# SIX VISIONARIES WHO BUILT THE MODERN OIL SANDS

Notes for an Address

by

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to the

Canadian Association of Lifelong Learners

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- **Slide I: Clark, Manning, Pew, Spragins, Lougheed, George**

It is a pleasure to talk to you today. This is the first presentation in a series on the Canadian oil sands.

There are two sponsors for the oil sands series of talks: The Calgary Society of Lifelong Learners is a new group of people who want to provide opportunities for people to be continually learning.

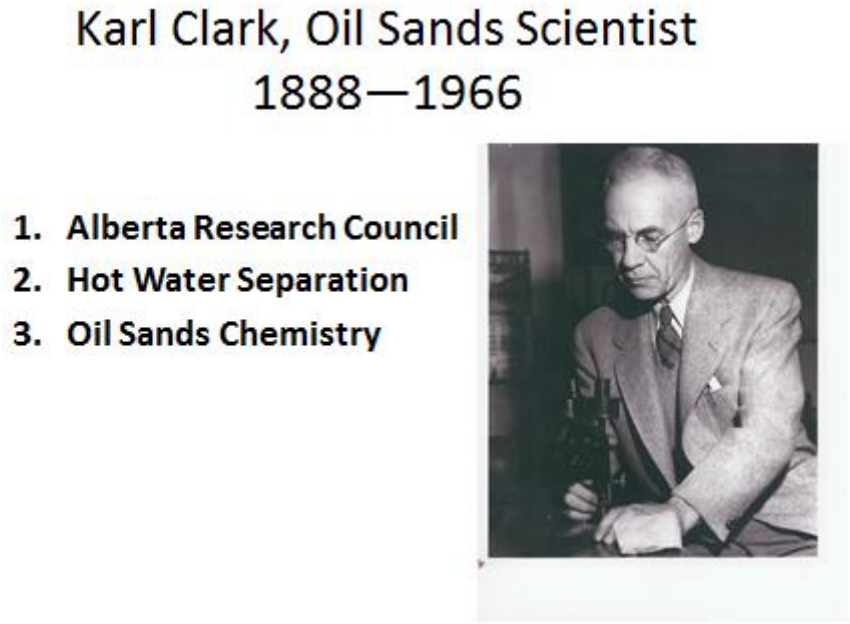
The Petroleum History Society is the other sponsor. I have sat on the board of that organization for most of the last 25 years, and its role is to help preserve the history of Canada's remarkable petroleum industry.

If the work and mission of either organization interests you, I urge you to become involved with either one of these organizations, or both of them.

This talk was publicised as being about five oil sands visionaries. As I thought about my topic, I concluded that there were six, not five. So today I am actually going to talk about six visionaries.

Countless people played roles in the early oil sands, but to my mind the six key people were chemist and researcher Karl Clark; Premier Ernest Manning; US industrialist J.

Howard Pew; corporate executive Frank Spragins; Premier Peter Lougheed; and Suncor's former chairman and CEO, Rick George. In this presentation I will offer brief commentaries on each of these visionaries




Karl Clark earned his BSc and MSc degrees from McMaster University and his PhD in Chemistry from the University of Illinois. The federal Mines Branch dispatched him to Alberta to investigate whether the oil sands would make a good road-paving material.

- **Karl Clark**
  - **Alberta Research Council**

In 1920 Clark was appointed research professor at the U of A, where he continued work on the oil sands for the Scientific and Industrial Research Council of Alberta. The first provincial research organization of its kind in Canada, its mandate included oil sands research and it enabled Clark to develop a career focused on the chemistry of the oil sands.

A year later, Clark wrote to University of Alberta president Dr. H.M. Tory that "I have been more fortunate that there was any reason to expect to have succeeded during one year in bringing to light and correlating the hidden properties of the tar sands and the relations between its constituents and other substances which were

needed to block out the various operations, of which I am now making use, to bring about what looks like a very promising separation of the tar sand bitumen from the mineral matter (with) which it is associated." It is tempting to say that such optimism reflected the hubris of a 32-year-old.

