PETROLEUM EXPLORATION HISTORY OF NORTHEASTERN BRITISH COLUMBIA

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ABSTRACT

A decade-by-decade analysis of the history of petroleum exploration in northeastern British Columbia attempts to understand why some regions remain relatively unexplored. Most development followed the trends of previous discoveries or the construction of infrastructure such as roads. Some portions of the unexplored regions are now opening up due to technical advancements in drilling and completions. Exploration patterns were largely influenced by events outside the province, such as the two world wars and discoveries in other parts of the Western Canada Sedimentary Basin.

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Key Words: patterns, white area, surface structure, seep, Peace River, cycles, Leduc, Alexander McKenzie, reefs, Alaska Highway, Boundary Lake, Fort St. John, Clarke Lake, Cordova Embayment, Presqu'ile, Triassic, Devonian, deep basin, resource play, National Energy Program, seismic, resistivity.

Figure 1: Oil drilling rig in Chilliwack, BC, ca. 1906. ***Photo courtesy of BC Archives collections; call number G-07686.***

INTRODUCTION

Understanding the historical patterns of oil and gas development of a petroleum region is perhaps as important a method of deciphering the subsurface as trying to see underground with sophisticated geological and geophysical methods. It is a method that is vastly easier to implement and should not be ignored.

Aside from considering this historical analysis as a valid exploration method, it is a response to a desire of the British Columbia Ministry of Energy, Mines and Petroleum Resources to know why some regions in northeastern BC have remained relatively unexplored and undeveloped for oil and gas. These areas are referred to throughout as "white areas" because they remain white on maps heavily dotted with oil and gas wells.

Before the current age of 3D seismic, horizontal drilling and sequence stratigraphy, most of the big oil and gas discoveries in Canada and around the world were made on the basis of the simple observation of seeps or surface structures. Seismic imaging of subsurface structures was not needed to discover the Middle Devonian reefal oilfield at Norman Wells in the Northwest Territories—its existence was known hundreds of years ago to the First Nations people by the presence of oil seeping from bluffs overlooking the Mackenzie River. The supergiant Baku oilfields in Azerbaijan did not require high-tech horizontal drilling rigs to become economic—hand-dug wells sufficed at first. Simple cable-tool rigs were adequate to get the oil industry going in southern Ontario more than 150 years ago because oil was obviously close to the surface. BC's petroleum potential was signalled in the 1920s by noting the presence of oil seeps along the Peace River; test drilling led to confirmation of potential and to the eventual development of BC's best oilfields. For many highly productive regions, such as the Sirte Basin in Libya, which lacked seeps or structures observable at surface, rudimentary seismic technology was sufficient to make very large discoveries.

Early exploration in British Columbia was marked by sparse and sporadic drilling, mostly in accessible parts of the province such as the Fraser Delta (Figure 1; Galloway 1915) or Crowsnest Pass (Hume 1933), where interest had been sparked by dubious reports of oil seeps or gas blows. Lack of positive results eventually shifted interest to the northeastern parts of the province, where drilling did lead to discoveries.

Once a new petroleum region has been discovered—often by relatively simple means—it is usually followed with additional discoveries in the vicinity. It is in the further development of initial discoveries that high technology and increasingly refined geological thinking have their greatest application. Traditionally, oil and gas discoveries have led geological studies, rather than the reverse.

METHODOLOGY

This report divides the past century of exploration activity in northeastern British Columbia into discrete five-year time intervals that are not entirely arbitrary—they reflect typical cycles of drilling activity. Historically, a cycle began with one or two years when a promising new play or a geopolitical or economic force translated into peaks of drilling activity; then, when something happened to force prices downward, a lag time of one year or so would precede the bottom of the cycle. Therefore, cycles of roughly five years duration are typical. More recently, with the maturation of the Western Canada Sedimentary Basin, those cycles may be lengthening or shortening—time will tell. But despite the pace of activity, they are likely to lengthen because true discoveries are not happening very often.

This report focuses on drilling activity (rather than other types of activity such as pipeline or gathering facility construction, seismic exploration, or field mapping) mainly because it is the most direct indicator of economic interest and results. Future revisions of this report may take a more comprehensive approach to gain a deeper overall understanding.

Much information about exploration activity came from annual public reports of year-to-year oil industry activity published by the Government of British Columbia beginning in the early 1950s. These reports also reveal the shifts of governmental priorities with the stages of exploration. As time went by the reports were published by various government divisions, depending upon the prevailing organizational structure. Formats and level of content varied with each organizational change. The earliest reports of the young oil industry contain much useful information; later on, government turned more to the role of promoter and so less detailed information about exploration was provided. All reports can be found (usually as a section within a mining report) online at: http://www.em.gov.bc.ca/Mining/Geolsurv/Publications/catalog/cat_rpts.htm

Another valuable source of detailed historical information for individual wells is the publicly available well files, available through the BC Ministry of Energy, Mines and Petroleum Resources. Sometimes individual well files give glimpses of the strategy used for the development of entire regions.

A map for each time interval has been provided (Figures 2–13). Only the wells drilled during each respective interval have been shown so the trends can be clearly seen.

Significant events in BC's exploration history have been linked with the wider world. World history for the past century has been heavily influenced by the search for oil, and that also applies for BC.

EXPLORATION DEVELOPMENTS

Pre-1948

In 1920 the first five or six exploration wells of northeastern BC were drilled in the Peace River area, just west of the townships, by the provincial government. They were part of a test-hole program and not intended to be producers. This drilling effort had been preceded the year before by field mapping that revealed promising structures and rock formations capable of forming hydrocarbon reservoirs. Similar activity was occurring in adjacent parts of Alberta for the same reasons. The test-hole drilling program did provide promising shows of oil and gas from Cretaceous clastic formations. At the time, no infrastructure was available to enable further development.

Early settlers had reported the presence of oil seeps, and because most petroleum discoveries in the world had been made near seeps, interest in the area was high before any geological field mapping had been done. At the same time as oil was discovered in the Northwest Territories (on oil seeps at Norman Wells), a well was drilled by Imperial Oil near Pouce Coupe near the site of oil seeps reported by an early settler (Clare 2003). A small quantity of oil was encountered at shallow depths but substantial amounts of gas were unexpectedly found at greater depths. The inexperienced and poorly equipped drilling crew was unprepared for the ensuing blow-out, which left killed one and severely burned several others.

In the early 1930s, the BC government took a different turn from its neighbour Alberta. Reflective of its divergent political philosophy, BC placed all the Peace River lands under reserve to discourage control by American interests, while Alberta continued to actively promote development, although the potential of the region at that time was largely unknown.

The BC government began to change its non-development stance in the latter part of the 1930s. As part of the war effort to find more oil, a well was drilled by the provincial government in 1941 near Pine Pass. This location was politically contentious because of the expense and lack of private interest. It had been recommended on the basis of surface mapping and the presence of an existing road from Dawson Creek to East Pine, but it did not provide promising results. Further activity in northeastern BC waited until after the 1947 Leduc discovery and improvement of transportation infrastructure with the building of the Alaska Highway and other roads.

