



**PETROLEUM
HISTORY
SOCIETY**

ARCHIVES

Newsletter of the Petroleum History Society

October 2012; Volume XXIII, Number 6

P.H.S. Lunch and Learn Meeting – Wednesday, October 31, 2012

The Visionaries – Five Oil Sands Pioneers

by Peter McKenzie-Brown, Petroleum Journalist and Historian

In this presentation Peter will discuss his research into oil sands history in which he focused on five visionaries who did more than any others to create the oil sands industry as it exists today. Those visionaries were chemist and researcher Karl Clark; Alberta Premier Ernest Manning; U.S. industrialist J. Howard Pew; corporate executive Frank Spragins; and Alberta Premier Peter Lougheed. Peter will offer a broad-brush view on how each contributed to this vital industry.

Peter McKenzie-Brown has extensive experience in researching and writing about the history of the Canadian petroleum industry, its business practices and its technologies. He has written more than 1000 periodical articles, speeches, brochures, annual reports and other published documents including numerous feature articles for Oilweek and Oilsands Review. He is also the author or co-author of four books on Canadian business history including two on the petroleum sector. He also recently published a volume on language learning. Peter is founding member of the Petroleum History Society and a winner of several of its awards. The library collection of the P.H.S. is named in his honour. Most recently Peter was one of the proponents of the P.H.S.'s highly successful Oil Sands Oral History Project and is one of its most active interviewers.

A variety of Oil Patch classic publications authored by P.H.S. members will be on display with complimentary copies available to attendees.

TIME: 12 noon, Wednesday, October 31, 2012.
PLACE: Calgary Petroleum Club, 319 – 5th Avenue S.W. – Viking Room
COST: Members \$30.00 and Guests \$35.00 (most welcome) (cash or cheque only)

**R.S.V.P. if you wish to attend to: Micky Gulless, 403-283-9268 or
micky@fuzzylogic.ca by noon, Monday, October 29, 2012, if not sooner.**

**Individuals who indicate that they will be attending
- but do not materialize - will be considered**

“no shows” and will be invoiced for the cost of the luncheon.

Individuals who do not R.S.V.P. by the deadline cannot be assured of seating.

THE PETROLEUM HISTORY SOCIETY THE BULL WHEEL



Next Luncheons: Our luncheon slate is still shaping up for this Winter and next Spring. We are always seeking speakers and interesting subjects. If you are considering making a presentation, please contact Clint Tippet, President P.H.S., at 403-691-4274.

Turner Valley Gas Plant Update: On May 3 of this year, well-known petroleum historian David Finch communicated with your editor concerning the status of plans for the historic Turner Valley facility in light of the upcoming 100th anniversary of the Turner Valley discovery in 2014. David would encourage all support and participation. David's report was:

"As to the TVGP, in two years we are having some sort of party, for sure! I have now upped my activity as a catalyst between industry and government and have appointments with community investment people at both [Company X] and [Company Y] over the next few days.

My standard pitch to any company, association, society or individual that wants to become a partner at the TVGP is that the government is now working on the development plan. The old office building is being developed first. With any luck the visitor reception building will be ready for May of 2014. We also hope to have the ramp ready for use at the grand opening too. It is a wheelchair accessible feature that goes from the museum building up and through the sulphur plant and to a viewing platform. From that overlook you can see the whole site. Tours are unofficially available now, on a demand basis, and Ian Clarke is the contact person for that program.

The Alberta government is responsible for the sites development and maintenance and operation. The role for industry - in my opinion - is to help install the displays and exhibits and signs to tell the many stories. [We have developed several] themes we intend to interpret at the site. I have helped prepare [a matrix depicting this], though it needs much more work. When I talk to [Company X], for example, I will be highlighting the natural gas story. Ian is talking to [Company Z] and for them the story will be oil. I will encourage [Company Y] to tell the story of transportation. If I recall correctly, you were thinking that [Company A] might want to help with the sulphur interpretation. And [a local technical society] can help with the geology story.....

With time being short, we are hoping to get help to research, fabricate and install interpretive panels along the ramp. The view at the south end, for example, is to the river, where the exposed bank can help us tell the geological story. Does this all make sense to you? Input, suggestions, cautions and ideas are most welcomed.

