	

**Water Management**

The Licencee must determine acceptable volumes of water to be applied based on:

- water holding capacity (general, inherent property) of each soil type;
- proper irrigation scheduling (specific in nature, based on current conditions, but subject to modification) to prevent excessive leaching; and
- nutrient content of the water and crop requirements (as outlined under "Nutrient Management").

**APPENDIX 'G' (Cont'd)**  
(Provided by Manitoba Agriculture, Food and Rural Initiatives)

**Nutrient Management**

The Licencee must clearly identify the crop(s) to be grown on each field throughout the duration of the project. Due to the risk of nitrate leaching on the soils likely to be included in the irrigation program, the Licencee must demonstrate that application rates for each field are based on:

- nitrogen content of irrigation water and
- nitrogen requirement of the crop

Nitrogen budgets must be provided for each field, based on relevant factors including soil, crop and inputs to account for as much nitrogen as possible.

Other nutrient requirements for optimal crop production must still be accounted for in the nutrient management planning, whether they are to be met by the irrigation water or by fertilizer applications.

**Monitoring and Reporting Program**

**Annual** – The Licencee must develop an annual soil monitoring program that will measure levels of appropriate nutrients, metals, cations and soluble salts. This program would be designed to detect any adverse impacts due to irrigation with wastewater and would include deep sampling for soluble constituents where warranted. Such impacts could include accumulation of wastewater constituents in the soil profile or leaching of soluble constituents out of the root zone and, potentially, ultimately into groundwater.

**Monthly** – The Licencee must also report monthly, to Manitoba Conservation and Manitoba Agriculture, Food and Rural Initiatives, on precipitation and irrigation events as well as crop performance as the growing season progresses. The latter reporting will address crop establishment (stand assessment) and productivity (yield and quality following cuts of forage) when data are available on both irrigated and non-irrigated (control) fields. This reporting will be used to assess the Licencee's ability to adjust irrigation scheduling as moisture conditions change and to match water and nutrient applications to crop requirements throughout the growing season.



**APPENDIX 'H'**

**FEASIBILITY STUDY: CARBERRY WASTEWATER TREATMENT**

**Major Objectives:**

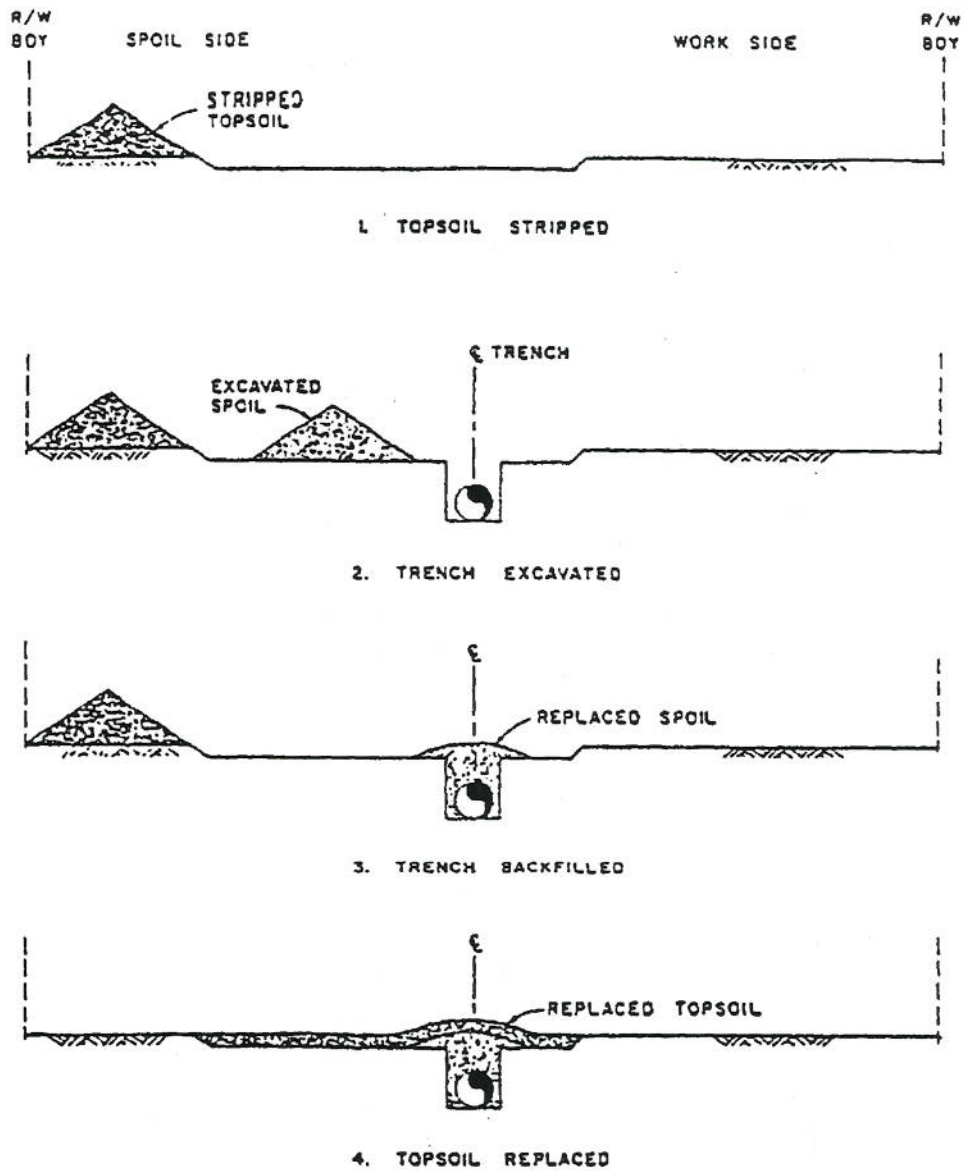
- Determine mechanisms of treatment within the lagoon/aquifer system and the ultimate treatment capacity (flow and load) of the proposed system.
- Determine requirements of the proposed groundwater withdrawal program to retain pollutants within a designated treatment/capture zone in the aquifer.
- Determine requirements to remediate the historical nitrate and sodium plumes.
- Determine control mechanisms to prevent the migration of arsenic and barium into on-site and neighboring potable water wells.
- Determine spray irrigation rates and procedures to control nutrients on irrigated lands.