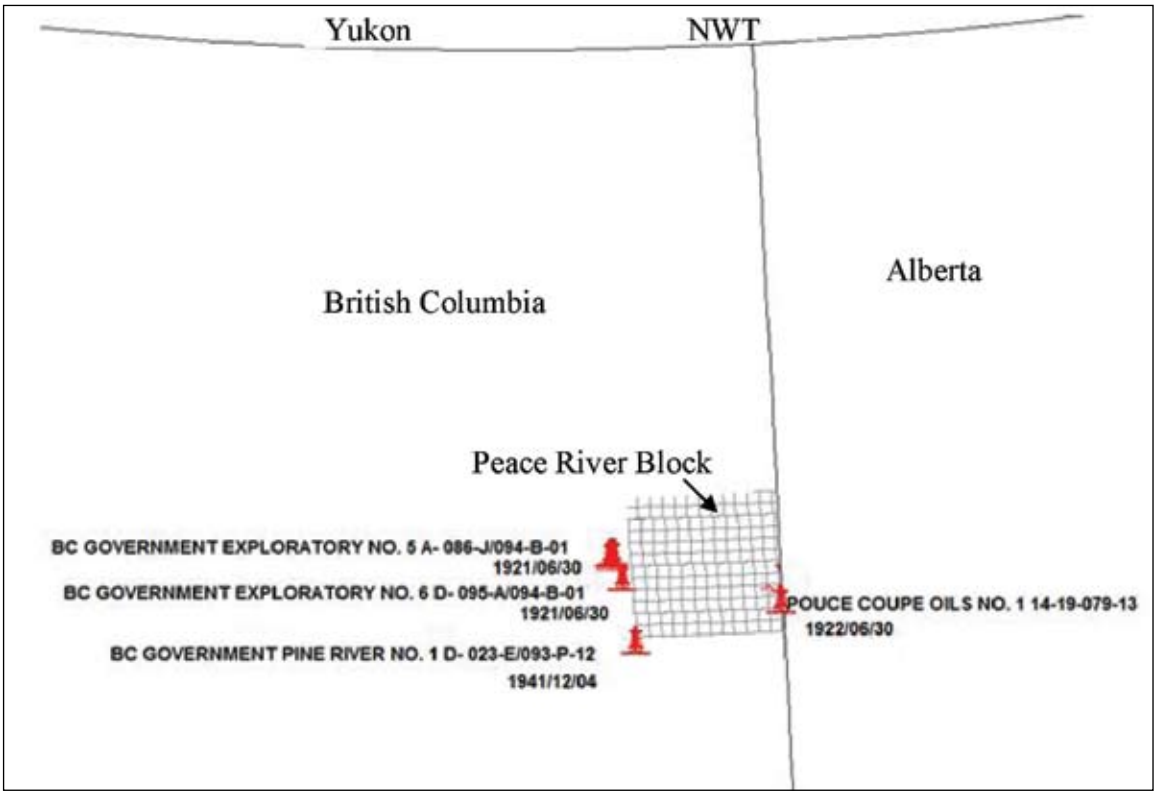

Figure 2: Drilling before 1948
In 1920–21 the first five or six exploration wells of northeastern BC were drilled in the Peace River area, just west of the townships, by the BC government; the township block was placed off-limits from American interests. Pouce Coupe Oils drilled a shallow well near the Alberta border to investigate signs of hydrocarbons at surface.

1948–1950

This was a brief interval of seminal importance for Canada's oil industry because of the discovery of the Middle Devonian reefal oil play at Leduc, Alberta. No better oil producer has since been discovered in Canada in terms of productivity and access. Many "dry holes" were drilled before this, but faith in eventual success was provided by previous reefal discoveries at Norman Wells, Northwest Territories, and Midale, Saskatchewan (Gould 1976). Many of those "dry holes" were not actually dry but simply not economic at that time. They provided information for later successful exploration efforts throughout Alberta and extending into BC; for example, the Leduc discovery led to the delineation of Middle Devonian reef trends, which helped lead to the discovery of the Clarke Lake Field in BC.

After the Leduc discovery, drilling extended into regions that had shown promise from test holes or field mapping. The opening up of more remote regions (such as the Peace River) with roads built to serve agricultural expansion also helped. In the late 1940s, a number of wells were drilled in Alberta, extending into BC just north of Dawson Creek, to follow up earlier observed shows in the Lower Cretaceous Paddy and Cadotte Formations. An east-west trend was quickly established by drilling for these gas-bearing shoreface to foreshore prograding sands.

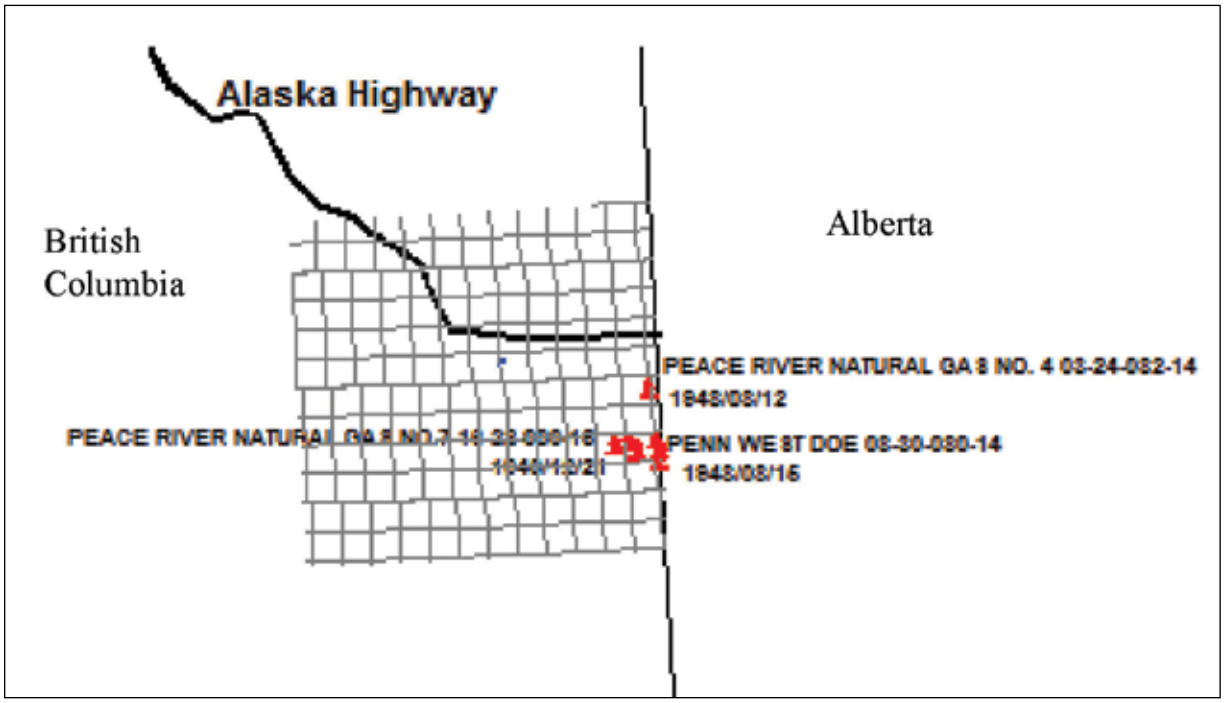

Figure 3: Drilling 1948–1950
Wells drilled during this period were pursuing shallow Lower Cretaceous gas plays found across the Alberta border.

1950–1955

By the early 1950s, operators were showing that northeastern BC held potential in multiple zones of different geological ages. It outlined a basic reality that still applies: if hydrocarbons are discovered in one formation in a region, they are usually present in other formations because it proves a source. The corollary has also generally held true: wells with only one hydrocarbon-bearing formation or interval are uncommon, at least in regions with substantial stratigraphic sections.

More wells were drilled for Lower Cretaceous gas in the previously established trend north of Dawson Creek. It did not meet with the same success as it had in Alberta; on the edge of the adjacent white area are a few dry holes. Many wells tested gas from the deeper Lower Cretaceous shoreface clastic Cadomin and Nikanassin Formations.

A number of wells were drilled deeper, perhaps in hope of there being another Leduc-style reef in the Devonian section. Nothing like that was found in northeastern BC at that time; instead—and of great significance for the oil industry in the region—was the discovery of gas in the Triassic Halfway and Baldonnel Formations. A northwest trend, parallel to the cratonic shorelines of the Triassic, was quickly delineated by drilling. Drilling along this trend was facilitated by the Alaska Highway, which more-or-less followed it. A few of these deeper wells also established other targets, with gas discoveries in Permo-Pennsylvanian formations.