A selection of historical tidbits:

- The July-August 2012 issue of *Up here Magazine* featured an article about local bookstore owner Cameron Treleaven who's Aquila Books on 16th Avenue NW is a "must visit" location for book collectors. Cameron's shop includes a good selection of petroleum-related volumes, as can be attested to by the often-empty wallet of your editor. The article is focused primarily on Cameron's quest for historical documents and artifacts that are related to the legendary Western Canadian lawman Sam Steele but also describes many other aspects of his collecting adventures. Well worth dropping into the store.
- The pdf of Don Yont's June 13 presentation to the P.H.S. on "Donating H.M.S. Investigator Artifacts from Banks Island to Museum Creates Rewarding Experiences" can now be accessed on the P.H.S. website through this link:
http://www.petroleumhistory.ca/history/speeches/DonYont_HMSInvestigator2012Jun13.pdf
- A museum featuring the theme "All Hell for a Basement" can be visited in Medicine Hat in the Esplanade Arts and Heritage Centre at 401 – First Street SE. See www.esplanade.ca for details. That tag originated with Rudyard Kipling who visited Medicine Hat in 1907 and was impressed with the flaring of natural gas in the region.
- The latest issue of *Alberta History* finally has something in it related to the oil and gas industry, even if it is just a note on the back cover. Under "Events in Alberta History", the story is bylined "Natural Gas Discovered" and is an excerpt from the December 12, 1883 issue of the Calgary Herald to the effect that "*At Langevin, 4th siding west of Medicine Hat, a rather singular phenomenon has presented itself. The well-borers have reached a depth of 1,120 feet without finding water, but a gas rushes out of the tube, which, on taking fire, emits a flame sufficient to light up the surrounding country. They still propose going deeper for the water, but have given up working at night, not considering it safe.*" If you are interested in this tale, please visit our website where there is an excellent write-up on this subject by P.H.S. Past-President Micky Gulless.
- A great geological story is told in the book "*Curiosity*" by Joan Thomas, as published by Emblem/McLelland and Stewart. It tells the story of Mary Anning who discovers fossil remains in the oceanside cliffs near Lyme Regis in Dorset, England approximately 40 years before the publication of the *Origin of Species*. It is historical fiction but is based on the true story of Mary Anning who was a pioneer amateur paleontologist (but they were really all amateurs then) who struggled, unfortunately unsuccessfully, against class and gender discrimination in an attempt to be taken seriously. For any of you who have visited Lyme Regis, you will recall the museum dedicated to Mary and including many of her collections and tools, including her rock hammer.

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Back issues are archived on our website at www.petroleumhistory.ca

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Tallying the oil reserves: How Canada made it to number three in the world

By Peter McKenzie-Brown, Director, P.H.S.

This article was published in the April 2012 issue of Oilsands Review who are thanked for their permission to reprint it here for our readers.

The issue of how much recoverable oil is in the ground in Canada has been a matter of political and commercial interest since the first surveys undertaken by the Geological Survey of Canada in the 1870s.

American eyes were opened to the true potential in April 2003 at a hearing of the U.S. Senate's foreign relations committee. Convened to examine international energy security, the committee learned that Canada was an energy superpower.

Alberta's energy regulator had changed its method of calculating oilsands reserves, with the result that booked reserves in Canada suddenly rose from 5 billion to 180 billion barrels. Canada suddenly stood in second place worldwide after Saudi Arabia. The Canadian Association of Petroleum Producers (CAPP) has since moved Canada into third place by accepting a calculation of Venezuela's vast extra-heavy crude oil reserves which puts that country at the head of the pack.

No one knows what happened to the eyes of Canadian senators when they heard the first credible estimate of how much oil was in place in the Athabasca area, at a hearing that took place in 1888. The senators were provided with an estimate from R.G. McConnell of the Geological and Natural Survey of Canada.

McConnell's calculation came from assumptions based on field and lab work: first, there were at least 1,000 square miles of bitumen-saturated sand in the area; second, the sands were 150 to 225 feet thick; third, and this result came from laboratory tests that involved boiling oil sand samples, that the bitumen content averaged 12 per cent by weight. Therefore there were about 30 million "long tons" of bitumen in place - roughly speaking, 220 million barrels. McConnell's estimate was short by orders of magnitude; to put it in perspective, Canada now consumes about 200 million barrels every three months.

McConnell's number was an estimate of resources in place, of course, and not a reserves estimate. At that time the very concept of reserves – hydrocarbons that are economically producible at current prices using current technology – was unknown. No one had any idea how to calculate what percentage of oil in the ground would ever see the inside of a pipeline.

