PanCanadian

WEYBURN CO_2 FLOOD
A PROJECT FOR THE
FUTURE

PanCanadian Petroleum Limited

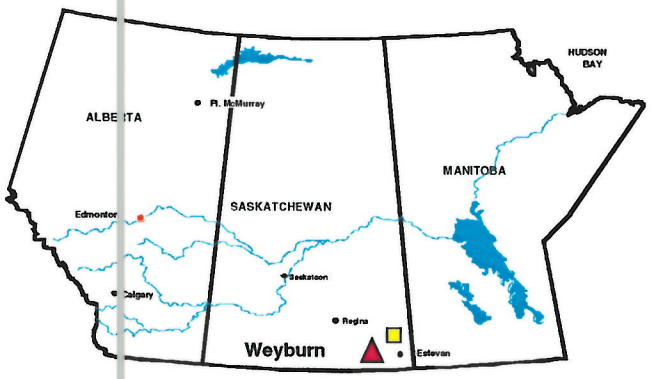
Landowner/Occupant & Resident
Information Package

July 1997

LANDOWNER / OCCUPANT & RESIDENT INFORMATION

The Weyburn CO_2 Miscible Flood Project — a $1.1-billion investment — represents the single largest commitment of capital in PanCanadian Petroleum's history. The enhanced oil recovery project will extend the life of the Weyburn oil field by more than 25 years and help stimulate long-term economic development and growth in Saskatchewan. At the peak of project activity, around the year 2010, an estimated 1,400 direct and indirect jobs will have been created.

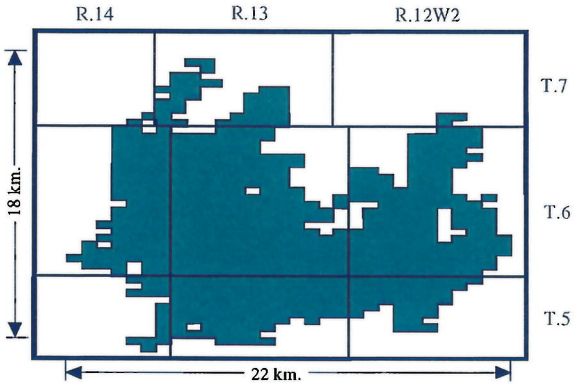
Weyburn Location Map



PanCanadian has been investigating the potential of enhanced oil recovery (EOR) techniques at the Weyburn oil field, or Weyburn Unit, for several years. During the past six years the company has been discussing the potential of using CO_2 flood at the oil field with the other working-interest owners of the Weyburn Unit.

The Weyburn Unit covers 21,044 hectares situated 16 kilometres southeast of Weyburn and 125 kilometres southeast of Regina. Discovered in December 1954, the Weyburn Unit was established in 1962 when 50 companies and individuals producing from the field pooled their interests into one unit. They initiated a waterflood project to increase the reservoir pressure and boost oil production.

Weyburn Unit (97-4-01)



Discovered: 1954
Area: 21,044 hectares
Current Oil Rate: 22,000 bopd
Number of Wells: 963 total
534 vert. oil wells
115 hz.oil wells
171 inj. system
146 susp./abn.

Sour Crude: 25-34 API
Low GOR: 2% H2S
Depth: 4,655 ft.
OOIP: 1,280 MMbbls
Cum. [illegible] MMbbls
Total Recovery to Date: 25%
Ultimate Waterflood Recovery: 3[illegible]%

Since the initial waterflood project began, the Weyburn Unit has maximized oil recovery through waterflood technology and innovative techniques such as horizontal drilling. Under this current system of recovery, however, production levels have been slowly declining. At the end of 1996, approximately 322 million barrels of oil

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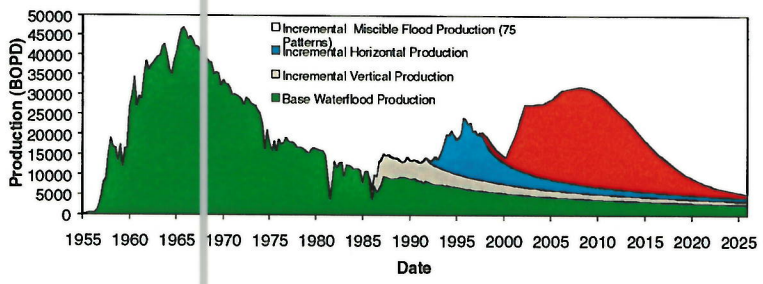
were produced from the Weyburn Unit, or approximately 25 per cent of the 1.28 billion barrels of oil originally in place. Over the 44-year life of the enhanced oil recovery project, the CO_2 miscible flood will extract at least another 122 million barrels of oil.