TASK	COMPONENTS	RESPONSIBILITY
Management/Technical Support	<ul style="list-style-type: none"> <li>• Monitor/track progress on individual tasks</li> <li>• Manage costs</li> <li>• Facilitate communication/interaction between consultants, Midwest Foods, ManCon, etc.</li> <li>• Coordinate review/feedback of results with ManCon</li> <li>• Resolve/arbitrate technical issues</li> </ul>	Lead: Walt Carey  Support: Samson Engr.  Walt Carey, Yale Univ.
Treatment	<ul style="list-style-type: none"> <li>• Investigate extent of facultative and anaerobic treatment processes occurring in the lagoon</li> <li>• Investigate/quantify treatment occurring by bank filtration</li> <li>• Consolidate results into overall estimate of attenuation/treatment for: BOD, nitrogen, phosphorus, sulfur (odor) compounds, sodium, others (?)</li> <li>• Determination of additional treatment needed</li> </ul>	CH2M/H, Yale Univ.  Yale Univ.  CH2M/H, Yale Univ.  CH2M/H, Yale Univ.
Hydrogeology	<ul style="list-style-type: none"> <li>• Develop 3-D hydrogeological model to:               <ul style="list-style-type: none"> <li>○ predict the rate of water movement in the aquifer during:                   <ul style="list-style-type: none"> <li>▪ recharge trench operation</li> <li>▪ periods of spray irrigation</li> <li>▪ non-spray irrigation periods</li> </ul> </li> <li>○ predict the volume of water withdrawn to:                   <ul style="list-style-type: none"> <li>▪ remediate the salt plume</li> <li>▪ prevent contamination of the aquifer outside of the treatment zone</li> </ul> </li> </ul> </li> <li>• Define the extent of the treatment zone</li> <li>• Define the parameters to be modeled and tracked to determine system performance</li> <li>• Establish location of additional (if any) extraction wells</li> <li>• Establish location of monitoring wells to determine/access treatment system performance</li> <li>• Map redox contours to predict potential zones of solubilization of iron, arsenic, and barium</li> <li>• Extend the model to incorporate transport of conservative ions (e.g. chloride) to define the extent of the plume</li> <li>• Determine well locations and pumping rates to remediate the existing nitrate and Na plumes in the aquifer</li> <li>• Establish system warning/failure trigger-levels</li> </ul>	CH2M/H        CH2M/H, Yale Univ. CH2M/H, Yale Univ.  CH2M/H  CH2M/H  CH2M/H  CH2M/H  CH2M/H
Pilot Spray Irrigation Trial(s)	<ul style="list-style-type: none"> <li>• Conduct a pilot spray irrigation trial on the 160 Ac plot (possibly others) adjacent to the lagoon utilizing groundwater from wells P6, P7, and/or P8               <ul style="list-style-type: none"> <li>○ determine odor generation potential of water withdrawals</li> <li>○ determine impact of water withdrawals on the lagoon</li> </ul> </li> <li>• Obtain permit for pilot trial</li> </ul>	Lead: AXYS  Support: KGS CH2M/H Yale Univ.  AXYS