Be-devilled Engineers

Petroleum engineering gradually emerged as a profession, and engineers soon figured out how to book reserves from conventional oil and gas reservoirs. However, how to calculate oilsands reserves was an issue that be-devilled engineers and geologists for many decades. This led to some curious anomalies.

For example, when the \$235 million, 45,000 barrel per day Great Canadian Oil Sands (now Suncor Energy Inc.) plant went on stream in 1967, it represented a substantial investment for the company and soon became a significant contributor to Canadian oil supply. The Canadian Petroleum Association (CPA - now CAPP) booked 6.3 billion barrels of oilsands reserves in its authoritative *Statistical Handbook* when the project went on stream, but reduced that number to about 1.5 billion in 1975. And when the 140,000 barrel per day, \$2.3 billion Syncrude plant went on stream in 1978, the situation became even more absurd: the Association didn't add any new reserves. It was as though the oil was appearing out of nowhere. By the early 1980s a growing number of in situ projects, including Imperial's Cold Lake activities, made the situation untenable.

According to Hans Maciej, retired vice president of the CPA, in the early 1980s he asked the group's reserves committee, "'Where the hell is [the oil] coming from?' That was quite the discussion," he recalls.

The committee eventually agreed that they had a problem, but there further endless questions about how to resolve it. "One thing was very easy," says Maciej. "We could put whatever Great Canadian Oil Sands produced, let's say it produced a million barrels that year and just add it to reserves – you know, wipe it out. Well that didn't go very far. [However], after lengthy discussions we decided that we would credit every producing project, and every project that had approval and was sort of certain to go ahead. There was some judgment involved, but we said we would [book their reserves at] 25 times their annual production." Maciej adds, "This was a very conservative estimate, [but] just to get things going we finally agreed on 25 years."

CAPP's reserves committee relies heavily on data provided by its member companies, and the association laboured mightily to stay on top of the country's burgeoning oil sands reserves, which with special speed during the last 15 years as Syncrude and Suncor expanded, new mines came on stream and in situ projects multiplied.

However, according to CAPP's research manager, Steve Rodrigues, it became increasingly difficult to get the necessary data from oilsands producers in the last decade – "not because of concerns about revealing competitive information, but because companies increasingly felt that they were not adding value by generating this information."

One result was that CAPP's calculation of oilsands reserves – historically, the Canadian standard – now compared to those being calculated by provincial and federal regulators. The numbers presented to the U.S. Senate's foreign affairs committee were, after all, government numbers, and they were 24 times greater than CAPP's.

Throwing in the towel

Where did the regulators get their numbers?

In a recent presentation, Neil McCrank, who served as chair of the Alberta Energy and Utilities Board until 2007, offered the background. The "new focus on in situ development created a need for the regulators to find new ways of assessing and monitoring these projects ... one of the major contributions made by the [regulator] was to recognize the need to re-categorize the in situ

bitumen 'resource' to a 'reserve' where it was proven on the 'core and cuttings' analysis to be commercially viable with current technology."

Bob Taylor, who was then Alberta's assistant deputy minister for oil development, stresses that the Department of Energy does not play a role in these discussions. However, he says, the information used to recalculate reserves would have been rigorous and the models used would have been mathematically challenging.

"Every leaseholder is obligated to go out and prove up a resource on the basis of one well per section, or the equivalent of one well per section plus some seismic, so it might be one well every couple of sections with seismic lines connecting them so that you can get the stratigraphy. So what [the regulator] did was to have geologists look at each company's assets," while examining proven technologies and likely future demand. Using all this information, they created models that could generate highly credible reserves calculations.

Such was the origin of the proved reserves that caused so much excitement in Washington in 2003. According to the McCrank, the announcement of more than 173 billion barrels of oilsands reserves "was initially criticized, but after a stout defence of its scientific approach... the international oil and gas community accepted these reserves calculations."

So did CAPP. In 2010 the organization threw in the towel as far as using its own method of calculation was concerned. An organization that has celebrated its independence from government since its earliest predecessor was formed in 1927 began using numbers from both Alberta and federal regulators as the basis for calculating oil sands reserves.

The in situ oilsands reserves of the association suddenly jumped by around 2,000 per cent, while its mineable reserves more than tripled. Canada's industry had caught up with its regulators, and the results were parabolic.