Weyburn Unit
Property Performance

Production History and Forecast



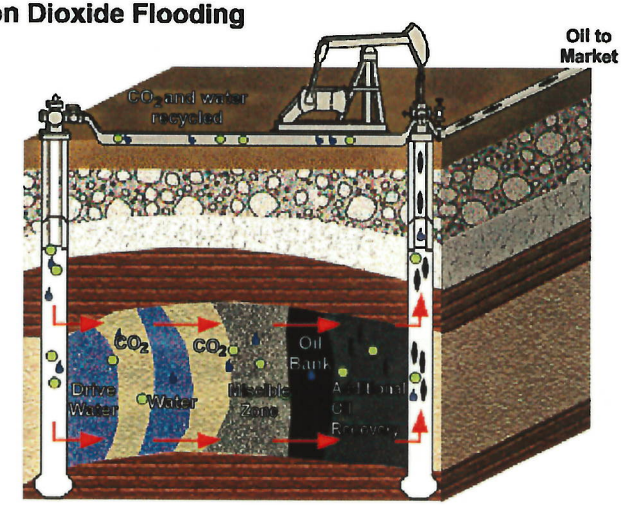
The Weyburn CO_2 Miscible Flood Project will generate additional benefits to the region and the province, including direct and indirect employment, business and procurement opportunities, an increased municipal tax base, oil sales revenues and provincial royalties. Currently in PanCanadian's Weyburn-area operations, about 65 per cent of the company's payment for contracting, materials and services are going to Weyburn-region suppliers.

What is CO_2 Miscible Flooding?

The use of carbon dioxide (CO_2) miscible flood techniques in enhanced oil recovery is not new. In fact, similar miscible floods are operating throughout the United States and this technique has been applied at Midale, Saskatchewan, located 45 kilometres to the southeast, and at Harmattan East and Joffre in Alberta.

The process was first tried in 1972 and since then has become a strong choice among petroleum producers to enhance oil recovery. CO_2 injection is an attractive process as it takes enhanced oil recovery methods, such as waterflood, one step further and can increase oil production greatly.

Carbon Dioxide Flooding



CO_2 does not normally mix with oil so in order to create miscibility (the mixing of two fluids) with the oil, the CO_2 must be injected at high pressures and make many contacts with the trapped oil. When CO_2 is injected into the reservoir, it mixes with the oil and the two compounds dissolve into one another. The CO_2 acts as a solvent to overcome forces that trap oil in tiny rock pores, helping to sweep the previously immobile oil that has been left behind after the effectiveness of waterflood injection has diminished. Carbon dioxide also increases the volume of the oil and lowers its viscosity, making it more mobile. This then allows the oil to be moved to the producing wells.

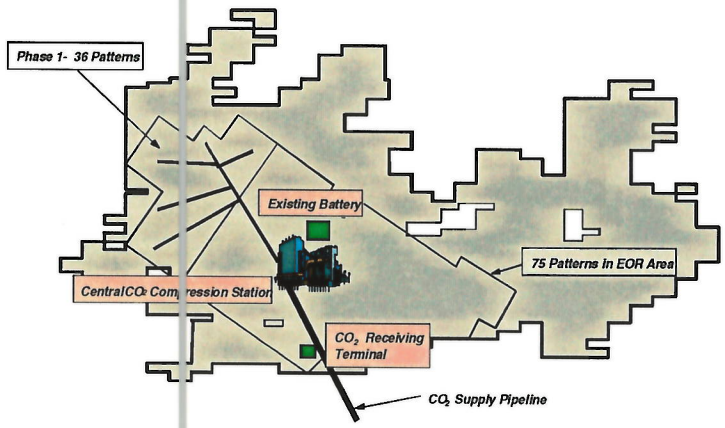
Ideal conditions for a CO_2 miscible flood include a reservoir depth of at least 762 metres to allow for the high pressures needed to ensure miscibility of oil and CO_2, and an oil gravity of at least 25 degrees API*. The Weyburn Unit — with average reservoir depths of 1,420 metres and oil gravity ranges from 25 degrees API to 34 degrees API (medium weight oil) — is an ideal candidate for miscible flooding.

