



**PUBLIC DISCLOSURE**

**FOR THE PROPOSED**

**SHELL CANADA LIMITED  
PEACE RIVER OIL SANDS**

**CARMON CREEK PROJECT**



May 23<sup>rd</sup>, 2006

Peace River Oil Sands – Proposed Carmon Creek Project

I am pleased to provide an update on the scope of the proposed Carmon Creek Project. This project will be an expansion of the Shell Peace River Complex, a facility that has been in operation for 25 years.

Though the Project is only conceptual at this time, this Disclosure Document describes the project as Shell currently envisions it. Shell is conducting an Environmental Impact Assessment (EIA) in accordance with the enclosed Terms of Reference (TOR) to support the Project's regulatory application.

Shell is committed to sustainable development and to conducting its operations in an environmentally and socially responsible manner. Part of this commitment means communicating our plans throughout the phases of development and operation, listening and responding to the public's interests, and working with our neighbouring communities to contribute to their well being.

Thank you for your interest in the proposed Carmon Creek Project. We look forward to working with you.

Sincerely,

A handwritten signature in black ink that reads "Ken Zaitsoff".

Ken Zaitsoff  
Consultation Coordinator  
Peace River Complex

## 1. CARMON CREEK PROJECT - INTRODUCTION

The proposed Carmon Creek Project will further develop Shell Canada Limited's existing oil sands leases located in portions of Townships 84 to 86, ranges 16 to 19, west of the 5<sup>th</sup> meridian in the Northern Sunrise County. The proposed project is approximately 40 km northeast from the Town of Peace River (Figure 1). The project will use Horizontal Cyclic Steam (HCS) well technology to produce the bitumen.

Shell currently has an in situ bitumen production facility, the Peace River Complex (PRC), located within Township 85, range 18, west of the 5<sup>th</sup> meridian (Figure 2). This facility is licensed to produce up to 12,000 barrels (bbls) per day of bitumen on a yearly average basis.



Figure 1 Site Location Map

Until recently Shell had been conducting engineering and environmental studies to progress planning and assessment of an expansion of the Peace River Complex that would have increased production to approximately 30,000 bbls per day of bitumen. Specifically, Shell had been conducting an Environmental Impact Assessment (EIA) in support of this project's regulatory application.

Shell has since decided to change the scope of those studies to support the planning and assessment of a larger potential development that could increase production to approximately 100,000 bbls per day of bitumen. This larger scale project will require additional wells and facilities across Shell's leases than previously envisioned for the 30,000 bbls/day project. The lands being considered for this larger development are shown in Figure 2. The EIA and regulatory application are on track for completion and filing in the fall of 2006.

Shell proposes to expand production in phases. The first phase of expansion will increase maximum bitumen production to about 50,000 bbls per day. Pending regulatory approval, Shell will make a decision on whether or not to proceed with construction of this first phase by the end of 2007, with start up in 2010. The decision on whether or not to proceed with subsequent phases of development will depend on the success of the first phase.