Of course, reserves estimates will never be unanimous. The most widely accepted global authority on energy numbers, BP's *Statistical Review of World Energy*, most recently puts Canadian oil reserves at 33 billion barrels, or tenth place. Venezuela at 175 billion stood in second place, while Saudi Arabia is the top dog at 264 billion.

We've come a long way since 1888, but we still have a way to go.

This article is part of a series which reflects information from the Petroleum History Society's current Oil Sands Oral History Project, which is recording the stories of oilsands pioneers in their own words. As with its previous oral history projects, transcripts and recordings will reside in Calgary's Glenbow Archives. Peter McKenzie-Brown is part of the team of researchers/writers behind the project.

Project Oilsand: Alberta's brush with the H-bomb

By Brian Brennan. OSOHP interviewer and historian

This article was published in the June 2012 issue of Oilsands Review who are thanked for their permission to reprint it here for our readers.

The headline on the *Toronto Star* story was tantalizing: "Will H-bomb Solve Riddle of Tar Sands?" It was a serious question, posed in December 1958. The writer of the article, the *Star's* George Noordhof, wondered if Canada's first hydrogen bomb explosion would "free the oil from the Athabasca tar sands of Alberta?"

The idea had surfaced publicly four months earlier when Richfield Oil Corporation of Los Angeles disclosed in a telegram to Canadian Press that it was investigating the possibility of using nuclear energy to facilitate recovery of oil.

The architect of the idea was Manley L. Natland, a senior geologist with Richfield. He had been travelling in the southern desert of Saudi Arabia and stopped one evening to watch the sunset. "It looked like a huge orange-red fireball sinking gradually into the earth," Natland wrote in his diary. The display of the sun's explosion of heat and light caused him to think about an oilsands lease that Richfield held in partnership with Imperial Oil Limited in Canada's Athabasca oilsands region, 85 kilometres southeast of Fort McMurray. "It has long been recognized that the most promising way to free the oil from the sand would be to heat it."

The timing was opportune. Earlier in 1958 the U.S. Atomic Energy Commission had established Project Plowshare, a program to develop peaceful uses for nuclear energy.

Among the proposed options was the exploitation of oil and gas deposits. Natland concluded from the Plowshare research that a small hydrogen-bomb explosion might be the most effective, and perhaps most inexpensive way of generating the intense heat needed to release the oil from the Athabasca sands. "The major production problem is the natural viscosity of the oil, which is hundreds of times greater than that of most other oils," he wrote in *Project Cauldron* (later changed to *Project Oilsand*), a proposal he sent to the Research Council of Alberta. "The tremendous heat and shock energy released by an underground nuclear explosion would be distributed so as to raise the temperature of a large quantity of oil and reduce its viscosity sufficiently to permit its recovery by conventional oilfield methods."

Natland suggested that Richfield explode underground a nine-kiloton atomic warhead (a "baby nuclear bomb," as Alberta's then premier, Ernest Manning, called it) to test his hypothesis.

His theory was that the heat from the explosion would melt the sands and release liquid hydrocarbons with little risk to the atmosphere above. The molten sands would solidify into a huge glass bubble, trapping most of the radiation inside. The liquefied oil would then flow into the cavity caused by the explosion, and the oil companies would pump it out just like they did with conventional well drilling. If the experiment was successful, Natland added, the industry would have a proven scientific way to "create an oilfield on demand."

Alberta oil industry officials and politicians embraced the nuclear proposal with enthusiasm. A former lawyer for Imperial Oil, Gerry Burden, recalls that one of his Calgary colleagues, a researcher named Jim Young, had been talking for some years about using nuclear power in the same way. Premier Manning, whose Social Credit administration had been actively seeking bids from oil companies to build the first commercial separation plant in the Athabasca region, said the proposal "makes an awful lot of sense."

The *Star* writer, Noordhof, was not so sure. A former science producer with BBC Television in London, he concluded after talking to officials with Canada's National Research Council (NRC) that nuclear extraction would be neither cheap nor risk-free. The only practical way to control a nuclear explosion was through a reactor, said one NRC official: "Building a reactor is ridiculously expensive for this sort of job, and any oil company would be far better off drilling elsewhere." And while Richfield's Natland had concluded that the radioactivity would be contained if the bomb was detonated in a capsule surrounded by a neutron-absorbing substance such as boric acid, there was no guarantee that the oil would remain uncontaminated. If the oil became radioactive, said the NRC official, "safe disposal would present a formidable problem."