** American Petroleum Institute crude oil gravity scale*

Description of the Weyburn CO_2 Flood Project

Construction of the Weyburn CO_2 Miscible Flood Project — currently at the preliminary design stage — will take five years with initial CO_2 injection in 17 patterns of nine wells each, which represents approximately 25 per cent of the total project area. This will expand to 36 patterns within two years and ultimately grow to 75 patterns with an estimated incremental oil recovery of at least 122 million barrels. The production phase of the project will last 44 years.

Weyburn Unit
Project Description



The project will consist of a central receiving terminal (CRT) to be located at the south end of the Weyburn Unit. The CRT will receive the CO_2 from the Great Plains Synfuels Plant in Beulah, North Dakota — the only commercial-scale coal gasification plant in the United States.

CO_2 Pipeline to Canada

The Synfuels plant currently produces about 200 million cubic feet of CO_2 per day as a by-product of its natural gas manufacturing process. The Weyburn miscible flood will use about half of this CO_2, which is presently being vented into the atmosphere.

In addition to the central receiving terminal, a 330-kilometre pipeline to ship about 95 million cubic feet of carbon dioxide a day from Beulah, N.D. will be constructed by Dakota Gasification Company, a subsidiary of Basin Electric Power Cooperative of Bismark, N.D. The portion of the pipeline located in Canada will be owned and operated by Souris Valley Pipeline Limited, a subsidiary of Dakota Gasification. The pipeline will run 270 kilometres in the U.S. and 60

kilometres in Canada and will cross the international border about 25 kilometres southwest of Estevan, Saskatchewan. As purchased CO_2 feeds into the CRT, it will be metered and fed into a network of pipelines, which will be built to carry the CO_2 to new injection satellites and, finally, to the CO_2 injection wells. Fluids produced from these wells will contain CO_2, oil, water and solution gas. New flowlines will be needed to bring this production to new production satellites where the solution gas and CO_2 will be separated from the oil and water.

A network of medium pressure gas gathering lines will also be built to transport solution gas and CO_2 mixture from the production satellites to a new recycle Central Compression Station (CCS). Here it will be compressed and dehydrated. The recycled CO_2 and remaining solution gas will then be blended with the purchased CO_2 and re-injected through the new CO_2 injection distribution network. The new CCS will be located immediately south of the existing Central Treating Plant (CTP).

The emulsion from the production satellites will be pumped through a network of medium pressure pipelines (new and existing) to the CTP where the water and oil will be separated and stored for sales in the existing system. The produced water will be re-injected through the existing injection plant facilities and distribution system.

Construction of the pipeline and new surface facilities at Weyburn will start in mid-1998 with CO_2 injection to begin in late 1999. Incremental oil production will start flowing in 2000.

Weyburn CO_2 Miscible Flood Project — Corporate Profile

The Weyburn CO_2 Miscible Flood Project is a joint effort between PanCanadian Petroleum Limited and a small number of working interest owners in the Weyburn Unit. PanCanadian is the operator of the unit and currently holds a 69 per cent interest.

PanCanadian Petroleum Limited is a major Canadian-owned energy company that explores for, develops, produces and markets crude oil, natural gas and natural gas liquids. Based in Calgary, Alberta, the company has more than 2.9 million hectares of undeveloped land situated mainly in southern Alberta.

PanCanadian is among the top three producers of oil and gas in Canada, with daily production of more than 130,000 barrels of conventional crude oil and more than 725 million cubic feet of natural gas. PanCanadian is continually expanding its business focus to include cogeneration and direct sales to natural gas customers throughout North America. The company's extensive exploration and production activities stretch from coast-to-coast in Canada and include a variety of international interests in the United Kingdom, Australia, South Africa and Venezuela.

Community

PanCanadian recognizes the need to integrate socio-economic considerations into the planning process in order to ensure the project is compatible with community and land use objectives.

PanCanadian is committed to the communities in which it operates. A key corporate goal is to be welcome in any community. This is achieved by gaining the trust of local citizens and building solid, long-term relationships that benefit both the company and nearby residents.