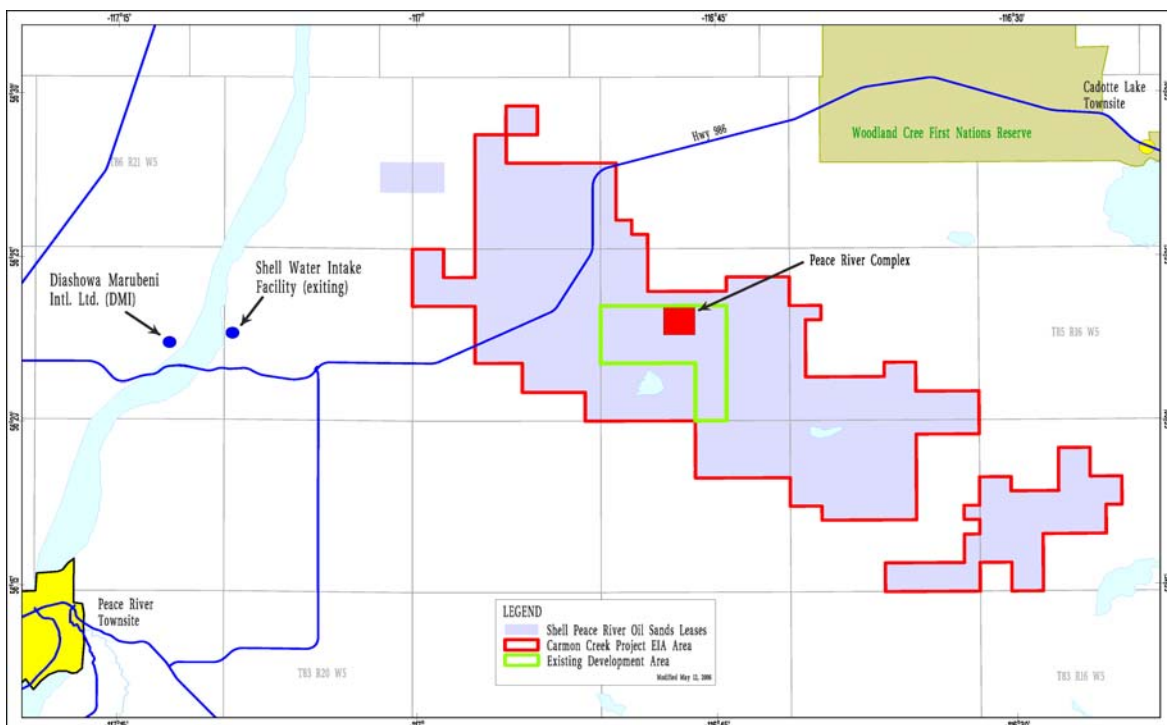


Figure 2 Location of Proposed Carmon Creek Project

## 2. TECHNOLOGY DESCRIPTION

Since the late 1990s Shell has been using Horizontal Cyclic Steam (HCS) well technology (Figure 3) to produce bitumen. Steam is injected downhole and after sufficient heating has occurred, the well is produced. Production rates from the well gradually decline as the reservoir cools. Steam is again injected into the reservoir and the cycle continues until the ultimate recovery is achieved.

Water for generating steam is obtained from the Peace River and is treated prior to being used. Produced water and bitumen recovered from the reservoir are separated at the facility. The produced water is disposed of through deep well injection, while the produced bitumen is combined with gas condensate to allow it to be shipped by pipeline. Natural gas recovered with bitumen is used, along with purchased natural gas, to fire the boilers that generate steam.

The Carmon Creek Project would continue to use HCS wells. Shell is also proposing to develop portions of the oil sands leases using cold production technology initially, followed by HCS technology. Cold production is a process of pumping some of the mobile bitumen from the reservoir using conventional recovery methods i.e. without using steam. The same well pads would be used for cold production and HCS production.

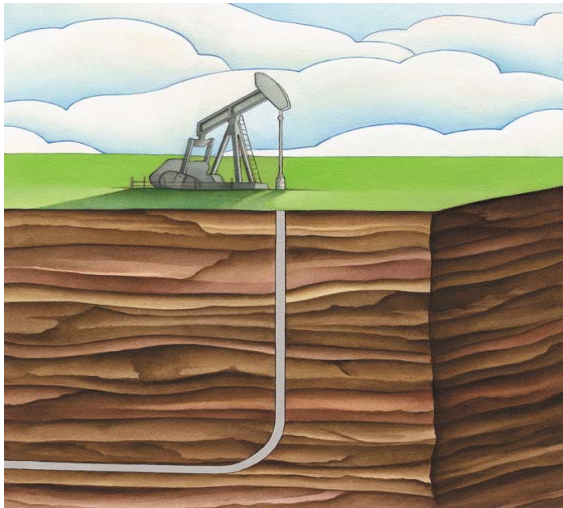


Figure 3 Schematic of Horizontal Cyclic Steam Well

## 3. PEACE RIVER COMPLEX OPERATIONS

### 3.1 HISTORY

Shell has a long history of operations in this area. Since the early 1950s when the oil sands leases were obtained, Shell has been investigating ways to more efficiently and economically develop this resource. In the early 1960s, Shell initiated its first steam soak pilot whereby steam was injected into the formation to decrease the viscosity of the bitumen. The Peace River In Situ Project (PRISP) was initiated in 1979 and utilized gas-fired boilers to generate steam that was

injected into the formation on a cyclical basis to enhance bitumen recovery. The existing steam generating and produced fluid processing facilities were constructed in 1985 as part of the Peace River Expansion Project (PREP).

