

**FINAL TERMS OF REFERENCE
ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT**

FOR THE PROPOSED

**NORTHERN EXTENSION OF THE EXISTING
PHOSPHOGYPSUM STORAGE AREA**

**AGRIUM PRODUCTS INC.
Approximately 13 km South of Redwater, Alberta**

Issued By: Alberta Environment

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1.0 INTRODUCTION

1.1 Purpose

The purpose of these Terms of Reference is to identify for the public and Agrium Products Inc. (Agrium), the information required by government agencies for an Environmental Impact Assessment (EIA) report with respect to a proposed extension of the existing phosphogypsum storage area located adjacent to Agrium's fertilizer plant near Redwater.

1.2 Scope of Environmental Impact Assessment (EIA) Report

Agrium will prepare and submit an EIA report to explain the environmental effects of the proposed northern extension of the existing phosphogypsum storage area (the Project) located adjacent to its existing fertilizer plant. The EIA report shall be prepared in accordance with these Terms of Reference and the environmental information requirements prescribed under the *Environmental Protection and Enhancement Act (EPEA)* and Regulations. The EIA report will address local and regional impacts, mitigation options and residual effects that are relevant to the assessment of the Project. The EIA report will assist the public and government in understanding the environmental consequences of the Project's development, operation and reclamation plans and will assist Agrium in its decision-making process.

1.3 Proponent's Submission

Agrium is responsible for the preparation of the EIA report. The submission will be based upon the final Terms of Reference and issues raised during the public consultation process.

1.4 Public Consultation

The preparation of the EIA report will include a public consultation program. The report will document the results of public consultation and provide environmental information to address the issues raised in the public consultation. The purpose of public consultation is to communicate with those members of the public who may be affected by the Project and to provide them with an opportunity to participate in the Environmental Assessment process.

2.0 PROJECT OVERVIEW

2.1 Agrium and the History of the Redwater Facility

Provide a corporate profile and overview of the Project.

Describe who will be responsible for the development, management and operation of the Project, as well as, provide a brief history of its operations at the Redwater facility.

2.2 Project Area and EIA Study Area(s)

The Project Area includes all lands that will be subject to direct disturbance from the Project and associated infrastructure.

The EIA Study Area(s) includes the proposed extension area (Project Area), as well as, other lands and watercourse/waterbodies that may be affected by or are in proximity to the Project. Each Study Area will vary depending on the specific parameter being assessed. The rationale for the selection of the Study Area(s) boundaries by the effects identified will be provided. Both temporal and spatial boundaries will be considered. Suitable maps and air photo mosaics to identify and describe the Study Area(s) will be included.

2.3 Project Components and Development Schedule

Outline the various components and purpose(s) of the Project, describing the anticipated development stages (e.g., construction, operation, decommissioning and reclamation), schedule and timing of the key construction and operational activities.

Discuss the need for the Project, alternatives to the Project and consider the implications of not going ahead with the Project. Discuss the reasons why the extension area to the north was selected, and the considerations of alternative areas. Discuss the reasons for not selecting the alternative areas.

2.4 Regulatory Approval

Identify the municipal, provincial, and federal environmental legislation, policies and approvals applicable to the Project. Indicate any specific regulatory approvals that are required and any approvals that have already been issued for the Project.

3.0 PROJECT DESCRIPTION

Describe the components of the Project focusing on material inputs and outputs, the synthetic liner, construction methods and the source and type of building materials (e.g., clay, gravel, sand, rock), wastes, machinery and utility requirements.

Discuss the suitability/effectiveness of the proposed liner system for the Project. Discuss the compatibility of the synthetic and clay (till) liners with the phosphogypsum, as well as, the thickness and geotechnical properties of the till. Discuss the overall design of the proposed liner system and describe the construction methods that will be utilized during installation of the liner. Demonstrate that Agrium is using the best available technologies throughout the design and construction of the Project.

Describe any changes in the phosphate fertilizer manufacturing process that will arise as a result of the Project. State the current water usage and source(s) and compare that to any changes in water use or utilities required by the Project, including any relevant energy and water minimization considerations. Provide a water balance for the existing plant site, pre- and post-construction of the Project.

Describe the services required for the Project including utilities, road and rail links.

Identify the source(s) of phosphate rock committed to the phosphate fertilizer manufacturing facility and the rock supply requirements.

Describe the infrastructure and transportation (access) requirements for the Project. Identify anticipated changes to existing access, (e.g., primary and secondary highways, municipal or local roads) traffic volumes and type, during construction and operation of the Project. Discuss the effects of these changes on surrounding communities and local residents and the results of consultation with Sturgeon County.