- **Karl Clark**
    - **Alberta Research Council**
    - **Hot Water Separation**

Clark took out a patent on hot-water separation in 1928, and his basic ideas have since been embedded in many commercial processes. Of particular importance was his recognition that the oil sands are acidic, and needed to be chemically neutralized for optimal separation to take place. Also, he established the importance of grinding up the sand, rather than working with lumps of the stuff.

Many other discoveries emerged from his long and tireless career investigation of the sands. According to historian Paul Chastko, "the value of Clark's contribution to the oil sands effort, however, is beyond question. He (was) instrumental in developing and promoting a commercial extraction process. He confirmed that the sands were the physical product that remained after lighter substances – natural gas, for example – escaped leaving behind natural asphalt."

- **Karl Clark**
    - **Alberta Research Council**
    - **Hot Water Separation**
    - **Oil Sands Chemistry**

Clark also realized that, given the state of petroleum refining in the 1920s, the oil sands could not be distilled into gasoline or kerosene. However, he did establish that while you could produce from it tar for roofing and a few other uses. In those days refining technology was so primitive that there was little hope of getting gasoline or other automotive fuels out of the stuff.

Clark was the foremost oil sands scientist – the title of a book of his letters and papers, which includes a biography of the man written by his daughter, Mary Clark Sheppard. One thing to note is that in 1949 he published six "statements" describing the chemistry of the oil sands. His description noted, for example, that if there is too much clay associated with the oil sand ore, separation "does not take place satisfactorily." His six statements were a landmark in oil sands chemistry.

# Premier Ernest Manning
# 1908 – 1996

1. **Bitumount Project**
2. **Blair Report**
3. **Oil Sands Conference**
4. **GCOS Supporter**

More than anyone else of his era, Premier Ernest Manning recognized the economic potential of the oil sands for Alberta. He took important steps to spur interest in the oil sands just after world-wide interest in Alberta's petroleum potential had been spurred by the spectacular Atlantic-Leduc #3 blowout in 1948. That event became standard fare on newsreels around the world, making Alberta and oil synonymous.

- **Ernest Manning**
  - **Bitumount Project**

When he became the Social Credit premier in 1943, Manning faced a chaotic situation with respect to the oil sands. Experimental projects at Bitumount and Abasand had taken on urgency because of the war. The province of Alberta funded Bitumount.

Although Bitumount was more successful than Abasand, which was funded by the feds, interest in the oil sands began to dry up when it became clear that Alberta contained conventional oil reservoirs.

- **Ernest Manning**
  - **Bitumount Project**
  - **Blair Report**

Nonetheless, Manning championed oil sands development. For one thing, he arranged for the province to continue financing the experimental Bitumount project. In 1949 he had the entire legislature visit the plant, and asked Sidney Blair, who had

once been Karl Clark's assistant at the Alberta Research Council, to prepare a technical report on the oil sands.

Released the following year, Blair's report argued that the costs of mining, separation, upgrading and transporting product to the Great Lakes would total $3.10 per barrel. That was pricy oil at that time, but he believed that refiners could get more valuable refined products from synthetic than from conventional oil. He suggested that a $43 million plant could produce 20,000 barrels of oil per day and generate a 5 to 6 percent annual return on investment.

- **Ernest Manning**
  - **Bitumount Project**
  - **Blair Report**
  - **Oil Sands Conference**

In 1951, Alberta sponsored a week-long conference for the petroleum sector, focused on the Blair report. Minister of Mines and Minerals Nathan Tanner outlined provincial policy on oil sands leasing and royalties.

To one group of participants he said, "We are quite prepared and anxious to have you come in and spend your risk capital in the development of our natural resources. We want to give you a good run for your money. We want you to know if you are successful in the search, that you will get a profit out of the development and the production. At the same time, we would like you to know that we are going to be at the end of the rainbow to get our share….." Tanner then released the government's oil sands policy, which was a masterpiece of brevity and precision.

