

# OSRIN Annual Report: 2009/10

Oil Sands Research and Information Network  
University of Alberta  
School of Energy and the Environment

July 2010



## Oil Sands Research and Information Network

OSRIN is a university-based, independent organization that compiles, interprets and analyses available knowledge about returning landscapes and water impacted by oil sands mining to a natural state and gets that knowledge into the hands of those who can use it to drive breakthrough improvements in reclamation regulations and practices. OSRIN is a project of the University of Alberta's School of Energy and the Environment (SEE). OSRIN was launched with a start-up grant of \$4.5 million from Alberta Environment and a \$250,000 grant from the Canada School of Energy and Environment Ltd.

OSRIN provides:

- **Governments** with the independent, objective, credible information and analysis required to put appropriate regulatory and policy frameworks in place
- **Media, opinion leaders and the general public** with the facts about oil sands development, its environmental and social impacts, and landscape/water reclamation activities – so that public dialogue and policy is informed by solid evidence
- **Industry** with ready access to an integrated view of research that will help them make and execute reclamation plans – a view that crosses disciplines and organizational boundaries

OSRIN recognizes that much research has been done in these areas by a variety of players over 40 years of oil sands development. OSRIN synthesizes this collective knowledge and presents it in a form that allows others to use it to solve pressing problems. Where we identify knowledge gaps, we seek research partners to help fill them.

### Citation

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Copies of this report may be obtained from OSRIN at [osrin@ualberta.ca](mailto:osrin@ualberta.ca) or through the OSRIN website at <http://www.osrin.ualberta.ca> or directly from the University of Alberta's Education & Research Archive at <http://hdl.handle.net/10402/era.17507>.

## Table of Contents

<b>ACKNOWLEDGEMENTS .....</b>	<b>iv</b>
<b>1 Introduction .....</b>	<b>1</b>
<b>1.1 Board of Directors .....</b>	<b>1</b>
<b>1.2 Staff.....</b>	<b>2</b>
<b>2 2009/10 Program.....</b>	<b>2</b>
<b>2.1 Tailings Reclamation.....</b>	<b>2</b>
2.1.1 Objective .....	2
2.1.2 2009/10 Projects .....	3
<b>2.2 Regional Landscape Reclamation .....</b>	<b>6</b>
2.2.1 Objective .....	6
2.2.2 2009/10 Projects .....	7
<b>2.3 Monitoring Ecosystem Impacts .....</b>	<b>9</b>
2.3.1 Objective .....	9
2.3.2 2009/10 Projects .....	9
<b>2.4 Increasing Awareness .....</b>	<b>12</b>
2.4.1 2009/10 Projects .....	12
<b>2.5 Social, Economic and Regulatory .....</b>	<b>14</b>
2.5.1 2009/10 Projects .....	14
<b>2.6 Strategic Design .....</b>	<b>15</b>
2.6.1 2009/10 Projects .....	15
<b>3 Financial Status.....</b>	<b>16</b>
<b>3.1 Revenue.....</b>	<b>16</b>
<b>3.2 Expenditure .....</b>	<b>16</b>
<b>3.3 Remaining Budget.....</b>	<b>17</b>
<b>4 2010/11 Program.....</b>	<b>17</b>
<b>4.1 Current Challenges that may Present Opportunities.....</b>	<b>17</b>
4.1.1 Performance-based Standards vs. Technology- or Regulation-based Standards .....	18
4.1.2 Use of Water for In-situ Processing.....	18
4.1.3 Need for Increased Openness, Transparency and Consistency in GoA and Industry Reporting.....	18
4.1.4 Desire for More (Better) Regional Reclamation Planning .....	18

<b>APPENDIX 1 – OSRIN Strategies.....</b>	<b>19</b>
<b>APPENDIX 2 – OSRIN Operations.....</b>	<b>22</b>
<b>APPENDIX 3 – OSRIN Story .....</b>	<b>23</b>
<b>APPENDIX 4 – Detailed OSRIN Budget.....</b>	<b>25</b>

## **ACKNOWLEDGEMENTS**

The Oil Sands Research and Information Network (OSRIN) acknowledges the continuing and valuable support of the Board of Directors in helping us get the program up and running.

OSRIN is also very grateful for the advice and guidance provided by Joseph Doucet, Director of the School of Energy and the Environment and the leadership provide by Dr. Steven Moran during his tenure as Executive Director of OSRIN.

Finally, OSRIN thanks the core funding agencies – Alberta Environment and the Canada School of Energy and Environment Ltd. – for their commitment to the program. OSRIN also appreciates the funding support of ConocoPhillips Canada for the OSLI iGEM project.

# 1 INTRODUCTION

This report describes Oil Sands Research and Information Network (OSRIN) activities and accomplishments for the fiscal year April 1, 2009 – March 31, 2010.

A major initiative, which occupied much of the period from April through the summer, defined the OSRIN strategic framework ([Appendix 1](#)) and operating framework ([Appendix 2](#)). OSRIN is pursuing four main strategies, which are described in more detail in [Appendix 1](#):

1. Strategic Knowledge Synthesis
2. Research
3. Communications
4. Organizational Sustainability

During 2009/10, the majority of activity focused on strategy 1, Knowledge Synthesis, with lesser focus on strategy 3, Communications. Research has been pursued through the targeted investment from Alberta Environment.

OSRIN defined three areas of program focus: (1) Tailings Reclamation, (2) Regional Landscape Reclamation, and (3) Monitoring Ecosystem Impacts. These programs were selected to respond to significant areas of concern, either for public perception and criticism of oil sands development, or for technical uncertainty. In addition to these technical areas we also funded work in the Increasing Awareness and Strategic Design programs.

Within each of these program areas, we identified a number of priority concerns and initiated studies to scope out the state of knowledge and gaps that stand in the way of moving to solutions. In September and October, we began implementation of the operating plan. [Section 2.1](#) provides an overview of projects launched by OSRIN during 2009/10.

[Section 3](#) outlines OSRIN's revenue, expenditures and remaining funds. OSRIN spent \$1,279,237.56 during 2009/10, leaving \$3,123,715.73 available for future OSRIN work.

## 1.1 *Board of Directors*

The Board of Directors met twice – in May and in October. The Board is chaired by Dr. Joseph Doucet, Director, School of Energy and the Environment, University of Alberta. Dr. Stephen Moran, Executive Director of OSRIN participated in meetings as a resource to the Board.

Membership on the Board changed during the course of the year, and included the following people:

Andy Greenshaw	University of Alberta
Bert Aram	Alberta Treasury Board
Bruce Carson	Canada School of Energy and Environment (CSEE)
David Layzell	Institute for Sustainable Energy Environment and Economy (ISEEE)
Eddy Isaacs	Alberta Energy Research Institute
Jillian Buriak	University of Alberta

Preston McEachern  
Stephen Smith  
Ted Cyr

Alberta Environment  
Energy Resources Conservation Board  
Alberta Energy

## 1.2 *Staff*

Dr. Stephen Moran was the Executive Director for the 2009/10 period. Caroline Simpson started as Dr. Moran's assistant in October 2009.