4.0 ENVIRONMENTAL ASSESSMENT

4.1 Project Parameters

State the objectives of the EIA report and provide the sources of information used for the assessment. Provide information that is sufficient to support predictions of environmental effects and conclusions about the impacts of proposed activities associated with the Project.

Provide the results of the EIA report including:

- a) the components and development activities of the Project that result in discharges to the environment, and the anticipated effects of these on the environment;
- b) existing conditions in the Study Area(s) that have potential, in combination with the Project, to affect the environment;
- c) the environmental effects that are anticipated as a result of the Project and their significance;
- d) any proposed environmental protection plan(s), mitigation measures, and monitoring procedures and systems for the Project; and
- e) residual effects of the Project.

Include appropriate maps, tables and figures to illustrate and summarize the key information within the EIA report.

Identify the environmental and socio-economic impacts of the proposed Project having regard for regional, temporal, spatial and cumulative effects and where possible, quantify the predictions.

Identify and discuss the assessment cases evaluated (e.g., baseline, application, cumulative effects), the Study Area(s) used (e.g., local or regional) and limitations/deficiencies of the environmental database including steps planned to fill information gaps.

Assess the cumulative effects of the Project based on the Information Letter issued jointly by Alberta Environment (AENV), the Energy and Utilities Board (EUB) and the Natural Resources Conservation Board (NRCB) in June 2000.

4.2 Site Preparation

Describe how the Project Area will be developed including, but not limited to, site drainage, timber salvage, brush disposal, salvage of topsoil, source of material for site development and disposal of debris from construction.

4.3 Air

Discuss baseline climatic and air quality conditions for the Study Area(s). Review current emission sources and discuss any changes as a result of the Project within the Study Area(s).

Identify components of the Project that will affect air quality from a local and regional perspective, and:

- a) discuss appropriate air quality parameters such as particulates (e.g., total particulates, PM₁₀ and PM_{2.5}), fluoride and radon;
- b) estimate ground-level concentrations of appropriate air quality parameters during current and future operating conditions.
- c) discuss any expected changes to appropriate air quality parameters as a result of the Project.
- d) justify the selection of the models used and identify all model parameters and assumptions used in the modelling process.
- e) conduct modelling in accordance with Alberta Environment's *Air Quality Modelling Guidelines*;

- f) identify the potential for air quality impacts resulting from the Project and discuss any implications of the expected air quality for environmental protection and public health, including if applicable, both acute and chronic effects;
- g) describe how air quality impacts resulting from the Project will be mitigated, including, but not limited to, a fugitive emission control program;
- h) identify ambient air quality monitoring and receptor monitoring that will be conducted during construction and operation of the Project;
- i) identify any local or regional air monitoring done in the area and describe Agrium's participation in any regional forum; and
- j) discuss possible odours due to the Project and identify any protocols or testing methods used to mitigate any odorous emissions resulting from the Project.

4.4 Groundwater

Describe the existing groundwater conditions in the Study Area(s) and identify major aquifers, aquitards and aquicludes in the Quaternary deposits and bedrock formations down to the base of groundwater protection.

Characterize the lithology, thickness, continuity, hydraulic properties, structure and groundwater quality of the geologic units in the Project Area. Specifically:

- a) determine the groundwater flow directions and velocities/hydraulic gradients;
- b) identify potential discharge zones, recharge sources, areas of groundwater/surface water interaction;
- c) assess water quality and quantity in bedrock and quaternary aquifers and discuss the potential for seasonal variations; and
- d) discuss both regional and local groundwater conditions, including quality and quantity. Maps and cross sections shall include data points and well locations from which interpretations have been drawn.

Describe the effects of the Project on groundwater and the implications for other environmental resources, including habitat diversity and quantity, surface water quality and quantity, vegetation resources, and soil conservation and reclamation, and water table levels within the EIA Study Area(s).

Discuss surrogate parameters to be used as indicators of potential aquifer contamination due to the proposed Project.

Describe the effects of the proposed Project on the existing groundwater regime, including any local and regional changes in groundwater quality, aquifer/aquitard pressure (hydraulic gradient changes), physical changes in aquifer or aquitard properties that may affect groundwater flow patterns or velocities, and changes in groundwater chemistry.

Assess the potential for contaminant migration in groundwater and its impact on receiving surface waters and down-gradient domestic groundwater users due to the Project. Identify potential changes in groundwater quality resulting from operations of the Project and the cumulative effects on local and regional groundwater regimes. Discuss the hydrogeologic models used, including any assumptions used in the modelling process. Discuss model verification.

Describe the existing and proposed groundwater monitoring programs including on-lease and off-lease monitoring well locations, well construction details, sampling and reporting schedules, and quality assurance/quality control (QA/QC) measures. Include an inventory of all surface water and groundwater users in the Study Area, identifying those down gradient of the Project. Discuss how

monitoring programs will allow early detection of potential contamination, and assist in remediation planning.