PanCanadian has conducted socio-economic studies throughout the CO_2 miscible flood area. The results of these studies, in conjunction with environmental studies and with public and regulatory input, will provide a basis for responsible pipeline/facility design and mitigation planning.

Information exchange and consultation with regulators, such as Saskatchewan Environmental Resource Management (SERM), and the public will be on-going throughout development of the project to ensure community issues continue to be effectively addressed.

Issues to be addressed include, but are not necessarily limited to, the following:

- *Employment opportunities*
- *Business opportunities*
- *Infrastructure*
- *Environment and public safety*
- *Agriculture and ranching*

Land and Landowners

PanCanadian is committed to:

- *Undertake all negotiations with landowners, whether for easements, land rights, restoration of lands or compensation for damages, in a manner that is* ***fair, equitable, courteous and respectful.***
- *Work cooperatively and proactively with*

stakeholders to ensure the pipeline facilities are safely and effectively integrated with land use development plans.

- *Undertake reclamation of the right-of-way in consultation with the affected landowner.*
- *Restore the land as close to its original condition as possible and compensate for possible damages in a timely manner.*

PanCanadian is currently undertaking consultation with potentially-affected landowners, to notify them of the project and to solicit their input to project development (surveying and routing). This early identification of issues will enable PanCanadian to construct a better pipeline for everyone.

Environment and Safety

PanCanadian is committed to protecting the environment and safeguarding the public and its employees throughout all phases of the Weyburn CO_2 Miscible Flood Project's operations.

During and after construction, a variety of monitoring programs will be conducted to verify that environmental protection measures are effective and being implemented properly. Issues to be addressed include things such as :

- *soil conservation and land reclamation*
- *wildlife and habitat management*
- *protection of endangered species*
- *erosion and sedimentation control*
- *preservation of water quality and fisheries*
- *preservation of heritage sites*

The selected routing of the pipelines and facilities will be determined by environmental studies, land use and residential set-back distances, and through landowner discussions. Ensuring the safety and well-being of both the public and employees is an important part of PanCanadian's work. All facets of the project will be designed and carried out in accordance with the health, safety and environmental standards required to meet and exceed all regulations and expected operating conditions.

Early in the history of miscible flood projects, concerns were expressed about the combination of carbon dioxide (CO_2) and sour gas (H_2S). At one time, it was believed the combination could accelerate the corrosion of pipes and other downhole equipment which

could lead to pipeline leaks and ruptures. Early projects used stainless steel pipes to avoid this potential problem. Since that time, operators have found no evidence of accelerated corrosion when CO_2 and H_2S are combined and concerns over corrosion causing line breaks have diminished considerably. Through properly placed block valves and monitoring procedures, safety concerns for both the public and employees will be addressed.

The CO_2 pipeline used in the Weyburn Miscible Flood Project will be similar to the thousands of natural gas pipelines crossing the continent. Its construction and operation must be approved by the National Energy Board (NEB) in Canada and the Federal Energy Regulatory Commission (FERC) in the U.S. The NEB and FERC will regulate the pipeline in their jurisdictions. The project will meet all environmental, safety and occupational health regulations of the Department of Energy and Mines and of the Department of Environment and Resource Management in Saskatchewan.

Emergency Response Planning For a Safe Community

- ***A Commitment to Safety***
- ***A Commitment to Working Together***
- ***A Commitment to the Future of Saskatchewan***

Information for Area Residents

At PanCanadian, protection of the public and employees by creating emergency response plans is, and continues to be, a number one priority. The possibility of a pipeline or plant emergency is remote because of stringent design/construction standards and vigilant monitoring and safety precautions. Nevertheless, PanCanadian will be working with Souris Valley Pipelines Ltd., local emergency responders (such as the fire department), and local emergency preparedness organizations to develop an expanded Weyburn Unit Emergency Response Plan, incorporating broadened emergency planning zones around the facility and the pipelines.

At PanCanadian we believe that people can, and should, be just as familiar with pipeline and facility emergency information as they are with such commonplace precautions as home fire and aircraft safety. You need to know exactly what to do in the unlikely event of an emergency. Even though most people have not experienced an event like a pipeline rupture, it is important to react quickly and calmly. Remember, any gas release would be of limited duration and set-back guidelines have been adhered to for your safety. Prevention is a key to pipeline safety. More often than not, leaks are caused by someone accidentally damaging the pipeline while digging in the area. That's why it's important to always call to have the pipeline "flagged" if you are planning to dig nearby.