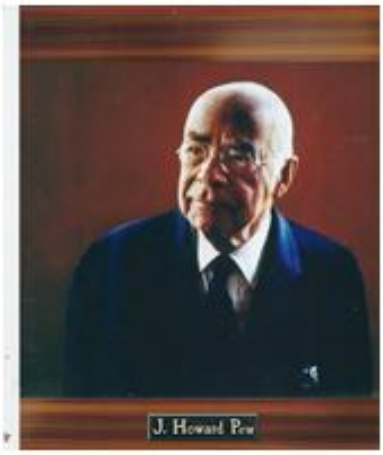
- **Ernest Manning**
  - **Bitumount Project**
  - **Blair Report**
  - **Oil Sands Conference**
  - **GCOS Cheerleader**

Energy and Resources Minister Nathan Tanner was the point man at this conference, but throughout his premiership Premier Manning was the oil sands' champion. Manning was the cheerleader as plans developed for the Great Canadian Oils Sands project.

Manning maintained a life-long belief in the importance of the oil sands to Canada and Alberta, and shared those beliefs in his long friendship with J. Howard Pew, the president, CEO and chair of Pittsburgh-based Sun Oil Company. Sun was the twelfth-largest oil company in the United States and was continually looking for ways to find enough crude to feed its extensive refining operations.

# J. Howard Pew, Industrialist
# 1882–1971

1. **Early Interest**
2. **Personal Determination**
3. **GCOS Opening**
4. **Personal**




Ernest Manning once called Pew "a fantastic man, just a delight to talk to. His grasp of things all over the world was tremendous. He was a humanitarian, a deeply religious man, an ideal character." For his part, Pew praised the premier's "character and intelligence," and described a religious broadcast on Manning's weekly Back to the Bible broadcasts as "One of the greatest sermons I ever heard."

J. Howard Pew enabled the Great Canadian Oil Sands (GCOS) plant – Alberta's first truly commercial oil sands development – to become reality. He entered the scene when private sector commitment for smaller-scale mining projects ranged from shaky to non-existent.

He was passionate about his work. "Working for Sun Company these years has been not merely a job," he said in 1956. "It has been participation in an exciting adventure – a way of life providing satisfaction in the accomplishment of our goals. So our people have become a great team, welded together by great ideals and purposes accepted by each of us."

- **J. Howard Pew**
    - **Early Interest**

One of the ten wealthiest Americans of his day, Pew first took a serious interest in the oil sands during World War Two, when his company hunted for oil as part of the war effort. According to one historian, Pew told Calgary-based George Dunlap at the beginning of the 1950s, "I have one area that I am interested in and would like to share with you my interest".

He went to a cabinet to pull out a thick file marked 'Athabasca Tar Sands,' then shared his vision of the future importance of the oil sands. He told Dunlap to ensure that 'Sun Oil always has a 'significant position' in the Athabasca Tar Sands area!'"

During the following eight years, Sun invested around half a million dollars in oil sands research. Then, through a complex business manoeuvre, it created Great Canadian Oil Sands Limited – a publically traded company – to construct an oil sands project on the historic Ruth Lake lease. In the early 1960s GCOS received provincial approval to construct a 31,500 barrel-per-day, $122 million plant. However, financial difficulties soon ensued and costs began to rise. By 1964 it was clear that the company would need more money, and Sun agreed to provide it.

- **J. Howard Pew**
    - **Early Interest**
    - **Brilliance**

The thumbnail sketch of his life is this: Born in 1882, J. Howard Pew graduated from high school at age 14, from university at 18 and became president of Sun Oil at age 30. With his brother Joseph he transformed Sun (founded by his father; now called Sunoco) by introducing new refining, marketing, and distribution techniques. He was astute. During the First World War he responded to the war-time demand for crude by building a navy of tankers. That fleet became one of Sun's most profitable businesses.