Two MBA students were hired in May to work on a variety of projects, with the primary emphasis on developing the structure and content of the Innovation Asset Database.

## 2 **2009/10 PROGRAM**

OSRIN has identified five program areas that have potential for significant contribution. Within each program area, we have launched projects to scope out the state of knowledge, identify knowledge gaps, and provide insights regarding R&D priorities.

- Tailings Reclamation Program
- Regional Landscape Reclamation Program
- Monitoring of Ecosystem Impacts Program
- Increasing Awareness
- Social, Economic and Regulatory
- Strategic Design

OSRIN remained flexible in terms of being able to participate in projects that arose during the year, as long as they were consistent with the mandate. These opportunistic projects included the Wetland Reclamation Conference, the OSLI iGEM project, the Clean Bitumen Technology Action Plan and the DCM Survey.

All expenditures noted in the summaries below are as of March 31, 2010 and include funds expended under grants, purchase orders and invoices (details are provided in [Appendix 4](#)). Some project costs will extend into the 2010/11 fiscal year. Grants show as fully spent since the funding was transferred to the grantee even if the grantee has not yet used all of the funds.

### 2.1 *Tailings Reclamation*

#### 2.1.1 **Objective**

By 2013, OSRIN intends to have developed, evaluated, and promoted a series of scenarios for minimizing the impact of tailings storage and disposal areas, at least one of which will have been implemented by the Alberta government.

This program seeks to identify challenges that must be addressed in accelerating the reclamation of tailings ponds and disposal areas and to catalyze necessary R&D efforts to resolve them.

Challenges for tailings reclamation include

- Accelerating the dewatering of fine tailings
- Treatment of process affected water either for environmental release for recycling or reuse either within the mining operation or in in-situ operations

- Reclamation of dewatered fine tailings
- Managing release of gases, such as H<sub>2</sub>S or CH<sub>4</sub>, during tailings pond reclamation

We began by:

- Documenting the status of various tailings dewatering technologies in terms of potential pros and cons of implementation, the state of development, and work remaining to evaluate options.
- Documenting the state of knowledge about reclamation of dewatered fine tailings. This material is different from the overburden and tailings sands on which nearly all reclamation research and practice has focused. We are determining the degree that existing knowledge is applicable to this material. In addition, we are identifying aspects of reclamation of dewatered fine tails that differ and will require new research.
- Conducting an independent, science-based assessment of the potential for environmental release and utilizing process affected water as feed water for in-situ production. This study examines water quality requirements, feasibility and cost of necessary water treatment technology, environmental implications, economics, and regulatory constraints and requirements for each option.

The output of this program is expected to be:

- Identification of gaps in current knowledge and technology and definition of research and technology development agenda to address the gaps.
- Advice to the Government of Alberta as to policy that should be developed and/or investments made to fill in gaps to accelerate reclamation of tailings ponds and disposal areas.

### **2.1.2 2009/10 Projects**

The following projects were undertaken (project details follow):

- Review of Dewatering of Fine Tailings
- Review of Reclamation of Fine Tailings
- Tailings Water Management Project
- Engineered Biological Processes to Accelerate Oil Sands Tailings Consolidation and Improve Reuse Water Quality
- Mining Clean Bitumen Technology Action Plan (CBTAB)
- Quantitative Characterization of Air Pollutants Emissions from Oil Sands Tailing Ponds: Phase 1 Review and Assessment of Air Pollutants Measurement Technologies

#### **Tailings Dewatering Technology Review**

*Performer:* BGC Engineering (Silva, Biggar, McKenna)

*Status:* Completion May 31

*Expenditure:* \$0

*Next Steps:* Validation workshop to develop research agenda

The key challenge being addressed is (1) to describe the state of knowledge regarding dewatering of fine tailings from oil sands mining; (2) to identify gaps in the knowledge required to develop specifications for segregation of water from sediment within ponds and for creating dry stackable tailings; and (3) to identify the research required to address these gaps.

Elements of scoping study include the following

- The initial step in this study involves identifying and reviewing any existing knowledge, reports, papers, etc. that provide insights into technologies for dewatering tailings.
- Identification of key researchers, oil sand company personnel, and consultants who are working with technology development and demonstration.
- Identification of the critical unknowns and uncertainties that need to be addressed and resolved to implement better, faster, cheaper technologies.

### **Reclamation of Dewatered Fine Tailings**

*Performer:* BGC Engineering (Silva, Biggar, McKenna)

*Status:* Completion May 31

*Expenditure:* \$0

*Next Steps:* Validation workshop to develop research agenda

The key challenge to be addressed is (1) to describe the state of knowledge regarding reclamation of dewatered fine tails from oil sands mining; (2) to identify gaps in the knowledge required to develop specifications for reclamation of landscapes underlain by these materials; and (3) to identify the research required to address these gaps.

ERCB Directive 074 requires that oil sands developers deposit a significant portion of their annual production of fine tails in Designated Disposal Areas (DDA). These DDA deposits must attain strength of 5 kPa by the end of the first year and 10kPa in 5 years. These DDA deposits, which will occupy relative extensive areas, represent a new material within the oil sands mining landscape. No one has any experience in reclaiming landscapes underlain by this material.

Elements of scoping study include the following

1. The initial step in this study involves reviewing the company plans, which are available on ERCB website. Location of DDA (both where is it, and what is the landscape setting), Size of DDA, planned thickness of deposits, plans for closure and reclamation?
2. Identify any existing knowledge, reports, papers, etc. that provide insights into reclaiming this material.
3. Identify existing knowledge, reports, papers, etc. that provide insights into landscape hydrogeology in the mining area and hydrogeology of reclaimed landscapes.
4. Who is working with reclamation (landscape design, material placement, revegetation, and performance monitoring) of this material? Include researchers, oil sand companies, and consultants.

5. Who is working in landscape hydrogeology in this area?
6. What are the critical unknowns and uncertainties that need to be addressed and resolved in order for landscapes overlying dewatered fine tails to be successfully reclaimed?

### **Mining Clean Bitumen Technology Action Plan (CBTAB)**

*Performer:* Petroleum Technology Alliance Canada (PTAC)

*Status:* First workshop held March 25, 2010 and explored about 10 areas for potential opportunities.

*Expenditure:* \$7,732

*Next Steps:* Depends on results

OSRIN committed \$8,000 to support this multi-player project to identify technology opportunities for breakthrough improvement in environmental and economic performance in oil sands development. OSRIN's primary interest is on technologies related to minimizing and managing tailings ponds. OSRIN is one of 23 investors and sits on the Mining Steering Committee.