Maybe the most significant event for the oil industry in northeastern BC at this time was the completion of Boundary Lake No.1 well in 1955 in the Triassic Schooler Creek Formation. Initially it was shut-in pending arrangements to bring the oil to market, but it later became the first well of a very important oilfield for the province. Development was aided by its location near the Alberta border with good existing road access.

Activity was still hampered by a shortage of passable roads. Aside from the Alaska Highway and roads in the vicinity of Fort St. John and Dawson Creek, only a few bush roads existed, and they were usable by heavy equipment only in the winter and the driest portions of the summer. Therefore, drilling and exploration were restricted to proximity of the better roads.

A few remote, scattered wildcats were attempted at greater distances from the main trends. Abandoned well d-82-L/94-J-2 tested significant amounts of gas from Middle Devonian formations. Access was no problem as it was located very close to the Alaska Highway. It is not clear why this particular spot was chosen for such a rank wildcat, except for its proximity to a good road. Perhaps by this time drilling throughout northern Alberta and the southern Northwest Territories was revealing the shape of the Presqu'ile Middle Devonian carbonate barrier.

In 1953, the Administration Branch of the former Department of Mines assumed the role of administering oil and gas activity in BC.

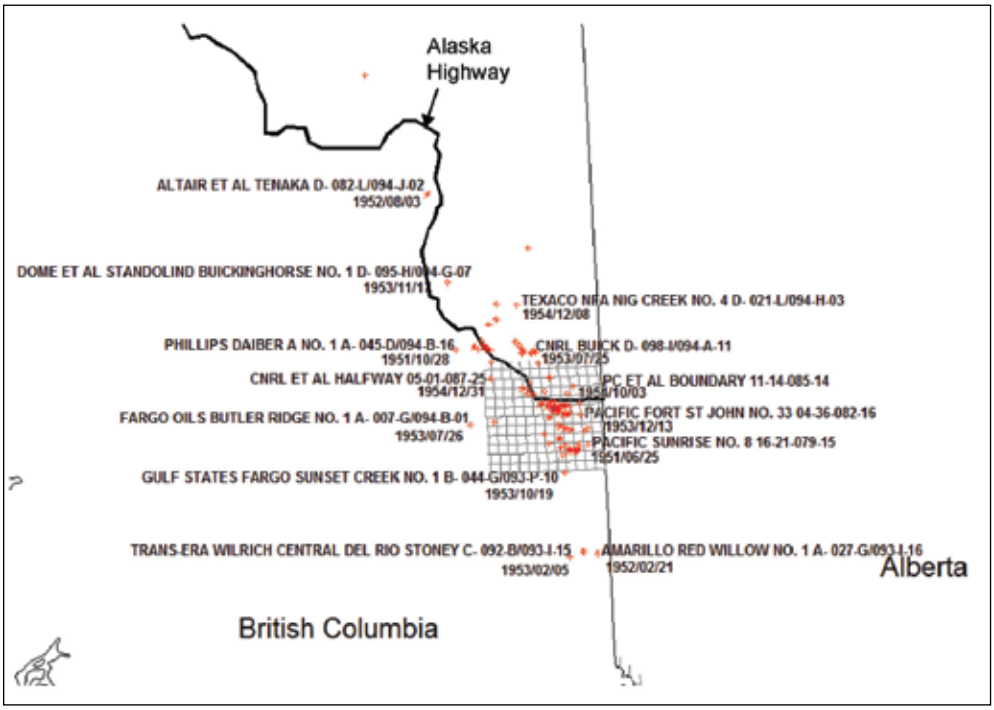

Figure 4: Drilling 1950–1955

Drilling expanded from its initial foothold in the Peace District near the Alberta border. Many fields were found in these early days of exploration, including significant oil finds near Fort St. John. Many of the discoveries were conveniently close to the Alaska Highway built for strategic purposes during World War II.

1955–1960

In 1956, the Boundary Lake oilfield—British Columbia's first—was put into continuous production. Ten wells were producing oil by the end of the year.

Exploration for Halfway, Baldonnel, and other Triassic formations pushed the producing fields further northward and north-westward. Fields such as Jedney and Bubbles began producing from the Baldonnel Formation at the edge of the deformed belt. Several wells were the first to be drilled directly within the BC foothills. None of these were completed as producers.

Other unexplored areas (white areas) were tested between the Halfway and Baldonnel trends and the foothills as well as to the north, where a big gap exists to this time.

Oil and gas were also found in the Lower Cretaceous Bluesky and Gething Formations in the Milligan Creek and Beatton River areas north of Fort St. John.

The previous discovery of gas in the Middle Devonian Slave Point Formation near Fort Nelson at Clarke Lake led to a flurry of activity chasing after this new trend. Several wells were completed, but no gathering system was yet available to bring the gas to market. Drilling was also constrained by the lack of roads in the area, other than the Alaska Highway. Several wells were drilled in the currently defined white area north of the Clarke Lake discovery, probably in the hope of extending the Middle Devonian gas play northward, but these did not provide positive results and the wells were abandoned.

The Petitot River discovery (d-24-D/94-P-13) in the Slave Point Formation at the northern boundary of the province would eventually become very important for providing a new Middle Devonian carbonate trend for explorationists.