The potential hazards and expense seemed of no concern to Canada's federal politicians, who championed the Project Oilsand proposal. Nor were they worried about possible environment consequences. Their only concern was that the bomb for the oilsands experiment would be built by the Americans, specifically the U.S. Atomic Energy Commission. "Canada should begin developing its own atomic bombs for peaceful purposes," a Conservative government MP, Joseph Murphy, told the House of Commons in April 1959. "Here [in the Athabasca region] we have a huge enterprise, far surpassing anyone's imagination, with a potential which will be the greatest asset the free world has ever known. Yet we in this country are going to rely entirely on U.S. research methods and application."

The prospect of a thriving nuclear industry springing from the Athabasca experiment caught fire when an official with the Department of Mines and Technical Surveys, John Convey, told a startled Commons committee that it could take as many as 11 million bombs to separate all the oil from the sands in the 17,000 square-mile area. "That seems like an awful lot of explosions but, of course, it is not going to be done overnight." If Canadian agencies could produce the materials, Convey added, the net result would be a \$10 billion industry and a guaranteed 700-year supply of oil for the country.

The appeal of the nuclear experiment for Richfield Oil and its associates in the project – Imperial Oil and Cities Service Company – was that it did not require the companies to remove layers of overburden and muskeg from the deposit before extraction, as they would have to do if they chose to mine the oil rather than use this untried in situ nuclear technique. And perhaps more significantly, as Paul Chastko has observed in his book, *Developing Alberta's Oil Sands*, the developers would no longer be limited to extracting the two percent of the Athabasca deposit accessible by conventional mining methods. "The potential productive capacity of the oilsands would leap from 700 million barrels to 800 *billion* barrels."

Richfield and associates hoped to detonate the first bomb in early 1961. It would cost \$1 million to build and – at an estimated size of nine kilotons – would be just three kilotons smaller than the atomic bomb that destroyed Hiroshima during the Second World War. The partners later announced at a congressional hearing in Washington that not one but three atomic blasts might be needed to test the economic feasibility of recovering oil from the sands.

However, with international disarmament talks under way in Geneva, then-Prime Minister John Diefenbaker decided that nuclear tests even for peaceful purposes would be politically unwise. He told the House of Commons in March 1960 that the decision on whether or not to allow a nuclear explosion in the Athabasca area would be made by the Canadian government, not by the U.S. Atomic Energy Commission.

Things came to a head in April 1960 when the U.S. Commission announced a 1961 date for the oilsands explosion without checking with Ottawa first. "The Canadian government today is seething with anger," said the story in the *Toronto Star*. Diefenbaker quickly nipped the project in the bud, stepping in and unilaterally cancelling the experiment. "There will be no nuclear tests as long as there is risk of upsetting East-West negotiations on disarmament," he said.

Scientists with Canada's Department of Mines and Technical Surveys announced in May 1960 that – notwithstanding Diefenbaker's decision – they planned to continue their studies on the feasibility of a nuclear explosion. "As soon as the political scene clears up we will come forth with our technical data," said a spokesman for the feasibility committee.