### **Tailings Water Management Project**

*Performer:* Alberta WaterSMART (Godwalt, Sturgess)

*Status:* Final report expected April 30, 2010

*Expenditure:* \$96,000 (grant)

*Next Steps:* Validation workshop to respond to R&D gaps

OSRIN committed \$96,000 to support this study which is being conducted by Alberta WaterSMART. The study evaluates treatment requirements and technologies for three alternative uses of process affected water from tailings ponds: (1) recycling for other uses within the mines, (2) release to the Athabasca River, and (3) make-up water for in situ oil sands projects. The project also examines the economic and environmental costs on a whole system, life cycle basis for utilizing saline groundwater and tailings pond water for in situ projects.

### **Engineered Biological Processes to Accelerate Oil Sands Tailings Consolidation and Improve Reuse Water Quality**

*Performer:* Dr. Tong Yu, Department of Civil and Environmental Engineering, University of Alberta

*Status:* Completion March 31, 2011

*Expenditure:* \$150,000 (grant)

*Next Steps:* Depends on results

Methanogenesis has been demonstrated to occur in oil sands mature fine tailings with improved fine tailings densification. While research is on-going as to the microbial processes occurring, there is no open public research to adapt engineered wastewater treatment technologies that exploit the microbially-mediated processes. This study will

explore engineered microbially-activated water treatment to significantly accelerate oil sands tailings consolidation and improve quality of water produced from the treatment processes for reuse. The project will study a number of biological processes and engineering reactor types to find the effective combination for achieving outcomes listed in greater detail below. The engineered biological processes will employ both suspended and attached microbial growth and both anaerobic and aerobic processes. In addition to determination of the parameters for the design and operation of these engineered reactors, additional measures for enhancement of the reactor performances will also be investigated. If successful, the proactive engineering approach could significantly shorten the time for water-solids separation, reduce the volume of tailings produced, and improve water quality for reuse. The long-term goal is to avoid production of mature fine tailings as we now know it. The knowledge and experience obtained from this study can also be used to better treat existing mature fine tailings.

### **Quantitative Characterization of Air Pollutant Emissions from Oil Sands Tailings Ponds: Phase 1 Review and Assessment of Air Pollutant Measurement Technologies**

*Performer:* Dr. Zaher Hashisho, Department of Civil Environmental Engineering, University of Alberta

*Status:* Work ongoing

*Expenditure:* \$40,000 (grant)

*Next Steps:* Depends on results

Because of the differences among the fundamental principles and operations of air pollutants measurement techniques, the performance of these techniques in the measurement of fugitive emissions of air pollutants from oil sand tailing ponds and other area sources can vary. Such variability adds another layer of complexity to the temporal and spatial variability inherent to fugitive emissions from tailing ponds. The choice of a technique for characterizing air pollutants emissions from tailing ponds needs to consider, in addition to accuracy, other factors such as the practicality, cost, and reliability of the technique. Hence there is a need to understand the advantages and limitations of these techniques in order to select the technique that is most suitable for measuring air pollutants emissions from tailing ponds. This project will (1) review characterization technologies for Volatile Organic Carbon (VOCs), methane (CH<sub>4</sub>), and hydrogen sulphide (H<sub>2</sub>S); (2) review technologies used in characterizing air pollutants emissions from oil sand tailing ponds; and (3) assess the performance of a photo-ionization detector (PID) for measuring VOCs under a range of environmental conditions.

## **2.2 Regional Landscape Reclamation**

### **2.2.1 Objective**

By 2013, OSRIN intends to have identified a series of implementable scenarios for integrating reclamation planning on a regional basis within the land-use planning framework. This program focuses on providing the knowledge necessary to support Alberta Environment's preliminary *Strategic Plan for Oil Sands Reclamation*.

Alberta Environment identifies as a desired outcome that there is *Recognition that reclamation success includes consideration of regional targets as well as site and mine level objectives*. Alberta Environment goes on to establish four specific goals related to achieving regional reclamation targets:

- Reclamation success is judged on the basis of criteria and indicators that are regional in scope in addition to those that are specific to the mine or site level, as per *Environmental Protection and Enhancement Act* approvals. This goal is consistent with the fundamental principle that healthy ecosystems are integrated across the oil sands region.
- Landforms are effectively designed to promote naturally appearing, hydrologically functioning landscapes that will support self-sustaining, healthy aquatic ecosystems and possess the desired vegetation communities.
- Surface soils and forest floor in upland areas are effectively salvaged, stored, and placed to ensure that their value is maximized.
- Reclaimed lands possess the desired vegetative communities and structures that are consistent with naturally appearing and functioning boreal ecosystems.

### **2.2.2 2009/10 Projects**

The following projects were undertaken (project details follow):

- Reclamation Alternatives Dialogue Assessment and Design
- Conducting a Dialogue ‘Challenges and Timelines in Reclamation and the Feasibility of Alternative End Land Uses’
- Support Wetland Reclamation Conference
- Oil Sands Terrestrial Habitat and Risk Modeling for Disturbance and Reclamation

#### **Reclamation Alternatives Dialogue Assessment and Design**

*Performer:* Innovation Expedition Consulting Inc. (Jones, Forrest)

*Status:* Completed February, 2010

*Expenditure:* \$13,356

*Next Steps:* Proceed with the Challenge Dialogue

#### **Conducting a Dialogue ‘Challenges and Timelines in Reclamation and the Feasibility of Alternative End Land Uses’**

*Performer:* Innovation Expedition Consulting Inc. (Jones, Forrest)

*Status:* Completion September 30, 2010

*Expenditure:* \$13,722

*Next Steps:* Depends on results

There continues to be discussion throughout the community regarding what the objective of reclamation of oil sands mining sites should be. Language used by many focuses on reclaiming to create a “robust, healthy, self-sustaining boreal ecosystem”. The fact that the oil sands mining area includes extensive bogs and fens that contain ecosystems

unique within Alberta leads to the expectation on the part of some that recreating bogs and fens should part of the objective of reclamation.

This project is intended to engage a cross section of academic, regulatory, and operational reclamation planners and practitioners from industry in reaching alignment over what objectives are appropriate from a technical perspective. Part of that alignment would involve a shared understanding of what successful reclamation would look like and what we need to be able to do to achieve success. With this agreement in hand, we would then move on to identify the knowledge gaps that need to be addressed to achieve this objective.

The project began with preparation of a Challenge Dialogue paper and solicitation of feedback from stakeholders. A workshop was planned for late March (now postponed until mid-June). The intent is that the workshop will lead to finalizing alignment on a position paper that summarizes the points of agreement and difference among the community.

### **Support Wetland Reclamation Conference**

*Performer:* PeatNet (Vitt)

*Status:* Conference held March 25 – 27. OSRIN contribution will fund publication of post conference book.

*Expenditure:* \$0

*Next Steps:* Support publication of book in 2010/11

Dr. Moran participated on the organizing committee for a March 25 – 27, 2010 conference organized by Dr. Dale Vitt on reclamation of wetland and forested sites. OSRIN committed \$10,000 to support the conference, in the form of assistance in publishing the conference papers.