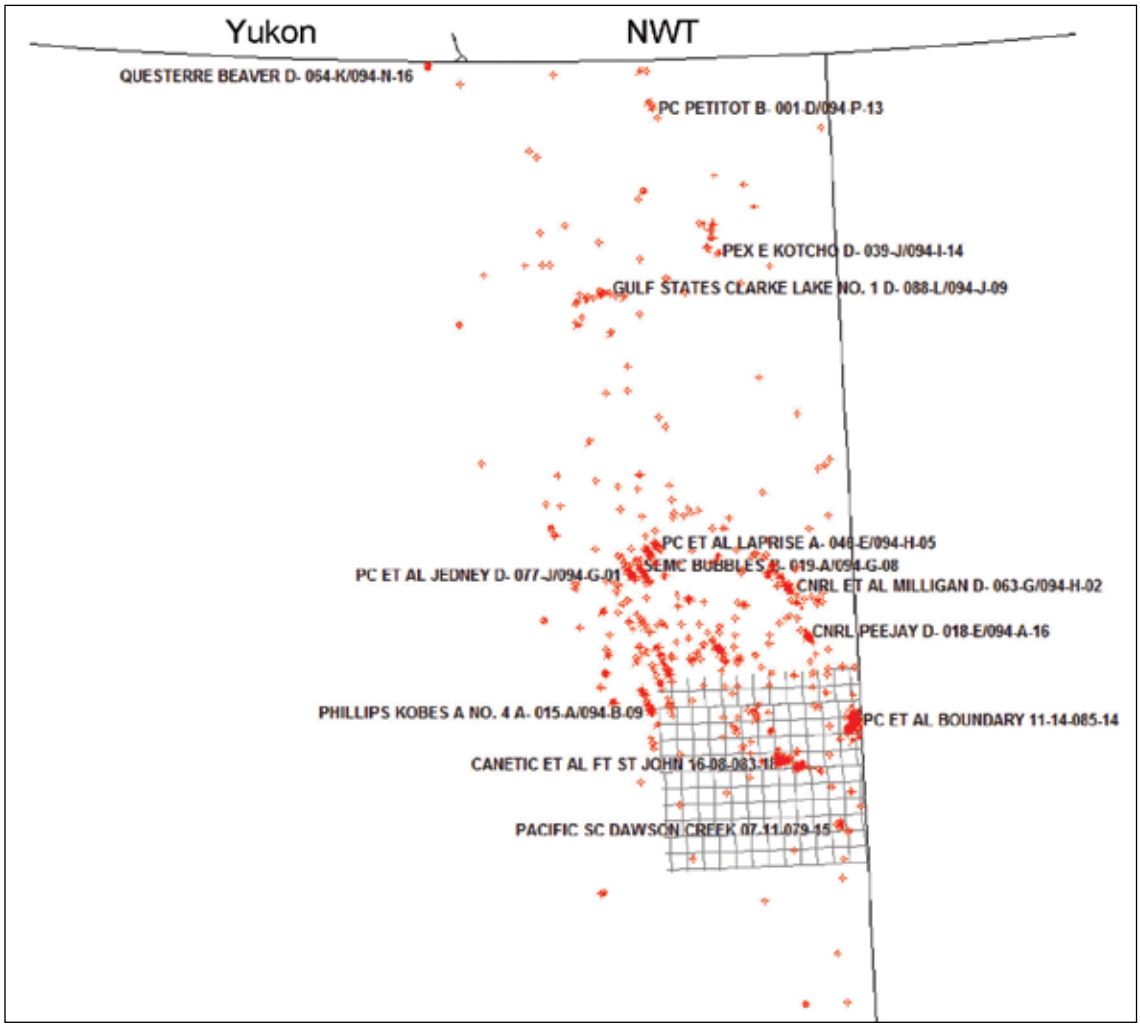

Figure 5: Drilling 1955–1960
Many of the fields familiar to BC explorationists were discovered. Clarke Lake—a Middle Devonian carbonate gas play—was discovered as explorationists scrambled to find more reefal plays like Leduc in Alberta. The Beaver Creek discovery near the Yukon border is close to the Alaska Highway within the disturbed belt.

1960–1965

By the late 1950s, the number of cores and drill cuttings turned over to the government by industry, as required by regulation, greatly exceeded the space available in a temporary storage shed in Pouce Coupe. In 1961, a new core storage facility opened in Charlie Lake, near Fort St. John. This was an essential step for facilitating the orderly further exploration and development of the province's hydrocarbon resources.

Drilling extended northward as multiple potential zones allowed the Triassic trend to broaden. The first wells were drilled in the Tommy Lakes area, also for Triassic gas. These wells were not successful producers at that time, but improved technology in later years enabled production from the relatively tight reservoir rocks from the lower portions of the Triassic section. One or two wells extended from Tommy Lakes into a white area to the north.

The new linear north-south trend at Petitot River was followed up with a number of wells. Another trend splayed off to the southeast at Kotcho Lake and Yoyo. Gas was also found in the Devonian Jean Marie Formation at Gunnell Creek.

In the far northwest of the region, in an area sparsely drilled even now, a discovery was made in the Nahanni Formation at d-73-K/94-N-16 at Beaver River. This well was directionally drilled into rock within the deformed belt. Very substantial gas recoveries were made from drill-stem tests in Middle Devonian formations, and that provided impetus for the building of infrastructure to deliver the gas to market. At around this time, gas was discovered on the Yukon side of the border along the same trend.

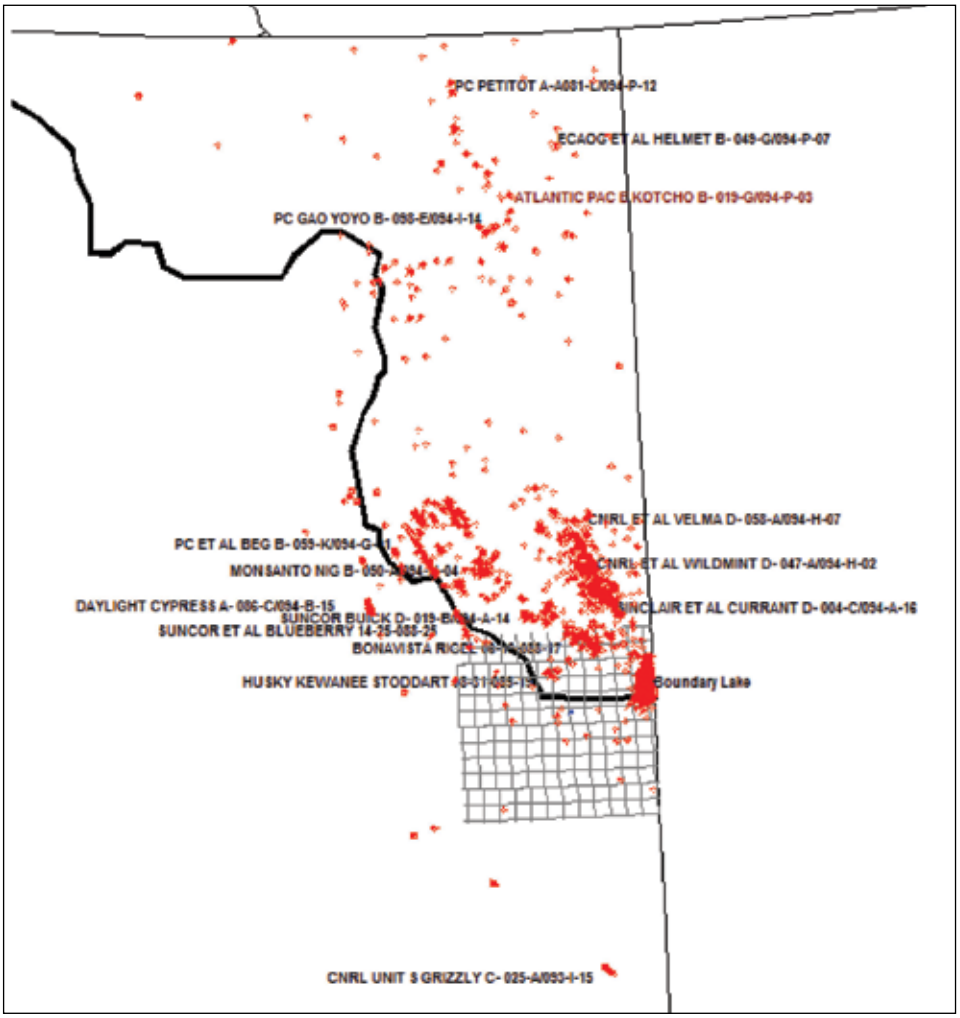

Figure 6: Drilling 1960–1965
A new linear north-south trend at Petitot River was followed up with a number of wells. Another trend splayed off to the southeast at Kotcho Lake and Yoyo.

1965–1970

Activity had settled into predictable patterns close to the major discoveries, and the rate of discovery had slowed. Most of the big discoveries, of which many are still in production, were being exploited or were in the process of expansion through step-outs. The progression of field development followed the northwest-trending Triassic reservoirs, such as the Inga Field in the Fort St. John region. To the north, discoveries followed the trends of porous Middle Devonian rocks at Clarke Lake. While drilling for the Triassic and Devonian formations, discoveries were being made in the shallower Lower Cretaceous. Extensive drilling revealed that the Lower Cretaceous clastic fields, such as the Dahl Field, followed a northwest trend similar to the Triassic shoreface clastics.

In the north-easternmost corner of the province, which was remote from established roads, follow-up wells were drilled for discoveries made in the Upper Devonian Jean Marie Formation. Exploration had been underway on the Northwest Territory side of the border, and these Jean Marie wells were drilled as part of the hunt for Devonian plays on the Presqu'ile Barrier that extends into the southern territories. At about this time, the Rainbow Reef Middle Devonian carbonate play in northwestern Alberta was discovered, and development quickly ensued. Reefal plays were still at the top of mind for many explorationists in the Western Canada Sedimentary Basin, as they had been since the Leduc discovery, which was not yet in the distant past.

The white area in the extreme northeast defines the extent of the Cordova Embayment, a basin shale correlative portion of the Devonian section. A handful of wells had been drilled there to explore the edges of the shale basin and define the fringes of the Middle Devonian carbonate barrier reef.

Other significant developments of this time included a gas discovery from the Mississippian Debolt Formation at a-75-D/94-G-7 in the Grassy Field.