Since the mid 1990s, further advancements have been made through the application of horizontal wells and higher injection pressures that improved production efficiency and economics of the Peace River Complex.

### 3.2 EXISTING OPERATION - ONGOING ACTIVITIES

In early 2004, Shell undertook a review of expansion options for the Peace River asset. Based on the findings of the review, Shell began engineering and environmental studies to progress planning and assessment to increase production beyond the 12,000 bbls per day annual average license limit.

While the engineering and environmental studies are being conducted for the expansion, Shell plans to continue with development activities in support of the existing operation. These activities include: geophysical data collection (seismic activities and delineation well drilling), infill well drilling, two new well pads (12 wells) of cold production, proposed cold production appraisal wells and modifications and upgrades to the existing plant. Shell is also completing the addition of two new well pads (Pad 32 and 33) to maintain current production at the 12,000 bbls per day license limit. These activities are outside the scope of the Carmon Creek Project. A map of the existing operation is shown in Figure 4.

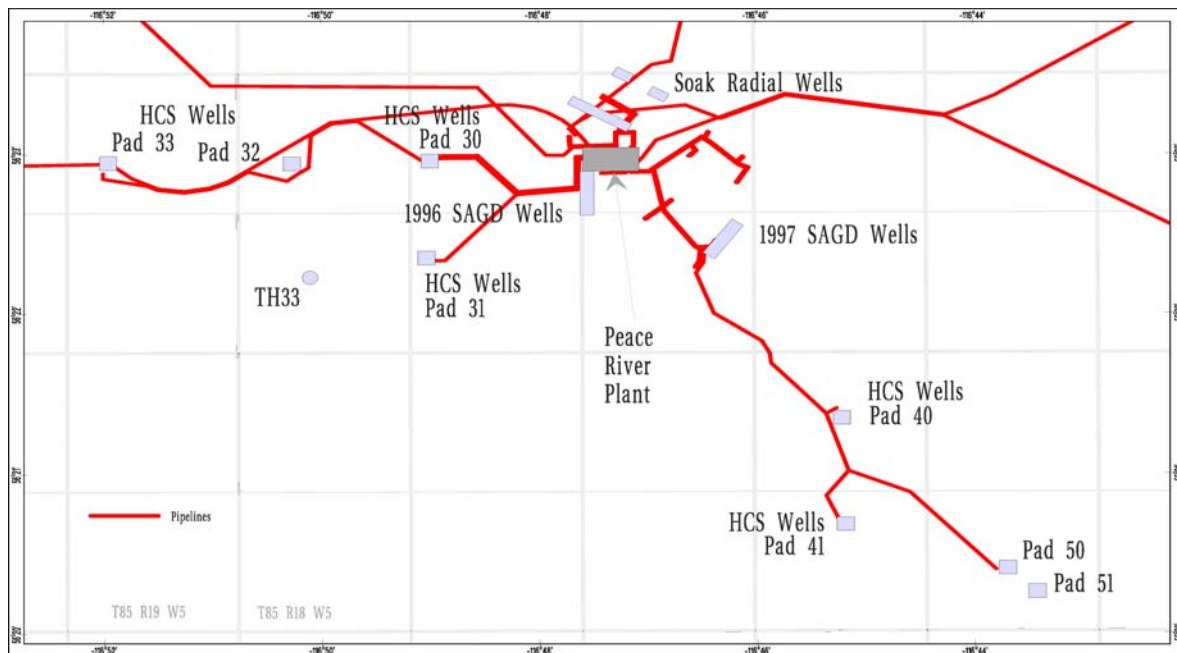


Figure 4 Existing Peace River Complex Operation

#### **4. CARMON CREEK PROJECT - OVERVIEW**

Shell is proposing to expand its existing in situ production facility located on its Peace River Oil Sands leases in phases that could eventually allow it to achieve bitumen production of approximately 100,000 bbls a day. This expansion is called the Carmon Creek Project. The first phase of expansion could increase maximum bitumen production to about 50,000 bbls per day. Dependent on the success of the first phase, additional growth phases could follow that could ultimately increase production up to 100,000 bbls per day.