A publication celebrating Sun Oil's centenary in 1986 described the man, who had died in 1971. "Tall and broad-shouldered, with bushy eyebrows, he was often seen clutching an enormous cigar in his fingers as he moved about Sun's corridors. He was intense, sure of himself and deliberate in his speech even in old age."

A few months ago I met a man who had once worked in the very low echelons of Sun Oil's global enterprise. His name was John, and he worked at a field project in Canada. He met Pew twice. The first time was at a social gathering of some sort. The second time was several years later at a meeting in a field operation.

On the second occasion, Pew came up to him and said "Hello, John. How's your dog, June?"

- **J. Howard Pew**
  - **Early Interest**
  - **Brilliance**
  - **Determination**

At a board meeting making its decision on the plant, Pew famously said "Gentlemen, either you approve this or I'm going to do it on my own." He also wrote a letter to the ERCB saying "I believe in the future of this project and I will put up my own money without reservations if the permit is approved." Sun Oil also agreed to expand the market for Alberta oil by purchasing much of the synthetic oil for its Toledo, Ohio, refinery.

- **J. Howard Pew**
  - **Early Interest**
  - **Brilliance**
  - **Determination**
  - **GCOS Opening**

By the time the GCOS project reached completion in 1967, costs had risen from $190 million to $235 million. At the plant's official opening, both Ernest Manning and Pew addressed the audience. According to Manning, "no other event in Canada's centennial year is more important or significant.… It is fitting that we are gathered here today to dedicate this plant not merely to the production of oil but to the continual progress and enrichment of mankind."

Pew's comments were blunt. "My associates have built this magnificent plant," the 85-year-old told his audience, "and so I trust that they take comfort in the knowledge that they are not going soft, and that they are most useful."

# Frank Spragins, Corporate Executive 1914-1978

1. **The Challenges**
2. **Prudhoe Bay**
3. **Spragins' Vision and Passing**

Cities Service Athabasca – yet another Canadian subsidiary of a large international oil company – was behind a consortium that applied in May 1962 for a licence to build Syncrude. The original idea was that the plant would produce 100,000 barrels of synthetic crude daily. However, the Oil and Gas Conservation Board ruled in favour of the smaller GCOS project, and the Syncrude partners mothballed their test facility.

At that point, according to Syncrude's official account of its history, Cities Service, Imperial, Richfield Oil and Royalite "called in their top guns to surmount the obstacles…. (Imperial employees) Frank Spragins and Dr. Clement Bowman, men known for their intuitive brilliance and perseverance, were both deeply committed to the success of the project and anxious to see it launched." Spragins became the president of Syncrude.

- **Frank Spragins**
  - **The Challenges**

Many years later, Clem Bowman described the challenges Spragins faced in those days. The participants had already invested $24 million in the Syncrude project, and

sponsors were re-evaluating their resolve. The price of oil never quite caught up to project costs. According to Bowman, Spragins "tirelessly kept anxious participants on hold," "developed a long term strategy for upgrading the bitumen" and "expanded Syncrude's research efforts with the first dedicated oil sands research laboratory."

In 1965 Syncrude reapplied for an 80,000 barrel-per-day plant, projected to cost $200 million, but that idea went into crisis mode three years later when Atlantic Richfield and Exxon discovered the Prudhoe Bay oilfield in Alaska. Prudhoe Bay's immediate impact was alarm – the Conservation Board and the province worried what impact these huge new oil supplies might have on markets for conventional oil. Once again, they deferred a decision.

Spragins sent a blunt message to the province. "We are finding it exceedingly difficult, both individually and jointly, to continue financial support for oil sand development without foreseeable goals. We must emphasize that any additional substantial delay may well have the same effect as a denial of application." The partners reapplied, and in 1969 the consortium's 80,000 barrel-per-day plant received the go-ahead. In 1971, however, the partners decided to ask for a licence for a larger plant. Spragins said the consortium would proceed with plant engineering if capacity were raised to 125,000 barrels per day.