Carbon Dioxide

- Carbon dioxide (CO_2) is a natural occurring product and is an inert, non-flammable gas. When humans and animals breathe we exhale CO_2. This "waste material" from our breathing is necessary for plant "respiration" called photosynthesis. However, CO_2 vapors are heavier than air and spread along the ground which could cause dizziness or asphyxiation. Contact with the escaping gas may cause burns, injury or frostbite.

Hydrogen Sulphide

- Hydrogen sulphide (H_2S or sour gas) is a natural component of the gas processed at the Weyburn Unit and is also a component (less than one per cent) of the gas transported within the Souris Valley Pipeline. Hydrogen sulphide can be found wherever organic matter is decaying, such as sewers, silage facilities, swamps and barnyards. It is frequently present in hot springs and in oil and gas fields in western Canada.
- H_2S is a toxic gas that is colorless, flammable and heavier than air.
- H_2S smells like rotten eggs in low concentrations. However, H_2S rapidly impairs the sense of smell, therefore, its presence may not be detected.
- The impact of H_2S on people depends on the concentration, exposure time and state of the sense of smell.

Sulphur Dioxide

- Sulphur dioxide (SO_2) is a by-product resulting from the burning of H_2S. SO_2 is a toxic gas. However, combustion heat carries the SO_2 high into the atmosphere allowing it to disperse to low concentrations before reaching ground level.

In The Event of a Pipeline Leak or Rupture

PanCanadian Response

- PanCanadian personnel will be dispatched to investigate any situation such as a gas odor complaint. PanCanadian and Souris Pipeline will activate their emergency response plans to respond to any situation that could endanger the health and safety of the public.
- For residents living in the emergency planning zone, company representatives will notify residents by telephone or by personal visit.
- Residents will be instructed to stay sheltered indoors until the gas dissipates and the area is safe. Residents may be given other safety instructions, such as evacuation, based on the nature and duration of the incident.

Residents' Actions

- Stay indoors unless you are otherwise instructed. Take measures to preserve the fresh air in your home:
- Close (and keep closed) all doors, windows and, if applicable, the glass doors on your fireplace.
- Do not operate your clothes dryer, kitchen/bathroom vent fans, range vent, vacuflo or air conditioner.
- Go to an inside room, preferably away from any windows or doors.
- Stay tuned to local radio stations for public information.
- Follow the instructions of emergency service personnel.

Important Numbers

PanCanadian Weyburn Office (24 hours): **(306) 848-4100**
PanCanadian Calgary Emergency (24 hours): **(403) 290-3333**

Reclamation

PanCanadian is committed to restoring the land as close to its original condition as possible. Key points of PanCanadian's approach to successful reclamation of the right-of-way are:

- *Return disturbed land to a capability equivalent to the pre-disturbance capability.*
- *Determine appropriate restoration techniques in consultation with stakeholders.*
- *Store topsoil separately from other salvaged soil.*
- *Minimize adverse effects of soil and drainage disturbance by grading, erosion control and compaction correction.*
- *Rebuild fences, pick rocks, and reseed pasture and hay lands.*
- *For revegetation, use species appropriate for the end land use. Control noxious weeds.*
- *Inspect environmental conditions on the right-of-way during and after construction.*
- *Meet or exceed the conservation and reclamation requirements of the Province of Saskatchewan.*

Heritage Preservation

Conservation and preservation of historic, precontact and palaeontological sites motivated the Government of Saskatchewan to pass the Heritage Property Act, under which land-altering developments may require the developer to conduct a heritage resources impact assessment.

PanCanadian has a long history of proactive Heritage Resource Management throughout western Canada, specifically in the Weyburn Oil Unit.

PanCanadian screens all proposed developments for heritage resource conflicts and conducts routine heritage resource impact assessments on a nearly annual basis.

An example of PanCanadian's commitment to heritage resource preservation is the work the company has undertaken to protect and enhance the Halbrite Medicine Wheel, a highly significant precontact site of great spiritual value to First Nations' people. The medicine wheel lies within the Weyburn Unit.

PanCanadian's contributions to the preservation of the Halbrite Medicine Wheel include reclamation to restore the cultural landscape of the site, installation of protective fencing and detailed mapping of the site.