### **Oil Sands Terrestrial Habitat and Risk Modeling for Disturbance and Reclamation**

*Performer:* FORRx Consulting Inc. (Welham)

*Status:* Phase I final report expected May 31, 2010

*Expenditure:* \$104,000 (grant)

*Next Steps:* Proposal for second phase of the work will be reviewed

The overall objective of this project is to develop a framework that integrates risk management and strategic decision-making in order to evaluate the impact of disturbance (natural and industrial) on ecosystem products and services, and on habitat availability for terrestrial species in Alberta's Lower Athabasca planning region. This will include an evaluation of the impact of disturbance (natural disturbance due to insect outbreaks, fire and wind, as well as other industrial and agricultural disturbances), conservation, and reclamation activities associated with oil sands development both at the lease and regional levels.

Four scenarios will be incorporated into the analysis. These include scenarios constituting a base case, climate change, mine development plans, and regional development plans. The base case scenario is a series of outcomes derived with no

consideration for future climate change. The importance of the base case is that it represents the null condition and thus provides a context for comparing the relative impact of different climate change scenarios. Data for the base case scenarios are derived from historical climate records. A significant component of the work conducted in Phase I will represent the base case scenario.

## **2.3 *Monitoring Ecosystem Impacts***

### **2.3.1 Objective**

By 2013, OSRIN intends to have identified components of a comprehensive, robust system in Alberta to monitor the effects of oil sands mining operations on ecosystem health – a system that is scientifically sound and has the confidence of the general public.

We began by:

- Documenting the various relevant monitoring activities currently in place
- Conducting an independent, science-based assessment of the full picture that emerges to determine where there are gaps, weaknesses to address, strengths to build on
- Facilitating a multi-stakeholder dialogue (industry, non-governmental organizations and associations, academics, government, media, First Nations groups) to better understand what would characterize a credible ecosystem monitoring system that meets the expectations of all interested parties

The output of this activity is expected to be:

- Recommendations to the Government of Alberta as to policy that should be developed and/or investments made to fill in gaps and strengthen the monitoring system overall
- A publicly available web-based “report card” that provides an integrated view of the full monitoring system as well as links to each monitoring activity

### **2.3.2 2009/10 Projects**

The following projects were undertaken (project details follow):

- Inventory and Characterize the Monitoring and Reporting of Oil Sands Environmental Health
- Assessment and Design of a Challenge Dialogue titled “What Constitutes Monitoring Adequacy in the Oil Sands Region?”
- Dialogue on Information Reporting Adequacy
- Isotope and Geochemical Tracers For Finger Printing Process-Affected Waters In The Oil Sands Industry
- Soil Nitrogen Indicators for Land Reclamation Policy Development for Forest Ecosystems in the Oil Sands Region of Alberta
- Instruments for Research on Air Quality Control and Characterization

## **Inventory and Characterize the Monitoring and Reporting of Oil Sands Environmental Health**

*Performer:* EO Consulting (Lott, Jones)

*Status:* Final report expected June 2010

*Expenditure:* \$32,906

*Next Steps:* Publish on web site.

An inventory of monitoring and reporting programs in the mineable oil sands region was prepared based on surveys of existing information and suggestions from various stakeholders of other monitoring programs. The survey was validated by requesting confirmation of content by the relevant monitoring groups.

## **Assessment and Design of a Challenge Dialogue titled “What Constitutes Monitoring Adequacy in the Oil Sands Region?”**

*Performer:* Congruent Strategies (James)

*Status:* Completed, March 2010

*Expenditure:* \$16,048

*Next Steps:* Proceed with the Challenge Dialogue

## **Dialogue on Monitoring and Information Reporting Adequacy**

*Performer:* Congruent Strategies (James, Vold)

*Status:* Completion September 30, 2010

*Expenditure:* \$0

*Next Steps:* Conduct Challenge Dialogue, produce Final Dialogue Report and publish on web site

This project is intended to engage a cross section of academic, regulatory, and operational planners and practitioners from industry in reaching alignment over what an adequate information and reporting system would look like. Part of that alignment would involve a shared understanding of: the purpose of the system; the necessary system characteristics, principles, and governance; what would be reported; and, how reporting would occur. With this agreement in hand, we would then move on to identify the knowledge gaps that need to be addressed to achieve this objective.

The project began with preparation of a Challenge Dialogue paper and solicitation of feedback from stakeholders. A workshop was planned for late March (now postponed until mid-June). The intent is that the workshop will lead to finalizing alignment on a position paper that summarizes the points of agreement and difference among the community.

## **Isotope and Geochemical Tracers for Finger Printing Process-Affected Waters in the Oil Sands Industry**

*Performer:* Alberta Innovates – Technology Futures (Dr. J. Gibson)

*Status:* Final report expected November 30, 2010

*Expenditure:* \$317,000 (grant)

*Next Steps:* May require additional funds to cover second field season. Follow-up depends on results.

The goal of this proposal is identification of the source, occurrence and distribution of process-affected water and solutes using isotopic and geochemical tracers as a potentially powerful tool for management and mitigation of environmental impacts related to oil sands development. Isotopic labelling would be particularly useful for establishing sources, pathways, and proportions of seepage waters entering surface-water receptors such as the Athabasca River, for tracing potential water leakage from end-pit lakes, tailings deposits and injected saline wastewater to groundwater aquifers, and in general to establish a sharper focus on development-related water quality and quantity impacts on the downstream Athabasca River system. This comprehensive program includes in-river validation through quantification of groundwater conductivity plumes in the Athabasca River.

### **Soil Nitrogen Indicators for Land Reclamation Policy Development for Forest Ecosystems in the Oil Sands Region of Alberta**

*Performer:* Dr. Scott Chang, Department of Renewable Resources, University of Alberta

*Status:* Completion March 31, 2011.

*Expenditure:* \$10,000 (grant)

*Next Steps:* Expect a proposal for actual field measurements.

The objective of this research is to establish the relationship between soil nutrient regime, more specifically soil nitrogen availability, and tree growth in the oil sands region to further develop the equivalent land capability concept in the Land Capability Classification System (LCCS) and to identify a suitable soil nitrogen availability indicator that supports on-going long-term soil-vegetation monitoring activities by industry operators in the oil sands region.

This project will examine soil nitrogen status and its relationship with forest productivity through laboratory and field investigations. The specific objectives of the proposed project are:

- to examine soil nitrogen availability indicators (soil total N, mineral N ( $\text{NH}_4^+\text{-N}$ ,  $\text{NO}_3^-\text{-N}$ ), different forms of mineralizable N) and their relationships with forest nitrogen nutrition status, tree growth rates and productivity of the following major tree species: trembling aspen (*Populus tremuloides*), white spruce (*Picea glauca*) and jack pine (*Pinus banksiana*), and
- to recommend nitrogen availability indicators to improve the LCCS for use in the oil sands region

### **Instruments for Research on Air Quality Control and Characterization**

*Performer:* Dr. Zaher Hashisho, Department of Civil Environmental Engineering, University of Alberta

*Status:* Completed

*Expenditure:* \$40,000 (grant)

*Next Steps:* None

Dr. Hashisho purchased equipment related to research into air emission control and characterization of tailings pond emissions, including a differential optical absorption spectroscopy air monitoring system, a gas chromatography-mass spectrometry with a canister concentrator system, and a microwave generation and monitoring system.