Like other major North American projects in the 1970s, Syncrude's costs began to skyrocket. High inflation rates multiplied budgets for every aspect of the Syncrude project. By the end of 1973 a reassessment of the project – already under construction – put the cost at more than $2 billion.

- **Frank Spragins**
    - **The Challenges**
    - **Prudhoe Bay**

This led to another crisis – again, in part because of the huge discovery at Prudhoe Bay. Richfield's parent company now had an embarrassment of great places to invest its money – developing Alaska, of course, but also developing new discoveries in Britain's North Sea.

The word came down from the top: no more money for Syncrude, which would be a high-cost project in a country that seemed increasingly unfriendly to the petroleum industry. The company withdrew its 30 percent participation in the project, effective December 31st, 1974. The three remaining partners informed the Alberta government

that the maximum risk they were willing to take on the project was $1 billion. They would need to find another $1 billion of risk capital if the project were to go on.

Alberta helped convene a historic meeting to salvage the project. Held in February, 1975, the Winnipeg Agreement was a thaw in a bitter political climate, but a thaw that did not last.

The participants in the 12-hour session included many of Canada's key decision-makers. Spragins, however, was not there. According to his widow, Nell, "Frank was at home furiously hanging wallpaper. He was not involved in the talks because he was an employee of Syncrude and not of one of the partners… I believe it must have been one of the most trying times of his life."

- **Frank Spragins**
  - **The Challenges**
  - **Prudhoe Bay**
  - **Spragins' Vision and Passing**

Syncrude went into operation in the summer of 1978 and produced 5 million barrels of oil within a year. Inexplicably to most people, the indomitable Frank Spragins – for nearly two decades one of Canada's most vocal and visible proponents of oil sands megaprojects – had resigned his presidency the previous year. However, he did attend the opening ceremonies, where he received a standing ovation from an audience of seven hundred. "The man behind the mission and a visionary of the first order," a Syncrude publication described him. It added that he died six weeks after the plant officially opened. According to his widow, Nell, he didn't go to the hospital until the day before he died of cancer.

On the matter of the oil sands, Spragins was a true believer. "A number of colossal projects will have to be undertaken and such projects take time," Spragins told a university audience a year before his passing. "Twenty years for the Syncrude project, for example. Therefore, we should waste no time in getting major heavy oil and tar sands projects underway. To do this, it will take complete cooperation between industry and government with a good measure of support by the public. Hopefully the Syncrude Project will be a guide in this direction. Henceforth, if we know the way, the big word is action and that means action now…."

As if to illustrate his concerns, world oil prices leaped skyward in 1979-80 and remained high for the first half of the 1980s. This helped Syncrude become successful

financially as well as technically. Still a major investor in R&D, the project began making huge strides in improving its mining and processing technology.

## Premier Peter Lougheed
## 1928 – 2012

1. **Energy Wars**
2. **The Winnipeg Agreement**
3. **AOSTRA and SAGD**

The fifth person I want to mention is Premier Peter Lougheed. I will keep my comments on the premier's huge contributions quite brief. We all had opportunities to recall his many achievements as we mourned his passing last year.

- **Peter Lougheed**
  - **Energy Wars**

During the Lougheed years, there was a series of "energy wars" between producing provinces and the federal government. Most people in this room remember those years, so I will not elaborate. Energy issues consumed an enormous amount of his government's time.

Of particular importance, he strongly asserted and ultimately resolved beyond doubt Alberta's ownership of most hydrocarbon and other mineral resources within provincial borders, and he put an end to federal efforts to impose export taxes, for example, on those resources. Those efforts affected all of Alberta's energy resources.

- **Peter Lougheed**

    - **Energy Wars**
    - **The Winnipeg Agreement**

As I mentioned earlier, Lougheed took a leadership role in the Winnipeg Agreement, which saved the Syncrude project.