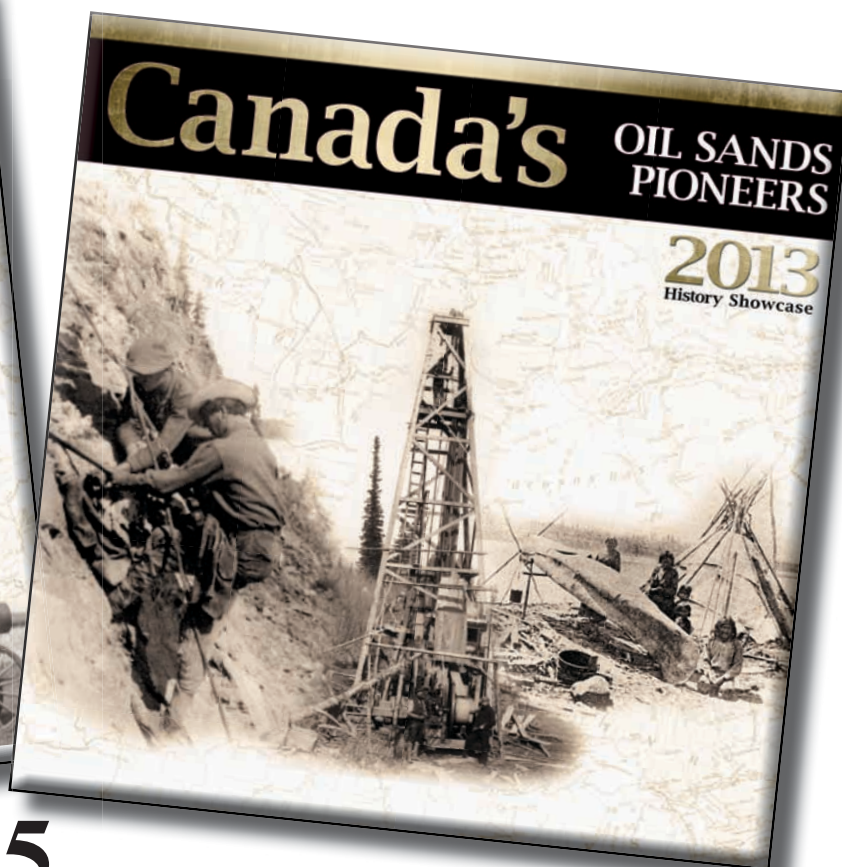
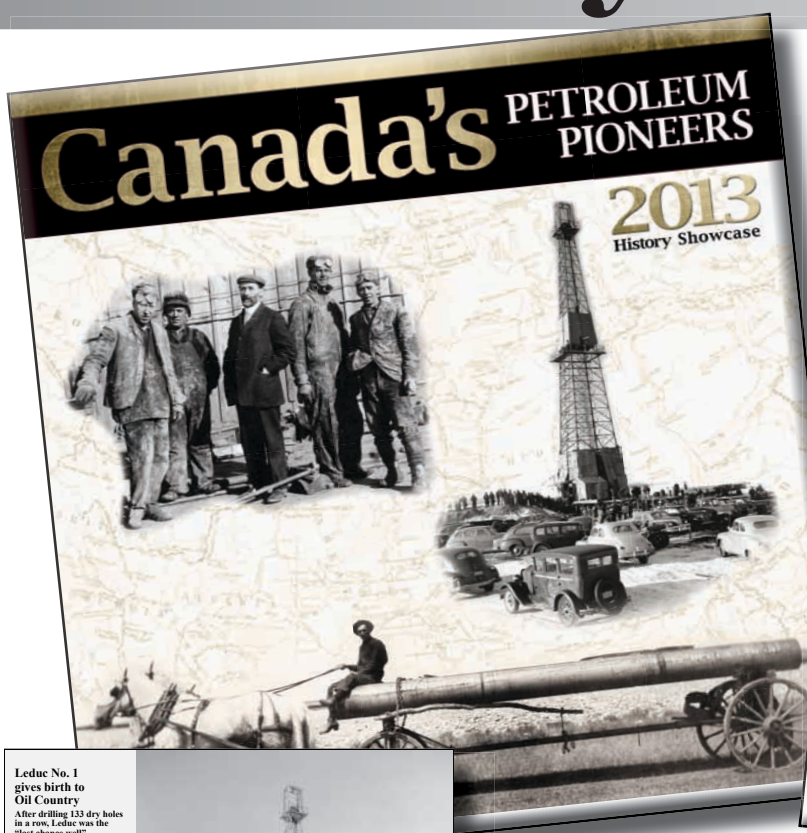
However, by that time the project was essentially dead in the water. "Ottawa now throws up its hands in horror at the thought of an atomic blast taking place in this country," said a story in *The Globe and Mail*.

Manning expressed great disappointment with the cancellation. He maintained for decades afterwards that nuclear energy could have played a key role in the commercial development of the oilsands. "If I had a say in it, and didn't have to deal with all the human obstacles, I would still very much favour proceeding with it," he said in a 1981 interview with a University of Alberta political science researcher. "But today you're living in a very different world. The media and the environmentalist groups would be 100 percent opposed to it. Yet, in this age of technology – when we can put men on the moon and bring them back – its utter nonsense for somebody to say, 'We can't build a nuclear plant that's acceptably safe.' The sooner the environmentalists realize that, the better for everybody concerned."

Was Manning's faith in the safety of the technology warranted or misguided? After the disaster of Chernobyl, we should feel greatly relieved, I suppose, that Albertans never had a chance to find out.

This article is one of a series based on information gathered via the Petroleum History Society's current Oil Sands Oral History Project, which is documenting the stories of oilsands pioneers in their own words. As with the society's previous oral history projects, the transcripts and recordings will be deposited in Calgary's Glenbow Archives. Brian Brennan is a member of the team of researchers/writers involved in the project.

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