More specifically, the differential optical absorption spectroscopy air monitoring system will be used for remote monitoring of Volatile Organic Compounds (VOCs) and inorganic pollutants emitted from oil sand tailing ponds and other fugitive sources. The gas chromatography-mass spectrometer will be used for the characterization of VOC species in ambient air and the microwave generation and monitoring system is used for research on selective regeneration of adsorbents with microwave heating, and remediation of contaminated soil using microwave energy.

## **2.4 *Increasing Awareness***

OSRIN began web portal design in a series of stages. The first stage was completed in late October with a strategy setting session involving Joseph Doucet and Preston McEachern. This meeting established the framework within which the OSRIN brand will be expressed through the web portal. The next phase of the project is to finalize the initial site content, train OSRIN staff to update the site and release it.

We also reviewed options for scanning media and producing reports on articles relevant to the OSRIN mandate that would be used to feed the website content. The project ended when it became apparent that the majority of media stories addressed issues that were outside OSRIN's mandate (particularly stories on greenhouse gases and in-situ projects).

### **2.4.1 2009/10 Projects**

The following projects were undertaken (project details follow):

- Web Portal Design
- Develop Website Structure
- Media Monitoring Project
- Innovation Asset Database
- Support to Innovation Asset Database Project
- iGEM Oil Sands Awareness Project

#### **Web Portal Design**

*Performer:* Murgatroyd Inc. Communications and Consulting (Stephen Murgatroyd)

*Status:* Completed

*Expenditure:* \$7,115

*Next Steps:* None

The consultant helped design the OSRIN web portal, in conjunction with the website structure designer, as a reliable, highly respected and independent information portal in which all essential information about the oil sands environmental issues/actions are documented in an effective way.

### **Develop Website Structure**

*Performer:* James Murgatroyd Communications (James Murgatroyd)

*Status:* Web design completed

*Expenditure:* \$0

*Next Steps:* Finalize content, train OSRIN staff and release website

The web designer converted the web portal design into a functioning website.

### **Media Monitoring Project**

*Performer:* Troy Media Corp. (Slywchuk)

*Status:* Completed

*Expenditure:* \$1,844

*Next Steps:* None

This project evaluated the viability of a system to track media content relevant to OSRIN. Specific tasks included:

- Track media coverage of environmental issues associated with the oil sands, especially as it relates to some key issues (tailings ponds, water quality, land remediation, methane and CO<sub>2</sub> emissions)
- Prepare monthly Media Clip Books, which consist of all media hits
- Prepare monthly Media Metric Reports

The project ended when it became apparent that most media hits were not related to OSRIN's mandate.

### **Innovation Asset Database**

*Performer:* UofA MBA Students (Cheruvathur, Hansdah)

*Status:* Preliminary design and data collection complete. Data proofing and final design ongoing

*Expenditure:* Staff costs

*Next Steps:* Finalize database and incorporate into website

Two MBA students are preparing a searchable database of people working on oil sands land reclamation. The database will be placed on the OSRIN website.

### **Support to Innovation Asset Database Project**

*Performer:* Murgatroyd Inc. Communications and Consulting (Stephen Murgatroyd)

*Status:* Completed

*Expenditure:* \$5,082

*Next Steps:* None

Murgatroyd was contracted to:

- Coach, guide and mentor the MBA students with respect of developing an asset map or set of maps.
- Related to your key issue(s).
- Provide technical help in the design of such a map.
- Oversee and support the development of the written document summarizing the available assets and identifying gaps.
- Seek out web based resources that would support the work of the MBA students.

### **iGEM Oil Sands Awareness Project**

*Performer:* OSRIN in partnership with the Oil Sands Leadership Initiative (OSLI )

*Status:* Trip occurred Aug 10 – 11, 2009.

*Expenditure:* \$5,760

\$19,634 spent but \$13,873 received back from ConocoPhillips Canada on behalf of OSLI.

*Next Steps:* Fund iGEM competition in 2010

About 30 students and faculty advisors from UofA, UofC, and UofL were given tours of Suncor Millennium Mine and ConocoPhillips Surmont in-situ project to familiarize them with challenges and opportunities for solutions using synthetic biology. The tour was used to set the stage for the 2010 competition.

## **2.5 Social, Economic and Regulatory**

This program seeks to identify social, economic and regulatory issues that may affect oil sands reclamation and to evaluate the impact and effectiveness of social, economic and regulatory instruments on reclamation success.

### **2.5.1 2009/10 Projects**

The following projects were undertaken (project details follow):

- DCM Survey of Albertan's Value Drivers

#### **DCM Survey of Albertan's Value Drivers**

*Performer:* Cambridge Strategies Inc. (Das)

*Status:* Survey drafts completed. Survey to be done in April or May. Planned completion July 31, 2010

*Expenditure:* \$0

*Next Steps:* OSRIN-related results interpreted and published on website

A discrete choice modeling survey of a random sample of 1,000 Albertans was designed to map the values driving Albertan's attitude towards oil sands development. Part of the survey will focus on reclamation. The survey was conducted in May 2010. OSRIN will synthesize and publicize the reclamation results.

## **2.6 Strategic Design**

OSRIN funded three projects to help establish and document strategic intent. We developed the OSRIN Story ([Appendix 3](#)) to provide a common text for the website, presentations and discussions with stakeholders about OSRIN's roles and goals. The Story, plus the OSRIN Strategy Roadmap and the OSRIN Logic Model, form the key tools to explain who we are and what we do.

### **2.6.1 2009/10 Projects**

The following projects were undertaken (project details follow):

- Communications Strategy Support
- Develop OSRIN Strategy
  - Phase 1 - Clarification of Strategic Intentions
  - Phase 2 - Outcome Mapping
  - Phase 3 - Identification of Key Indicators
- Communication Input and Guidance with Challenge Dialogues

#### **Communications Strategy Support**

*Performer:* Redoaks Management Consulting Inc. (Simpson)

*Status:* Provided initial support/advice.

*Expenditure:* \$8,263

*Next Steps:* Determine need for further support/advice.