- **Peter Lougheed**
    - **Energy Wars**
    - **The Winnipeg Agreement**
    - **AOSTRA and SAGD**

More importantly, he initiated a government agency to promote experimentation in extracting bitumen from the deeply buried oil sands reservoirs, which represent about 90% of the resource. Imperial had made some progress at Cold Lake and Shell at Peace River, but there were no economic technologies that could unlock bitumen from the deep Athabasca deposits, and few companies were experimenting there.

To speed up the development of new oil sands technology, the Lougheed government proclaimed the Alberta Oil Sands Technology Research Agency (AOSTRA) into existence. One of the largest research and development programs ever launched in Canada, it helped fund more than $1 billion of in situ research.

While AOSTRA helped fund many great ideas, its most brilliant move was the construction of the Underground Test Facility in the late 1980s. It was at the UTF that the technology now known as steam-assisted gravity drainage (SAGD) was developed. That technology has transformed the oil sands industry.

# Rick George
# 1952 – Present

1. **The Rickety Project**
2. **Trucks and Shovels**
3. **Our Second Largest Corporation**

- **Rick George**
  - **The Rickety Project**

An American by birth, Rick George is an engineer and lawyer by training. When Sun Oil assigned him to take over the Suncor in 1991, he had inherited some great oil sands properties, but a plant that was marginally profitable even when oil prices were relatively high. At that time prices were low, and would continue to decline for most of the 1990s.

The plant at the time was 25% owned by the Ontario government, with the balance owned by Sun Oil. George's first significant step was to look for ways to make the project a going concern. He then turned Suncor into an independent oil producing company listed on the Toronto Stock Exchange.

When Suncor was first listed in Toronto, the company had market capitalization of about $1 billion. Today, two decades later, the company is worth some $50 billion.

- **Rick George**
  - **The Rickety Project**
  - **Trucks and Shovels**

When George took over Suncor, both of the oil sands plants – Suncor and Syncrude – had an Achilles heel. They both used coal mining equipment to extract the oil sands – bucketwheel reclaimers, as they are known, that have long been used for soft coal.

This made little sense, since ore from the oil sands is a much harder form of rock, especially in periods of deep cold it freezes into an extremely hard material. The bucketwheels were constantly failing, and needed continual repair.

George and his team analyzed the problems at Suncor and found that the entire system was inefficient. They made a number of fundamental changes to the system at Suncor, but the single most important idea was to replace the bucketwheels with trucks and shovels – much like the systems used to clear a construction site: you simply dig up the soil with a big industrial shovel and put it into a truck to take it away.

Mechanical shovels have been used for industrial construction since the 19th century. They were actually used in the 19th century during the construction of the Panama Canal. Early shovels were large machines with coal-fired steam boilers which rolled along on railroad tracks or on wheels. Today, they use diesel engines, and generally run on caterpillar tracks.

It was not until Rick George moved to Suncor that the company realized trucks and shovel represented a solution for oil sands mining. Syncrude soon followed Suncor's lead.

- **Rick George**
    - **The Rickety Project**
    - **Trucks and Shovels**
    - **Our Second Largest Corporation**

George and his team began to investigate the use of steam-assisted gravity drainage for producing deep bitumen from land holdings relatively near the Suncor plant. This worked, and the company had the advantage that it could produce oil through both mining and SAGD, and upgrade it all at the much-improved and finally reliable upgrader that was part of the rickety project the company had inherited from Sun Oil.

These innovations had an amazing impact on the company. Suncor is now the second most valuable corporation in Canada, after the Royal Bank of Canada.

The company now produces more than half a million barrels of bitumen every day, and intends to produce a million barrels per day by the end of this decade. To put that in perspective, that one company will produce about one tenth as much oil as Saudi Arabia, the world's energy giant.

- **Six Visionaries who Built the Modern Oil Sands**

So let me wrap up. Many people have played huge roles in the development of the oil sands. However, Karl Clark, Ernest Manning, J. Howard Pew, Frank Spragins, Peter Lougheed and Rick George are the six outstanding pioneers from the industry's first century.