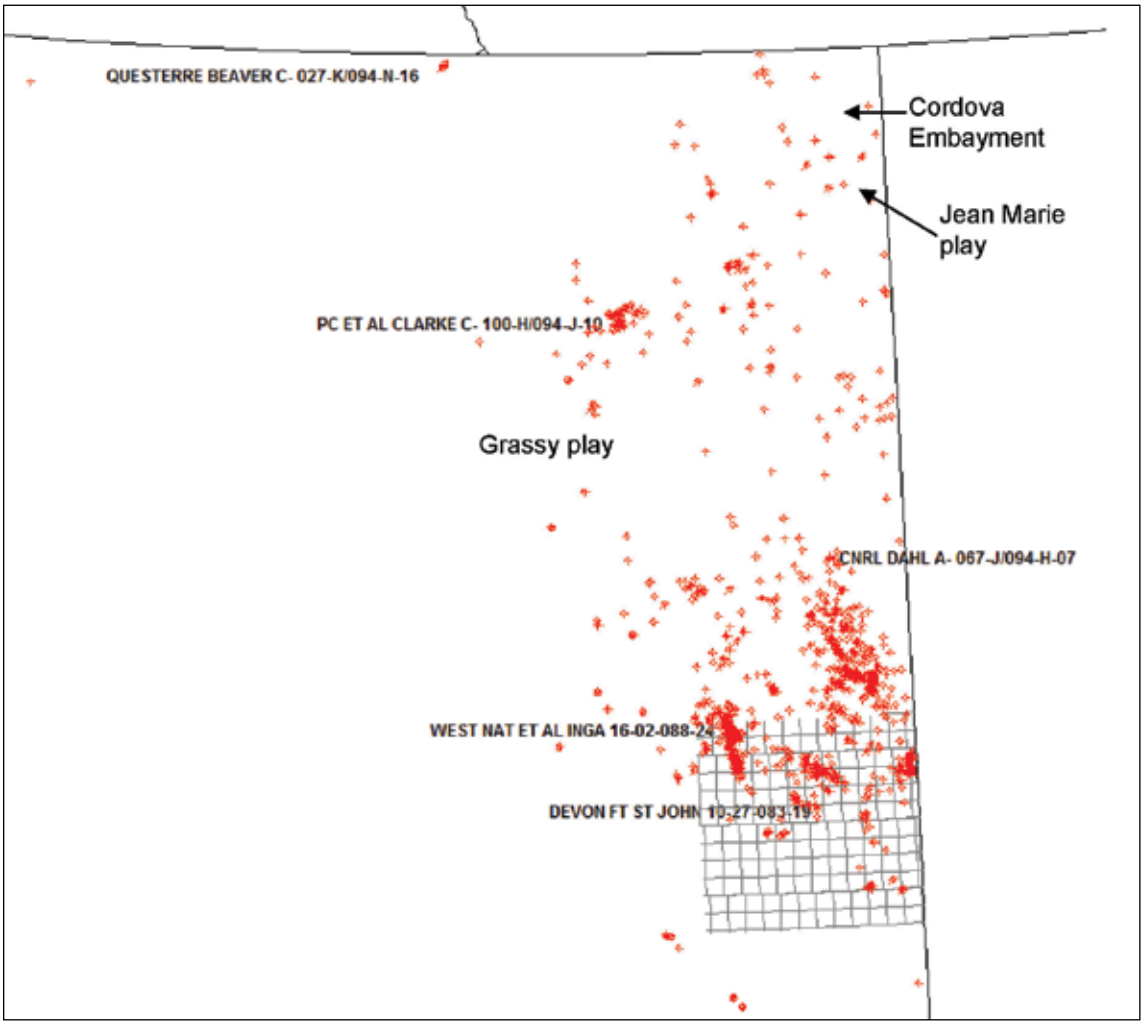

Figure 7: Drilling 1965–1970
Activity included further developments of the Clarke Lake carbonate play and extensions to the Dahl Field; it was moving away from rank exploration and instead clustering around existing fields.

1970–1975

This was a time of discord between the federal government and western oil producers. As a bargaining tactic, production was withheld, and therefore activity levels were low for part of this period. Also, the pace of discovery had slowed; most of the major discoveries we know about now had already been made. Some exploration wells were drilled in the white areas without success.

Drilling continued to expand the Triassic trend further to the north-northeast. The pace of activity for this trend did not match the march of development in adjacent parts of Alberta. Tensions between the BC New Democrat government and industry were high, as compared with the pro-business Conservatives in Alberta.

Possibly the most significant exploratory development was the discovery and drilling of Mississippian and Cretaceous shallow gas in the northernmost part of the province, just to the east of the linear Nahanni Formation gas trend in the foothills. Many wells were also drilled for Debolt Formation gas at Helmet Field, which would later expand to the edge of the Cordova Embayment.

Figure 8: Drilling 1970–1975
New discoveries, such as Pink, Sukunka, and Crow, were made in the disturbed belt along the western fringe of northeastern BC. Helmet was another significant development in the far northeast. Most activity centred on existing fields as oil companies stuck to safe prospects.

1975–1980

The first of many wells to follow were drilled during this period in the "Deep Basin" region of northeastern BC, south of Dawson Creek and adjacent to the Alberta border. On the Alberta side, drilling was very intense for the tight Lower Cretaceous reservoirs recently made economic by advances in fracing technology. This play is among the earliest prototypes of the so-called "resource plays" that have attracted more attention as the more mature basins run out of conventional targets.

Although northeastern BC was slowly running out of conventional wildcat targets, many small fields were still being found and existing play trends were expanding.

More drilling took place to define the linear foothill trends. Compared with "resource plays", these targets could be considered conventional despite being expensive and dependent on advances in seismic and drilling technology. The numbers of such wells drilled in any given year will always be low due to their expense and the technical difficulties in defining a location.

A new trend started to take shape at the Dahl Field (in block NTS 094H adjacent to the Alberta border) with the discovery of gas from the Bluesky Formation.

Most of the existing plays within northeastern BC were heavily drilled during this period because an oil boom caused by Middle Eastern political tensions was at its height. Despite the prevailing speculative frenzy for any reasonable play, only a few wells (unsuccessful) were drilled within the increasingly clearly defined white areas.