Redoaks Management was contracted to provide:

- Strategic orientation of web site
- Communications input and guidance with the Challenge Dialogue and subsequent reports
- Assistance with letters or documentation relating to the Oil Sands Research and Information Network (OSRIN) consultation with a variety of interest groups

#### **Develop OSRIN Strategy**

*Performer:* Innovation Expedition Consulting Inc. (Jones, Forrest)

*Status:* Completed

*Expenditure:* \$83,167

*Next Steps:* Release OSRIN Strategic Roadmap

The project consisted of three phases:

- Phase 1 - Clarification of Strategic Intentions
- Phase 2 - Outcome Mapping
- Phase 3 - Identification of Key Indicators

## Communication Input and Guidance with Challenge Dialogues

*Performer:* Pembina Institute (Dyer)

*Status:* Providing ongoing advice on the Challenge Dialogues

*Expenditure:* \$7,000

*Next Steps:* None

Pembina was contracted to provide guidance on communications regarding the Challenge Dialogues and to provide input to the design of the Dialogues.

### 3 FINANCIAL STATUS

#### 3.1 Revenue

During the past year we received the second tranche of core funding, \$1.5 million, from Alberta Environment, for a total of \$4.5 million. In addition we received a \$250,000 grant from the Canada School for Energy and Environment Ltd. (CSEE) to help defray administrative expenses.

ConocoPhillips (on behalf of OSLI) provided \$14,567.13 to cover part of the costs of the iGEM Oil Sands Awareness Project. ConocoPhillips also gave us a grant of \$5,000 to help finance additional iGEM activities.

#### 3.2 Expenditure

In 2009/10, OSRIN spent \$1,278,701.50 (broken down by program area and administration in the table below).

Cost Centre	\$ Spent <sup>1</sup>	% of Total \$ Spent
Tailings Reclamation	\$293,732.00	23.0
Regional Landscape Reclamation	\$131,079.17	10.2
Monitoring Ecosystem Impacts	\$415,954.85	32.5
Increasing Awareness	\$19,802.01	1.6
Social, Economic and Regulatory <sup>2</sup>	\$0	0
Strategic Design	\$98,430.40	7.7
Administration <sup>3</sup>	\$319,703.07	2.0
<b>TOTAL</b>	<b>\$1,278,701.50</b>	

<sup>1</sup> Includes grants, purchase orders, invoices and expenses related to projects.

<sup>2</sup> Project expenses will be billed in 2010/11

<sup>3</sup> Includes salaries, and travel and expenses for OSRIN staff

[Section 2.1](#) summarizes expenditures by project and [Appendix 4](#) provides more details.

### **3.3 Remaining Budget**

At the end of March 31, 2010, total OSRIN expenditure since 2008 was \$1,305,238.24. An additional \$338,310.61 in outstanding commitments leaves an uncommitted balance of \$3,123,715.73.

## **4 2010/11 PROGRAM**

OSRIN will continue to fund projects in the five program areas during 2010/11, based on the results of current projects, advice from the Board of Directors and discussions with other funding agencies. OSRIN fully expects a broad range of opportunities to be identified through the two Challenge Dialogues currently underway.

Every effort will be made to co-fund projects with partners, likely by co-funding work of others. In some cases OSRIN may decide the issue is important enough that it should fund the work on its own; however, these cases will be carefully examined to ensure the Board agrees the project will be adding value.

It is important to get OSRIN better known amongst our targeted stakeholders. The following activities will be undertaken to address this key need:

- The website will be finalized and released for use in June or July.
- OSRIN will finalize reports from existing projects and make them available through the website.
- The Executive Director will continue to engage stakeholders and research providers to identify and document research needs and opportunities. The results of these conversations will be shared with the Board.
- OSRIN will provide financial support to at least two conferences that are relevant to our mandate in exchange for recognition as a sponsor. Potential conferences include: *Second International Oil Sands Tailings Conference 2010* and *Mine Closure 2011*, both to be held in Alberta.
- OSRIN will present, or encourage research providers to present, results of OSRIN work at relevant conferences.
- OSRIN will digitize older oil sands related government-sponsored research work (e.g., Alberta Oil Sands Environmental Research Program and Reclamation Research Technical Advisory Committee) and place them on a University of Alberta-sponsored website to make information more readily accessible to stakeholders (budget to be determined).

OSRIN will add a new program area encompassing Social, Economic and Regulatory issues based on the early results from the two Challenge Dialogues and discussions with stakeholders.

### **4.1 Current Challenges that may Present Opportunities**

Discussions with the Board and various stakeholders, feedback from stakeholders through the two Challenge Dialogues started in 2009/10, and observations on existing policies and legislation have identified areas that may require work by OSRIN.

#### **4.1.1 Performance-based Standards vs. Technology- or Regulation-based Standards**

The government of Alberta's move to increased focus on outcomes provides opportunities to assist in the development of performance-based standards for oil sands reclamation. This area of work could comprise:

- Identification of needs
- Description of current state-of-knowledge
- Development of standards
- Field testing of standards
- Development of methods and tools to measure performance against standards

#### **4.1.2 Use of Water for In-situ Processing**

OSRIN notes that current interpretation of the terms saline water, non-fresh water and fresh water may be leading to unintended consequences in terms of optimizing water use. For example, it is unclear how process-affected water (either from the mines or from in-situ plants themselves) will be labeled for the purposes of the rules established under the ERCB's Draft Directive *Requirements for Water measurement, Reporting and Use for thermal In-situ Schemes*. OSRIN could extend the OSLI WaterSMART work to address this issue.

#### **4.1.3 Need for Increased Openness, Transparency and Consistency in GoA and Industry Reporting**

One of the most common criticisms heard around oil sands is the lack of easily accessible, understandable and reliable information. Alberta Environment's proposed Oil Sands Information Portal (OSIP) will go some way to addressing this concern. OSRIN believes there are additional opportunities to support better information including:

- Facilitating development of common terminology and reporting standards
- Reviewing stakeholder needs and available technology platforms for presenting mine reclamation plans

#### **4.1.4 Desire for More (Better) Regional Reclamation Planning**

Although it is a requirement of *Environmental Protection and Enhancement Act* approvals that operators develop integrated reclamation plans (across leases and between leases and adjacent undisturbed land) there is little visible progress. OSRIN could help explore real and perceived barriers to accomplishing this goal.

## **APPENDIX 1 – OSRIN Strategies**

OSRIN is pursuing four main strategies.

1. Strategic Knowledge Synthesis
2. Research
3. Communications
4. Organizational Sustainability

### ***Strategy 1 – Strategic Knowledge Synthesis***

The Strategic Knowledge Synthesis strategy involves the following five step process

- Issue Identification: Identify the key questions or challenges. These may be challenges confronting regulators as they pursue the goal of ensuring that reclaimed post-mining landscapes meet Provincial objectives. They may be challenges confronting companies as they seek to most effectively reclaim landscapes.
- Scoping Study to define state of knowledge and critical gaps: Commission and oversee scoping studies to define state of knowledge. In most cases, this will involve retaining a consultant with significant experience in the issue area. The scoping study will involve identifying and synthesizing existing knowledge, identifying the key people engaged in addressing the issue, and acquiring and summarizing the important literature. A preliminary identification of knowledge gaps is an important product of the scoping study.
- Expert Validation: Circulate the draft scoping study to an independent panel of experts for reaction and comment. The experts would include academics, and personnel from industry and government. This stage may involve a workshop to bring the expert panel together to arrive at alignment on the state of knowledge, knowledge gaps and to identify areas where the experts agree to disagree. Part of this process will involve definition of a research agenda to address the knowledge gaps.
- Publication of study and action plan to respond to gaps: Publish the findings of the scoping study and the expert panel conclusions
- Promotion of R&D program to address gaps: Engage potential funding partners in developing an R&D program to address the remaining knowledge needs

### ***Strategy 2 – Research Strategy***

OSRIN is defining knowledge gaps in terms of barriers to taking action. (1) If policy and or operating organizations lack the knowledge of how to proceed, a gap exists. (2) If it is clear how to proceed, but there are concerns or unknown factors that may lead to unexpected and undesirable consequences of the action, a knowledge gap exists. In either case, OSRIN would develop a research program to address the knowledge gaps.