Describe management plans, mitigative measures, monitoring and response strategies for the Project in the event that changes show up in monitoring that will be implemented to minimize any adverse impacts. Describe groundwater remediation options that may be considered for implementation in the event that adverse impacts on groundwater are detected.

4.5 Surface Water

Describe existing surface hydrology conditions in the Study Area(s) including, but not limited to, volume of surface storage in streams, ponds, lakes and sloughs, and the volume and seasonal timing of runoff through the life of the Project.

Discuss the impacts of the Project on the hydrology and quality of surface waters, aquatic and riparian habitat diversity and quantity, vegetation resources and soil conservation and reclamation from local and regional perspectives.

Identify surface water quality parameters that could be influenced by the Project through groundwater movement and airborne contaminants. Discuss the potential impacts of the Project on routine water quality parameters, as well as, metals in local and regional surface waters potentially impacted by the Project.

Provide plans for mitigating impacts to the local and regional hydrology, surface water quality and riparian habitat.

Assess baseline water quality conditions in the North Saskatchewan River. Provide monitoring data proximate to Agrium specifically for parameters that will potentially be influenced by the Project.

Provide a fate assessment for all potential releases from the Project to surface waters.

Describe baseline conditions of aquatic biota (e.g., benthic invertebrates) recognizing the impacts that already exist. Describe any potential changes that could occur in this component of the aquatic ecosystem in the Study Area(s) as a result of the Project.

Identify monitoring plans for assessing potential future impacts to surface waters from the Project and adequacy of mitigation activities including, but not limited to, the following:

- a) assess the quality of data on which the impact assessment is based;
- b) assess the quality of the historical record for surface waters where impacts from the Project could occur;
- c) discuss how data gaps might influence modelling scenarios for predicting future impacts of the Project;
- d) address how any data gaps will be overcome with a monitoring plan.

4.6 Vegetation and Wildlife

Describe vegetation and wildlife communities and dominant species within the Study Area(s). Determine the occurrences and potential for occurrences of vegetation and wildlife species (e.g., ungulates, carnivores, fur-bearer small mammals, birds, reptiles and amphibians) within the Study Area(s). Comment on the importance of the size, distribution, and variety of wildlife habitat and other land uses from a local and regional perspective. Provide a description of the habitat types and values within the Study Area(s).

Identify the type and amount of vegetation and wildlife to be impacted during the construction and operation of the Project. Predict the anticipated effects of the Project on vegetation and wildlife communities within the Study Area(s). Predict the anticipated effects of the clearing required in the Project Area.

Discuss any potential effects the Project may have on rare plants within the Study Area(s).

Predict the anticipated effect of the Project on wetlands within the Study Area(s). Determine the area of wetlands to be affected by the Project.

Discuss the significance of the effects on vegetation and wildlife as a result of the Project. Evaluate and discuss the potential impacts to vegetation and wildlife in the Study Area(s) as a result of emissions or other changes to air quality parameters as a result of the Project.

Describe measures designed to mitigate impacts of construction and operation activities associated with the Project on vegetation and wildlife. Discuss monitoring programs to determine the effectiveness of mitigation measures to protect vegetation and wildlife.

4.7 Soils

Describe and map the soil types and their distribution in the Project Area.

Provide an assessment of the anticipated changes (e.g., type and extent) to the pre-disturbed topography, elevation and drainage patterns of the Study Area(s) resulting from disturbance during construction, operation and reclamation. Identify these changes sequentially on maps.

Develop a soil reclamation management plan for the Study Area(s). Describe the availability and suitability of soils within the Study Area(s) for reclamation. Outline the criteria to be used in storing and salvaging soils for reclamation within the Study Area(s).

Identify any activities associated with the Project, which may cause soil contamination and discuss mitigation strategies.

4.8 Reclamation and Land Use

Outline reclamation concepts and objectives, proposed end land use objectives and other factors necessary for a reclamation plan to be implemented for the Project Area.

Discuss the potential disposal options for phosphogypsum.

Provide an overall long-term management plan for the phosphogypsum storage area in the event that the phosphogypsum is permanently stored in place.

Discuss a conceptual reclamation/closure plan for the Project.

Discuss and provide information on revegetation trials conducted by Agrium. Discuss and provide information on materials management research and experience.

Discuss how the "*Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials (NORM)*" relates to materials management and reclamation planning for the proposed Project. Discuss the long-term impacts to the environment and human health with respect to radioactivity if the phosphogypsum is permanently stored in place.