Initial HCS well pad development associated with the first phase of development will be around the existing Peace River Complex and will include up to 15 new pads comprised of about 200 wells. Up to 20 closely spaced HCS wells may be drilled from a single well pad, which helps to reduce the overall project footprint on the landscape. Evaluations are under way to establish the pad locations for the potential cold production.

If additional growth phases proceed to increase bitumen production to 100,000 bbls a day, a total of approximately 80 well pads may be required over the approximately 35 to 40 year operating life of the project. The extent of well pad development will be constrained by the geology of the oil sands formation. Delineation seismic and drilling has been conducted to gather data to determine optimum subsurface locations for new well pads. The exact number, size, location and construction timing of initial and future well pads have yet to be finalized

In addition to having wells, the pads will have piping manifolds, well testing equipment and casing vent gas compression. The HCS pads themselves will be accessed by road and will be connected to the main processing facility by above-ground pipelines. Cold-produced bitumen may be transported by underground pipelines or trucked.

The first phase of construction will include:

- bitumen/water/gas separation;
- produced water treating for reuse;
- gas treatment to reduce sulphur dioxide emissions;
- steam generation boilers;
- utilities and offsites;
- cogeneration facility; and
- external infrastructure tie ins.

Like the well pads, the exact size and locations of new roads, distribution and gathering systems, infrastructure tie-in corridors, and new processing facilities has yet to be determined. A new condensate pipeline connection from an existing or extended rail spur to the processing facility may also be built. This would require an offloading facility to transfer the condensate from rail cars to the pipeline. These facilities would be the subject of a separate regulatory application and approval. Other activities associated with the Project include upgrades to an existing airstrip, tankage upgrades at Haig Lake terminal, and upgrades to electrical transmission lines. Final investment decision for the Carmon Creek Project is expected by the end of 2007 with

construction to start soon afterwards. Start up of the cold production could begin in 2008 and start up of the HCS production would begin in 2010.

Subsequent phases will require additional well pads, roads, distribution and gathering systems, processing and cogeneration facilities.

Water is required to generate the steam that the Peace River Complex uses in the HCS recovery process. To reduce the water requirements, the project will be reusing the produced water; however there will still be a need for additional water. Additional make up water sources could include brackish (non-potable) groundwater and water from the Peace River. The proposed Carmon Creek Project will increase the water requirements of the current Peace River Complex operations. The existing water supply facility from the Peace River may be resized to accommodate the increased water requirements.

## **5. ENVIRONMENTAL MATTERS**

### **5.1 SETTING**

The study area for the Environmental Impact Assessment is in the Peace River Lowland physiographic region. The area is low-lying, relatively flat, and poorly drained. Large tracts of land are covered by marsh or muskeg. The Peace River is the dominant regional drainage feature, located about 10 km west of the plant site. The general area of the development is drained by two creeks. Carmon Creek drains the area to the south and flows west-northwest to the Peace River. An un-named creek flows west of the plant site northward to join the Cadotte River. The Cadotte River flows northwest to join the Peace River. Carmon Lake and Carmon Creek are situated over two kilometres south of the existing plant and within the development area.

The climate is characterized by short cool summers and long cold winters. The mean temperature of the warmest month is less than 22°C and less than 4 months have mean temperatures exceeding 10°C. The region has a mean annual precipitation of 405 mm, 25% of which occurs as snow. Potential annual evapotranspiration is in the order of 400 mm.

Vegetation and wildlife are typical of northern boreal forest, with forests dominating the highlands and muskeg vegetation dominating the lowlands. The merchantable timber species in the area include spruce (approximately 2/3) and aspen (approximately 1/3), with various other species accounting for the balance of the forest and understory cover.