OSRIN will seek other organizations and funding sources to partner in funding an R&D project/program to address gaps. In most cases, the R&D program would be structured to

1. define clearly what expected outcomes are desired,

2. solicit statements of interest from the broad community of researchers who are interested in and capable of developing solutions to the knowledge gaps, and
3. screen statements of interest and request full proposals from teams of researchers deemed best able to provide the missing knowledge.

### ***Strategy 3 – Communications Strategy***

OSRIN's communications strategy consists of 3 elements, (1) Maintaining informal and formal contacts with key stakeholders, (2) establishing and maintaining a web portal, and (3) hosting a series of dialogues and workshops directed at developing shared understanding of key issues.

#### *Maintaining Contacts with Key Stakeholders*

To establish and maintain credibility and influence, OSRIN must be seen to be part of the community. This will involve creating, developing and maintaining regular informal contact with key individuals and organizations. It will also involve participating in organizations and processes by which knowledge is shared, processed and implemented in policy.

#### *Web Portal*

The primary element of OSRIN's communications strategy is to develop a web portal to serve as a vehicle to provide knowledge products to multiple stakeholders. We intend to explore the use of social networking tools such as Twitter, and Facebook to acquire and distribute content and to enhance traffic to the web portal.

We intend to establish partnerships with existing and emerging sites that will avoid duplication of content. OSRIN will publish on our site only those materials that are not available through existing sites. We intend to link with other resources, wherever we can find them. In some cases this may involve investing in partner sites to facilitate their maintaining complete and current archives.

Key elements of the portal will include (among others):

- A report Archive will provide, to the extent feasible, access to full text reports. OSRIN intends to bring together in one place a means of accessing all publically reports related to land and water impacts of surface mining of oil sands.
- Background papers that provide insights into the context within which oil sands development is occurring.
- Policy analysis papers that examine key questions and present alternative scenarios of potential policy options that might respond to the issues.
- A site for Dialogue around key issues. Oil sands development occurs within the context of economic, social, cultural, geopolitical, environmental, ethical and technical forces. The web portal intends to be a host for public dialogue on these issues to facilitate Albertans in evolving their understanding of the issues and tradeoffs involved in managing the development of their oil sands resource. This area will include links to influential bloggers and columnists that are contributing to the public debate.

- Sense making, fact checking and accountability. The discussion of oil sands development involves many conflicting voices with differing agendas. Not infrequently, information is presented in differing ways to make particular points. From time to time, mis-information is published. One of the functions of the site will be to help clarify the seemingly conflicting facts and illuminate incorrect fact or assertion in the media.

#### *Dialogues and Workshops*

OSRIN intends to engage the professional community through dialogues and workshops that will explore key issues. These types of events will be especially important in seeking alignment among experts on key issues.

#### ***Strategy 4 – Organizational Sustainability***

OSRIN is taking a two pronged approach to organizational sustainability. The first involves leveraging our resources to create win-win opportunities to advance our mission and help partner organizations advance their missions. The second involves actively seeking to create value for potential future investors and seeking long-term funding partnerships.

The first element of the strategy will involve seeking out opportunities to partner with organizations such as PTAC, OSLI, the Helmholtz/Alberta partnership to advance the agenda of substantial improvement in the environmental performance of oil sands mining. In many cases this will involve investing our funds outside of OSRIN to contribute to programs and projects that advance our mission.

OSRIN intends to be opportunistic in pursuing funding for projects, but not at the expense of remaining focused on our mission. OSRIN is not about capturing dollars simply to increase the budget.

OSRIN is proceeding on the basis and of the belief that if value is created for stakeholders, investors will commit to sustaining OSRIN's ability to continue to contribute. We believe that OSRIN has the greatest potential of creating value for two groups of stakeholders, (1) the Alberta Government, and (2) private foundations with a strong mandate in the energy/environment nexus. OSRIN's sustainability strategy therefore focuses on pursuing those sources of potential sustaining support.

## **APPENDIX 2 – OSRIN Operations**

### ***Staffing***

OSRIN has operated with a minimal staff. Leadership has been provided by the full-time Executive Director. A program support person was hired in October, 2009.

### ***Executive Director***

Dr. Stephen Moran served as Executive Director on a term contract from March 1, 2009 to April 19, 2010. Chris Powter, formerly of Alberta Environment, became Executive Director effective April 19, 2010. Dr. Moran will continue to play a reduced role in completing current projects, providing technical advice in areas of his expertise, and as strategic advisor and mentor for at least the remainder of 2010/11.

### ***Program Support Position***

Administrative support was provided by SEE and a temporary project position (Caroline Simpson) but the arrangement was not sustainable and did not provide OSRIN with the critical continuity required to manage projects and finances. Therefore a full-time administrative support position (Doug Leong) was finalized in April 2010. A portion of the responsibilities of this position include administrative support, contract management and web support. Other functions that might be served by this position include conducting literature reviews and active involvement in business development.

### ***Consultants / Contractors***

Other functions are considered to be of short term duration and require specialized knowledge and skills. We intend to retain consultants or contractors to cover these functions.

### ***Design of Web Portal***

Developing and maintaining a web site will require significant dedicated manpower. We intend to engage consultants to assist in strategic design and implementation of the web portal. Maintenance of content will require a significant amount of effort. Current thinking is that this will be provided by the Program Support Position but it may require occasional contract work. There is an annual fee for hosting the web portal.

### ***Scoping Studies***

OSRIN will engage experts to conduct scoping studies. In most cases, this will involve retaining a consultant with significant experience in the issue area although university staff with an interest in the subject matter could undertake the work. In other cases, the consultant will be retained to manage a process with the domain expertise provided by researchers and technical experts in government, industry and academia.

### ***Researchers***

OSRIN will engage the research community in conducting research and policy analyses to address knowledge gaps and to link existing knowledge to policy issues.

## **APPENDIX 3 – OSRIN Story**

### ***What is OSRIN's Vision***

OSRIN is working toward a future in which Albertans can reap the economic benefits of oil sands development without sacrificing the health of the natural ecosystem or human health.