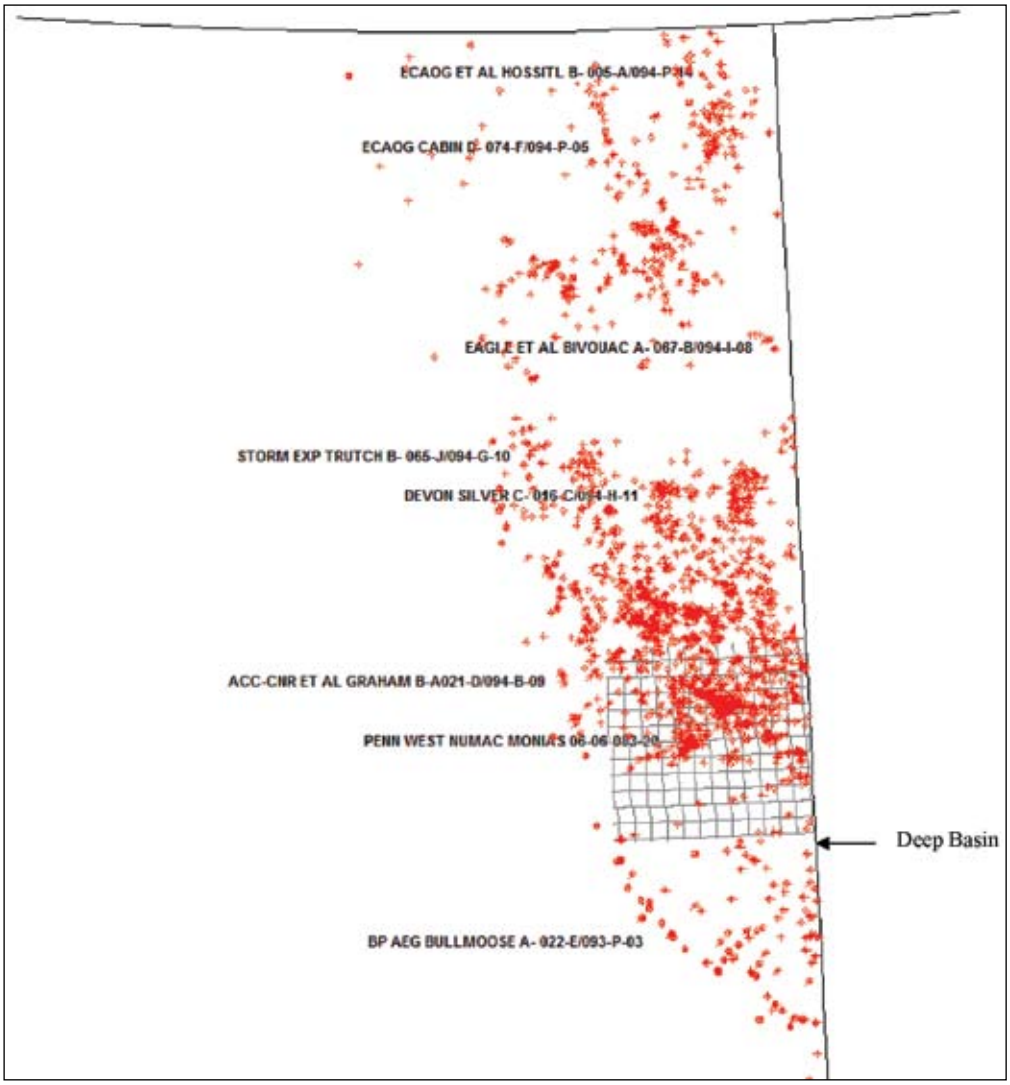

Figure 9: Drilling 1975–1980

Perhaps the most exciting new development was the drilling and production of gas from tight Cretaceous sands in the Deep Basin. A number of small fields in proximity to existing ones were also brought into production. A large number of wells were drilled during this period due to increases in oil prices caused by tensions in the Middle East.

1980–1985

This period was one of the most volatile of all time for the oil industry, both within Canada and worldwide. In the early part of the decade, oil prices remained near the record levels of 1979; before long, prices began a steady drop that lasted for the rest of the period. Activity and speculative fever peaked at the beginning but dropped very quickly by 1985. In Canada, the effects of oil price volatility were compounded by the National Energy Program, which imposed new taxes on production. One of the effects of this new policy was the diversion of significant amounts of investment from conventional plays in the Western Canada Sedimentary Basin to much more risky frontier plays on the north and east coasts. As a result, drilling activity slumped drastically from the peaks of the late 1970s.

One area in northeastern BC that did not suffer a drop in activity was the Deep Basin, where well density began to approach that on the Alberta side. The Helmet and Desan Fields also did not lack for activity where drilling density increased and drainage extended almost to the Alberta border.

Gas prices also were very low during this period. Many newly drilled gas wells were shut-in indefinitely because tie-in costs were high and no markets existed for the gas. A number of existing producers in more remote regions also were shut-in because low gas prices rendered them uneconomic.

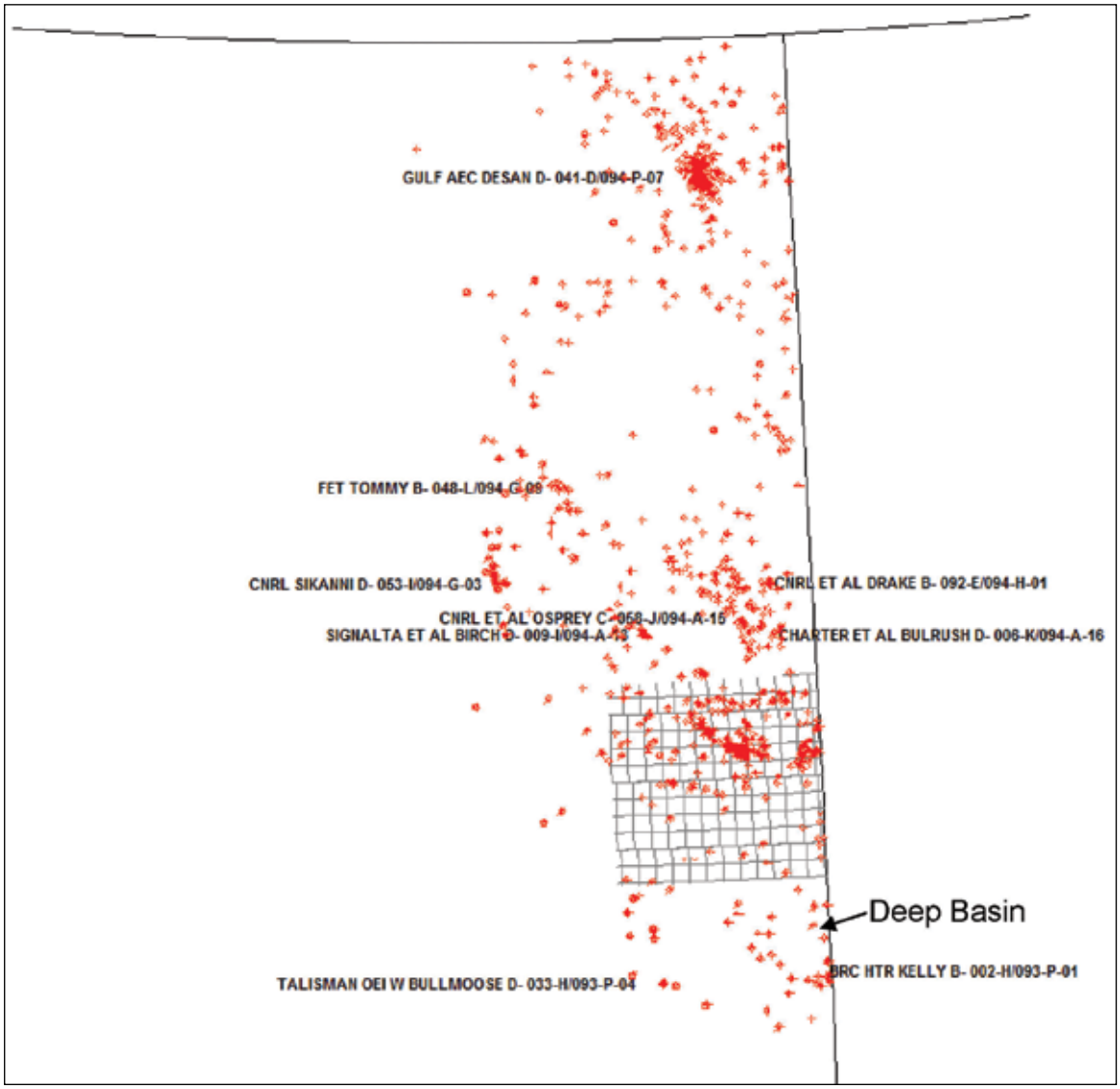

Figure 10: Drilling 1980–1985
The number of wells (1104) dropped considerably from the previous period due to a collapse in world oil prices and the National Energy Program in Canada.

1985–1990

The volatility of the previous period was followed by even greater volatility as the price of oil went from a steady decline to the steepest plunge of all time for one year in 1986. While oil consumers revelled in cheaper fuel prices, countries, regions, and individuals that had grown dependant on abundant revenues faced a stark new reality. Prices began to recover in 1987, but they did not approach former levels until they shot up briefly when Iraq invaded Kuwait at the start of the first Gulf War in 1990.