The Dunvegan Formation (the uppermost bedrock unit) and the overlying glacial channels have the potential for providing low-yield domestic groundwater supplies. The Dunvegan Formation is isolated from direct hydraulic connection with surface developments by the clay till, and may be locally absent. It is expected that all groundwater associated with older, deeper geologic formations will have a natural mineral content well in excess of drinking water standards.

Land use activities near the proposed development area include farming activities to the south and west; the Woodland Cree First Nation reserve to the northeast; logging (hardwood and softwood) by Gordon Buchanan Enterprises (Buchanan Lumber) and Daishowa-Marubeni



International (DMI); various natural gas and cold bitumen producers and numerous traplines around and crossing the lease area. The DMI mill is located approximately 20 km to the southwest and is the most significant industrial operation in the area (Figure 2).

## 5.2 EIA SCOPE

The EIA Final Terms of Reference (TOR) focuses on key issues to stakeholders and addresses the following subject areas accordingly:

- public involvement;
- cumulative environmental effects;
- biodiversity and fragmentation;
- climate, air quality and noise;
- water resources (hydrogeology, hydrology, surface water quality and aquatic ecology);
- terrestrial (land use, geology, terrain, soils and vegetation);
- wildlife;
- traditional ecological knowledge and land use;
- historical resources;
- public health and safety issues; and
- socio-economic assessment.

The EIA assesses many of the above subjects with regional study areas and data collected will be used to help determine the locations of future facilities. Local study areas can be assessed as needed, once facility locations have been determined.

The PRC has a long operating history and much of the environmental data collected in support of its operation is directly relevant to the EIA and the proposed development. As such, the PRC operating history provides a unique opportunity to use existing environmental information in the planning of future development. This will enable the EIA to be based primarily on measured impacts, with less reliance on predictive assessment, as is usually the case for emerging projects. The facility operations include regular monitoring and reporting of air, surface water, groundwater and soil quality.

In addition, much of the baseline information collected for past EIAs remains relevant to the proposed Carmon Creek Project. Shell has previously completed three EIAs for various Peace River Complex development plans. One was completed in 1982 and was submitted to Alberta Environment in support of an application to construct the PREP. The second was completed in 1987 for a proposed expansion that was being considered at that time. The expansion was not pursued and hence the EIA was retracted from the formal review and approval process. A third was completed in 2003 in advance of a potential expansion which did not proceed, and consequently was not submitted to the regulators. While the scope of EIAs has increased since the 1980s, the baseline information gathered for these EIAs remains valid. Information contained within these EIAs will prove valuable in understanding site-specific interactions and potential impacts. Baseline information in the development area will be updated through focused studies proposed for this EIA.

The following text summarizes the environmental information that has already been collected from PRCs operation history, and how it is proposed to be used.

## **AIR QUALITY**

Current sources of atmospheric emissions include the plant itself, casing gas, flaring, construction equipment and vehicles, and fugitive emissions. Information collected by the existing air monitoring network will be used to predict the extent and nature of air impacts. This monitoring data includes:

- manual stack surveys twice per year;
- sulphur dioxide emissions from the steam generator (boiler) stacks, test project flare stack and the central facility flare stack;
- weekly analysis of produced gas for hydrogen sulphide concentration, total hydrocarbons and heating value;
- hydrogen sulphide and sulphur dioxide measurements from 12 exposure stations;
- operation of an air monitoring trailer for 6 continuous months of the year to record wind speed and direction, and monitoring of hydrogen sulphide and sulphur dioxide.

This data will be used to support the air quality component of the EIA.