Discuss how the closure landscape design will:

- a) return appropriate productivity equivalent to pre-development conditions, if applicable;
- b) integrate with the surrounding landscapes including interconnectivity to the surrounding landscapes;
- c) integrate surface and near surface drainage within the Project Area; and
- d) be incorporated into planning and development of the Project.

Provide the anticipated timeframes for completion of reclamation and release of all lands affected by the Project.

Describe the physical and biological parameters that Agrium will use to monitor and evaluate the reclaimed terrestrial and aquatic ecosystems.

Discuss any constraints to reclamation such as timing of activities, availability of materials and influence of natural processes and cycles. Identify any soil-related constraints or limitations that may affect reclamation.

4.9 Noise

Identify activities that will affect noise levels and expected noise levels at local residences during the construction and operation phases of the Project. Provide information on recent noise studies conducted in the Study Area. Present the results of the noise studies as specified by the EUB ID-99-8 Noise Control Directive. Describe any noise reduction strategies to be employed for the Project.

4.10 Waste

Describe the waste generated as a result of the Project and provide a waste management plan that includes a description of the wastes, estimated volumes generated, method of on-site management or disposal and suggested responsibility. Identify how impacts resulting from waste generated by the Project will be mitigated.

4.11 Environmental Monitoring

Describe environmental monitoring that Agrium will undertake to verify and manage predicted effects, confirm performance of mitigative measures and improve environmental protection strategies. Discuss the following:

- a) all monitoring activities and initiatives that Agrium is proposing to conduct; and
- b) mechanisms for sharing results and reviewing findings.

4.12 Emergency Response Plans

Provide a summary of Agrium's emergency response plan and discuss mitigation plans that will be implemented to ensure workforce and public safety during construction and operation of the Project.

5.0 HISTORICAL RESOURCES

Provide evidence of consultation with Alberta Community Development to determine the nature of assessment required to evaluate impacts of the Project on historical or archaeological resources.

6.0 PUBLIC HEALTH AND SAFETY ISSUES

Identify those aspects of the Project that may have implications for public health and safety, discussing the measures to be taken to prevent or minimize the potential for adverse health effects. Specifically:

- a) discuss the potential for changes to water quality, air quality in the Study Area(s) that may increase human exposure to contaminants;
- b) identify and discuss the data and methods used by Agrium to assess the impacts of the Project on human health and safety;
- c) justify the selection of the models used and identify any assumptions used in the modelling process;
- d) assess the potential health implications of compounds that will be released to the environment from the proposed operations in relation to exposure limits established to prevent acute or chronic adverse effects on human health;
- e) identify components of the Project that will affect radiological air quality from a local, regional and public health perspective;
- f) estimate ground-level concentrations of radiological air quality parameters;
- g) identify the potential for radiological air quality impacts resulting from the Project and discuss any implications of the expected radiological air quality for the protection of public health;
- h) assess cumulative health effects that are likely to result from the Project in combination with other existing, approved, and planned projects or reasonably-foreseeable activities in the region;
- i) provide a summary of Agrium's emergency response plan and discuss mitigation plans that will be implemented to ensure workforce and public safety during construction and operation of the Project. Include prevention and safety measures for accidental release of chemicals to the atmosphere or water, and failures of structures retaining water or fluid wastes;
- j) describe how local residents will be contacted during an emergency and what type of information will be communicated to them;
- k) identify and discuss potential health and safety impacts due to changes in regional traffic volumes; and
- l) document health and safety concerns raised by stakeholders during consultation on the Project and discuss proposed mitigation measures.

7.0 SOCIO-ECONOMIC ASSESSMENT

Describe the impacts of the Project on communities within the region and on Alberta, including:

- a) socio-economic impacts of current operations;
- b) local employment and training;
- c) local procurement;
- d) population changes;
- e) demands upon local services and infrastructure; and
- f) regional and provincial economic benefits.

Summarize the effects of the Project on the Study Area(s) and on Alberta, having regard for capital, labour and other operating costs and revenue from services. Describe Agrium's policies and programs regarding the sourcing and use of Alberta products and services. Include an estimated breakdown of Alberta, other Canadian and foreign industrial benefits for Project management/engineering; equipment and materials; construction labour; and total overall project that will be provided.

Identify employment and business development opportunities attributable to the Project for local communities and Alberta. Provide a breakdown of the labour force, type of employment and

number of employees for construction and operational phases of the Project. Identify labour sources for the Project and their expected place of residence.

Outline the implications of the Project on existing local and regional services.

8.0 PUBLIC CONSULTATION

Describe how public input was obtained and addressed for the EIA report and show how resolution of the concerns and issues were incorporated into development of the Project. Document the public consultation program by types of information obtained, concerns/issues expressed and the nature of Agrium's response or actions taken to address the concerns/issues.