In BC, the downturn in oil prices led to a 40% drop in drilling activity in 1986 from 1985. Despite the drop in prices, infill drilling of oilfields continued. Toward the end of the decade, gas prices recovered, leading to a re-emphasis on gas.

Significant additions or extensions to existing play types were made in this period at Blueberry, Brassey, and Boundary Lake Fields and other areas. Although many new fields were brought into production, most of that occurred near other producers and no dramatically new play concept brought drilling into the white areas.

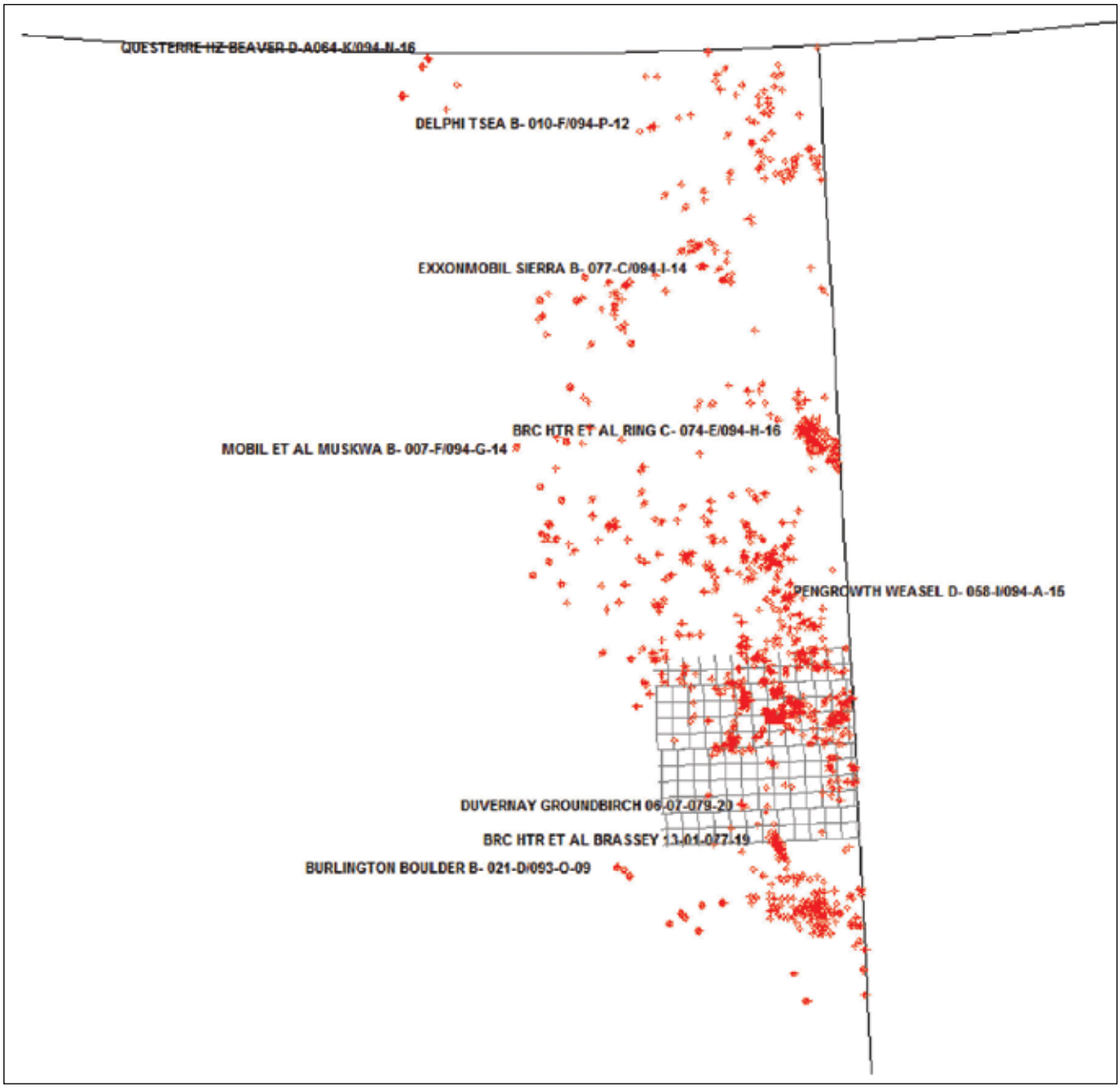

Figure 11: Drilling 1985–1990
Only a few small fields were found at this time. Most drilling (1274 wells) concentrated on safe infills. Low oil and gas prices suppressed activity.

1990–2000

Technology began to play an increasingly important role in the exploration of northeastern BC. Seismic imaging, especially 3D, continued to improve. Horizontal drilling opened up possibilities for exploiting previously uneconomic plays or extending the life of oidfields. Within exploration departments, computers appeared on the desktops of all geologists—the mapping capabilities of the personal computer were by this time greater than the most powerful mainframe of the previous decade.

Coinciding with a recession in Asia—and before the emergence of China as an economic superpower—oil prices hit rock bottom in 1998. They had never been so low in dollars adjusted for inflation. This depression lasted only a year, and by the end of the 20th century, oil prices began the more-or-less uninterrupted climb that continues today.

In northeastern BC, uncertainty over oil and gas prices restrained drilling activity until after the price collapse of 1998.

A small tongue of drilling extended into a white area with the development of shallow Montney Formation gas at the Kahntah River Field. Many new wells were also drilled for Lower Cretaceous Chinkeh Formation at the Maxhamish Field in the structurally deformed north-westernmost part of northeastern BC.