### ***Why OSRIN?***

Albertans, as well as others across the world, are increasingly concerned about the environmental impacts of oil sands development. Alberta is investing to develop the technology and practices necessary to improve environmental performance. Alberta Environment has invested in OSRIN to address issues related to impact of oil sands development on water and land. OSRIN's role is to help Alberta “do the right thing” to ensure healthy, self-sustaining boreal landscapes after mining and processing oil sands.

### ***What is OSRIN?***

OSRIN is a university-based, independent organization that develops the best available knowledge about returning landscapes and water impacted by oil sands mining to a natural state and gets that knowledge into the hands of those who can use it to drive breakthrough improvements in reclamation regulations and practices. OSRIN is a project of the University of Alberta's School of Energy and the Environment (SEE).

### ***Who are OSRIN's Customers?***

We provide:

- **Governments** with the independent, objective, credible information and analysis required to put appropriate regulatory and policy frameworks in place
- **Media, opinion leaders and the general public** with the facts about oil sands development, its environmental and social impacts, and landscape/water reclamation activities – so that public dialogue and policy is informed by solid evidence
- **Industry** with ready access to an integrated view of research that will help them make and execute reclamation plans – a view that crosses disciplines and organizational boundaries

### ***Who pays for OSRIN work?***

OSRIN was launched with a start-up grant of \$4.5 million from Alberta Environment and a \$250,000 grant from the Canada School of Energy and the Environment Ltd. We intend to seek partners and additional financial supporters with whom to collaborate in sustaining this work.

### ***Where will OSRIN focus?***

OSRIN's initial focus is on facilitating development of regulations, practice, and technology that support:

- Reclamation of oil sands tailings – reducing the footprint and impact of tailings ponds and disposal areas

- Landscape reclamation – integration of reclamation regulations with the regional land-use planning framework to return mining and processing sites to successful, self-sustaining boreal landscapes that meet citizens’ expectations; this will include work on terrestrial, wetland and water body reclamation
- Identification and minimization of the effects of oil sands mining on ecosystem health

We recognize that much research has been done in these areas by a variety of players over 40 years of oil sands development. OSRIN synthesizes this collective knowledge and presents it in a form that allows others to use it to solve pressing problems. Where we identify knowledge gaps, we seek research partners to help fill them.

## APPENDIX 4 – Detailed OSRIN Budget

The following table provides details of OSRIN's 2009/10 budget.

Project	Committed	Spent	Remaining	Other Expenses	Total Spent
<b>Tailings Reclamation</b>					
Tailings Dewatering Technology Review	\$32,835.00	\$0.00	\$32,835.00	\$0.00	\$0.00
Reclamation of Dewatered Fine Tailings	\$30,335.00	\$0.00	\$30,335.00	\$0.00	\$0.00
Mining Clean Bitumen Technology Action Plan (CBTAB)	\$8,000.00	\$7,600.00	\$400.00	\$132.00	\$7,732.00
Tailings Water Management Project	\$96,000.00	\$96,000.00	\$0.00	\$0.00	\$96,000.00
Engineered Biological Processes to Accelerate Oil Sands Tailings Consolidation and Improve Reuse Water Quality	\$150,000.00	\$150,000.00	\$0.00	\$0.00	\$150,000.00
Quantitative Characterization of Air Pollutant Emissions from Oil Sands Tailings Ponds: Phase 1 Review and Assessment of Air Pollutant Measurement Technologies	\$40,000.00	\$40,000.00	\$0.00	\$0.00	\$40,000.00
<b>Regional Landscape Reclamation</b>					
Reclamation Alternatives Dialogue Assessment and Design	\$14,650.00	\$12,150.00	\$2,500.00	\$1,206.42	\$13,356.42
Conducting a Dialogue 'Challenges and Timelines in Reclamation and the Feasibility of Alternative End Land Uses'	69,350.00	\$13,500.00	\$55,850.00	\$222.75	\$13,722.75
Support Wetland Reclamation Conference	\$10,000.00	\$0.00	\$10,000.00	\$0.00	\$0.00
Oil Sands Terrestrial Habitat and Risk Modeling for Disturbance and Reclamation	\$104,000.00	\$104,000.00	\$0.00	\$0.00	\$104,000.00
<b>Monitoring Ecosystem Impacts</b>					
Inventory & Characterize the Monitoring and Reporting of Oil Sands Environmental Health	\$54,750.00	\$31,784.39	\$22,965.61	\$1,122.19	\$32,906.58
Assessment and Design of a Challenge Dialogue titled "What Constitutes Monitoring Adequacy in the Oil Sands Region?"	\$17,272.50	\$15,787.77	\$1,484.73	\$260.50	\$16,048.27
Dialogue on Monitoring and Information Reporting Adequacy	\$67,925.00	\$0.00	\$67,925.00	\$0.00	\$0.00
Isotope and Geochemical Tracers For Finger Printing Process-Affected Waters In The Oil Sands Industry	\$317,000.00	\$317,000.00	\$0.00	\$0.00	\$317,000.00
Soil Nitrogen Indicators for Land Reclamation Policy Development for Forest Ecosystems in the Oil Sands Region of Alberta	\$10,000.00	\$10,000.00	\$0.00	\$0.00	\$10,000.00
Instruments for Research on Air Quality Control and Characterization	\$40,000.00	\$40,000.00	\$0.00	\$0.00	\$40,000.00
<b>Increasing Awareness</b>					
Web Portal Design	\$10,237.50	\$7,000.00	\$3,237.50	\$115.50	\$7,115.50
Develop Website Structure	\$35,700.00	\$0.00	\$35,700.00	\$0.00	\$0.00
Media Monitoring Project		\$1,813.97		\$29.93	\$1,843.90
Support to Innovation Asset Database Project	\$7,500.00	\$5,000.00	\$2,500.00	\$82.50	\$5,082.50
iGEM Oil Sands Awareness Project		\$66.64		\$5,693.47	\$5,760.11

<b>Project</b>	<b>Committed</b>	<b>Spent</b>	<b>Remaining</b>	<b>Other Expenses</b>	<b>Total Spent</b>
<b>Social, Economic and Regulatory</b>					
DCM Survey of Albertans' Value Drivers	\$60,000.00	\$0.00	\$60,000.00	\$0.00	\$0.00
<b>Strategic Design</b>					
Communications Strategy Support	\$25,000.00	\$5,200.00	\$19,800.00	\$3,598.95	\$8,798.95
Develop OSRIN Strategy	\$74,100.00	\$74,100.00	\$0.00	\$9,067.51	\$83,167.51
Communication Input And Guidance With Challenge Dialogue	\$7,000.00	\$7,000.00	\$0.00	\$0.00	\$7,000.00

NOTES:

Some project costs are higher than the project commitments because:

- The Environment grants do not allow GST charges; GST is paid separately.
- OSRIN decided to fund some project costs (e.g., travel, accommodation) for some projects through invoices in addition to the funds provided directly through the purchase order.