## **AQUATICS AND WATER QUALITY**

Steam is required to soak the oil-bearing formation, prior to bitumen production. Fresh water for generating steam is obtained from the Peace River, at an intake located approximately 10 km west of the PRC. Any water produced along with the bitumen is disposed of through deep well injection. Water quality monitoring at the facility has been implemented since 1984, and includes the following:

- surface runoff sampling for routine parameters prior to discharge;
- domestic waste water sampling for biochemical oxygen demand and total suspended solids prior to release;
- boiler feedwater sampling prior to deep well disposal for a large spectrum of parameters;
- disinfection, and daily sampling of potable water supply
- groundwater sampling conducted annually at the plant site, and annually at the Produced Solids Disposal Site (PSDS) which is now Pad 32;
- Drilling Waste Disposal Site (DWDS) sampling in 2004; and planned for 2008
- deep groundwater sampling since 2004.

The existing data provides the basis for assessment of potential impacts to surface water and groundwater quality as a result of the proposed development. Because the production facilities for the Project may be similar to the existing operation, this data is relevant to the EIA. The EIA will also provide the information required to evaluate the implications associated with water recycling for the first phase of the Project.

## **LAND DISTURBANCE**

### **Soil Quality**

Detailed soil monitoring programs are completed every 5 years in accordance with the requirements of AEPEA Approval 1642-01-00. These surveys concentrate on the areas of potential contamination, relative to published remediation criteria. The initial soil monitoring program was implemented in 2002 and this data will be available for inclusion in the EIA.

### **Reclamation**

Reclamation programs have already been completed for the Produced Solids Disposal Site (PSDS), and the original PREP well pads. Full assessments will be done on the PRISP area prior to construction. These programs include development of assessment and reclamation procedures in consultation with Alberta Sustainable Resource Development (ASRD). Through this work, the principles for reclamation have been established and refined and will be included in the reclamation component of the EIA. The experience gained from ongoing reclamation at the site will provide insight into mitigation measures as well as requirements to be included for future reclamation work.

### **Terrestrial Ecology**

The Shell leases provide habitat for numerous wildlife species; however the potential blockage of movements from above ground flowlines has been identified as a concern by regional ASRD staff. To minimize the potential for flow lines to block passage of ungulates, particularly moose, wildlife crossings have been installed to facilitate movement across the rights-of-way. As well, a trail has been created to divert animals from the road. Observations have been made since 2002 to determine if animals are effectively using the crossings and trail. The monitoring data collected will provide important feedback regarding the importance and effectiveness of this mitigating measure and will assist in the assessment and design of future flowlines.

## **6. REGULATORY REVIEW PROCESS**

As part of the approval process, an Environmental Impact Assessment (EIA) report is required under the *Environmental Protection and Enhancement Act* (AEPEA). Shell acknowledges federal participation in the EIA process until such time that a decision is made by Canadian Environmental Assessment Agency (CEAA) as to their level of involvement. The EIA report prepared will be reviewed as a cooperative assessment under the Canada-Alberta Agreement of Environmental Assessment Cooperation. Alberta will be the Lead Party for the cooperative assessment.

## **7. COMMUNITY INFORMATION**

Shell's existing Peace River Complex employs about 100 full-time employees, the majority of whom live in Peace River and Grimshaw. In 2005, the Peace River Complex had a regional Goods and Services expenditure of approximately \$10 million, and a payroll of approximately \$8 million.

Shell recognizes the socio-economic benefits that an expansion project of this type brings to the area, and to this end will work within the local community to leverage the amount of contracting and business work that is made available to local companies and labour.

The EIA process also provides opportunities for stakeholders to participate in the EIA study and provide input into the Project through the ongoing public consultation programs, interviews for the socio-economic impact assessment, and interviews for traditional and non-traditional land uses. The EIA report will be submitted as part of the regulatory filing and will be available for public review at that time.

## **8. COMPANY PROFILE**

Shell Canada Limited is a large integrated petroleum company in Canada with three major businesses. Exploration and Production explores for, produces and markets natural gas and natural gas liquids. Oil Sands is responsible for an integrated bitumen mining and upgrading operation in the Athabasca area of Alberta and Shell Canada's Peace River in situ bitumen business. Oil Products manufactures, distributes and markets refined petroleum products across Canada.

Shell is committed to sustainable development and to conducting its operations in an environmentally and socially responsible manner.

## **9. CONTACT**

For more information about the proposed Shell Canada Limited, Peace River Oil Sands, Carmon Creek Project please contact:

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