**APPENDIX 'H' Cont'd**

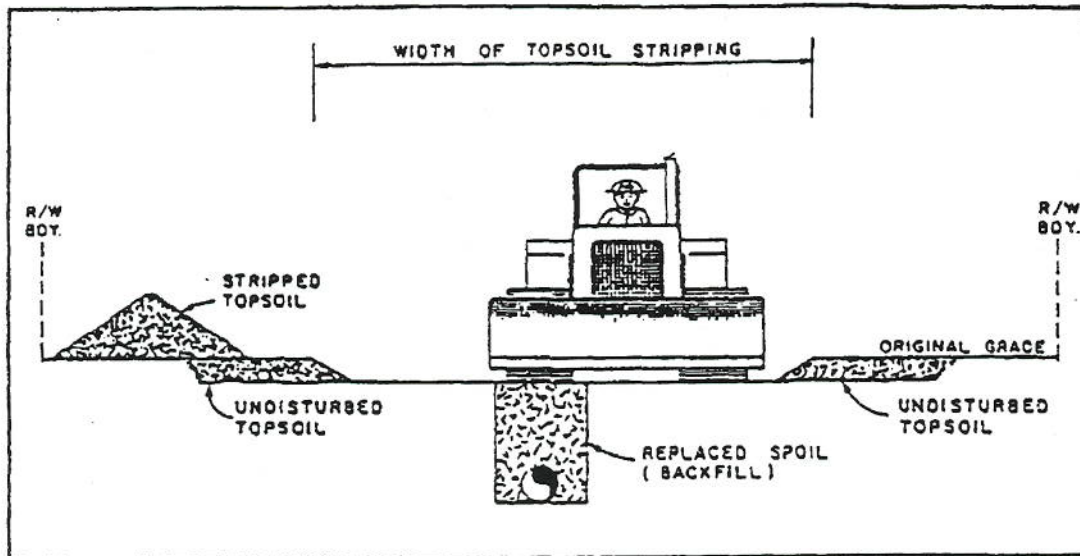
TASK	COMPONENTS	RESPONSIBILITY
<b>Arsenic/Barium Occurrence</b>	<ul style="list-style-type: none"> <li>• Determine extent of naturally occurring As and Ba concentrations in the aquifer               <ul style="list-style-type: none"> <li>○ survey all local wells: As and Ba concentrations, well logs, well integrity, surrounding land uses that could potentially impact groundwater</li> </ul> </li> <li>• Utilize 3-D hydrogeological model to determine pumping strategies to minimize impacts on neighboring and Midwest potable water wells</li> <li>• Determine contribution of Ba in peel waste to Ba concentrations in the aquifer</li> </ul>	Lead: KGS Support: CH2M/H Yale Univ.  CH2M/H  CH2M/H
<b>Agronomy</b>	<ul style="list-style-type: none"> <li>• Conduct an evaluation to determine applicable spray irrigation flow and loading rates:               <ul style="list-style-type: none"> <li>○ conduct soil survey to assess land suitability for spray irrigation</li> <li>○ develop base line for nutrients and selected ions (Na, K, others)</li> </ul> </li> <li>• Devise operating procedures to control salt and nutrient accumulations on lands irrigated</li> </ul>	AXYS    AXYS

FIGURE 1

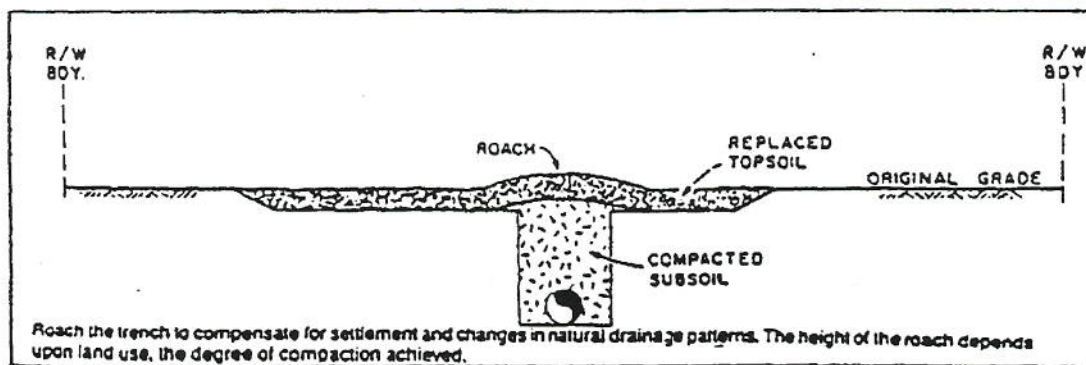


SEQUENCE OF TOPSOIL HANDLING

FIGURE 2



COMPACTION OF BACKFILL



ROACHING THE TRENCH