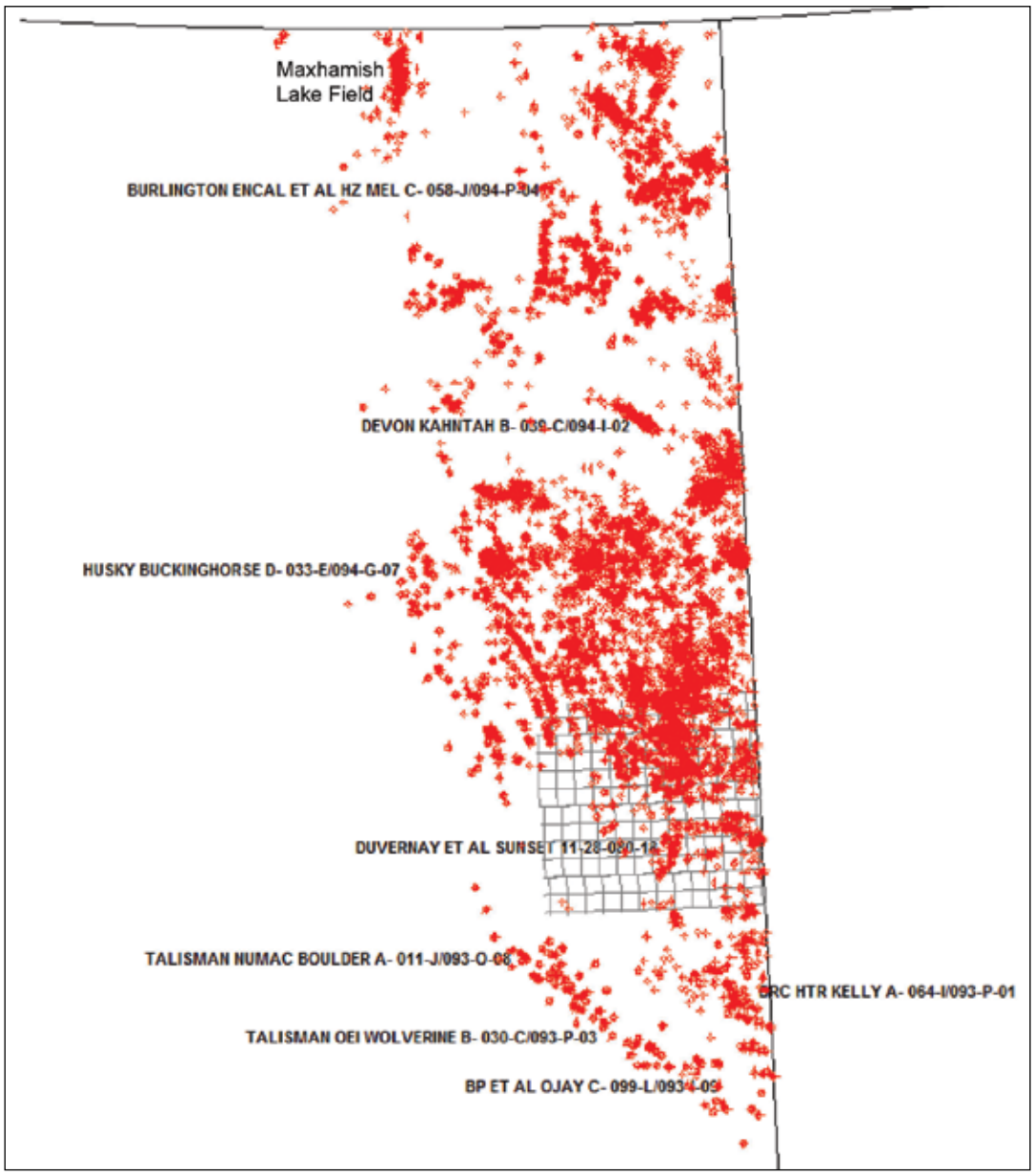

Figure 12: Drilling 1990–2000
Drilling activity remained low until around 1998, when it took off due to increasing oil prices. Activity concentrated around known developments and the white areas remained dotted with only a few outposts.

2000–January 2008

The steady rise in energy prices led to record levels of drilling activity throughout northeastern BC in the first part of this century. Most of the drilling took place within established areas, which began to resemble the mature petroleum regions of Alberta and the US. Only a relatively small number of wells were attempted in the white areas, despite the overall number of wells drilled and the availability of sophisticated new exploration technologies.

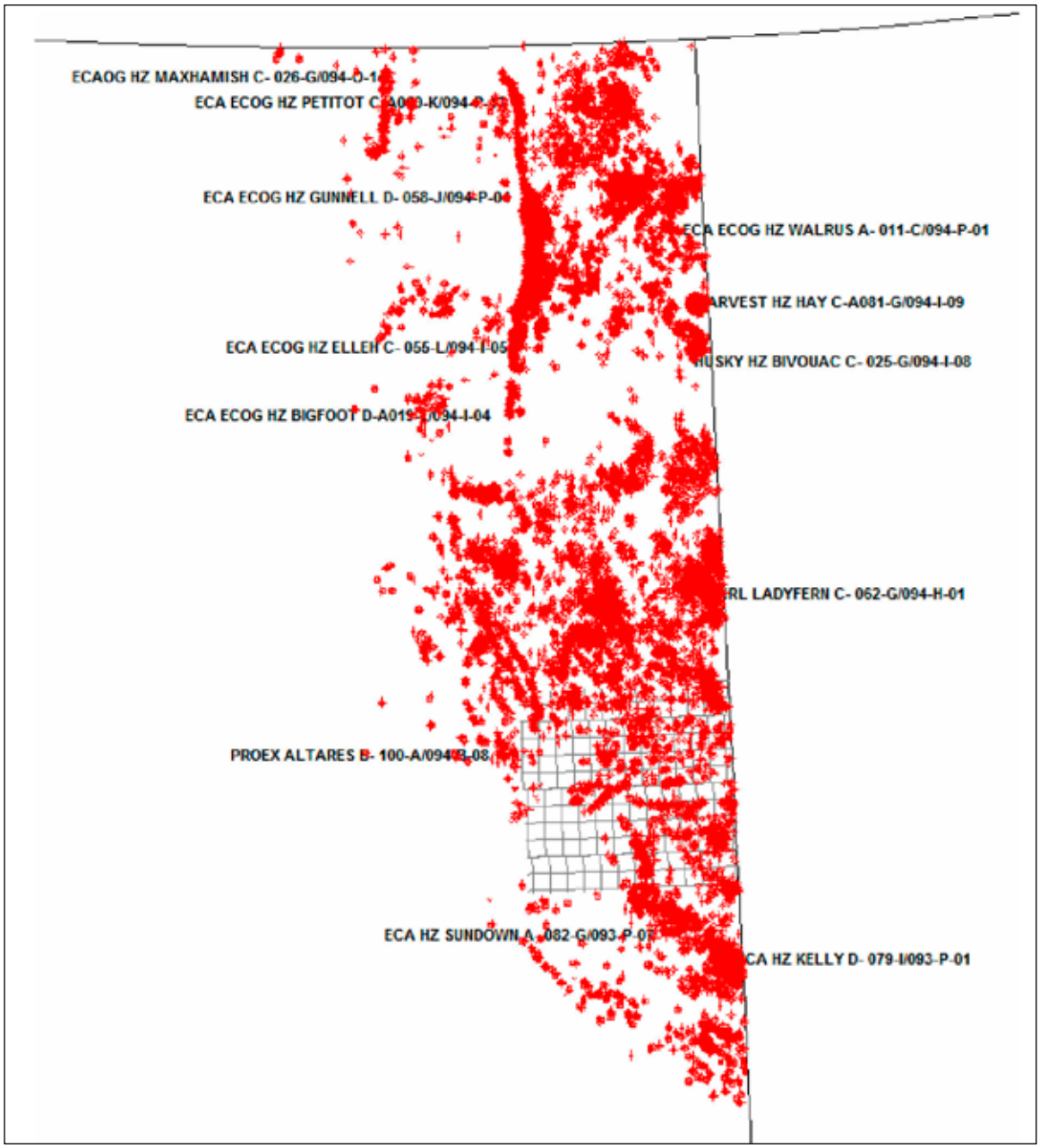

Figure 13: Drilling 2000–January 2008
Drilling reached all-time highs due to steadily rising oil prices. The Gunnell trend of the Jean Marie Formation became hotly pursued as technology improved to enable production from tight carbonates. The white areas received little new attention despite improvements in exploration and production technologies. Activity levels were strong in the demanding foothills areas.

SUMMARY AND CONCLUSIONS

The earliest wells in northeastern BC were drilled in the 1920s and 1930s in the Peace River area (which had already been thinly populated by settlers). Like elsewhere in the rapidly growing oil industry throughout the world, the earliest wells, and often still the best, were drilled on surface indications like seeps or obvious structures.

A non-seep discovery, the Leduc Field in Alberta, influenced the exploratory pursuit of the deep Devonian reefal trends in northeastern BC. Deeper drilling for Devonian targets near Fort Nelson also resulted in finding multiple potential producing zones in the Lower Cretaceous, Triassic, and Mississippian. The original Triassic discoveries near Fort St. John and Dawson Creek provided expanding trends to the north and northeast.

By the late 1960s, almost every corner of northeastern BC had been penetrated by a drill bit. Not all attempts found commercial shows of hydrocarbons. However, the areas around Fort St. John and Dawson Creek, with multiple pay zones in the Lower Cretaceous and Triassic, quickly became densely developed.

In the late 20th and the early 21st centuries, new technologies enabled the development of some of the previously discovered but uneconomic resource-type plays, such as the tight sands of the Deep Basin and the widespread Jean Marie Formation carbonates of the far northeast.

The primary play fairways within northeastern BC were largely well established by the late 1960s, and for economic reasons most exploration was concentrated on finding extensions to already well understood plays. The most daring and expensive wildcats were drilled in the foothills, but their risk was mitigated by increasingly precise seismic imaging and the promise of quick returns on investment with their substantial potential reserves. By contrast, in the more central parts of northeastern BC, including the white areas, the hopes of finding another huge discovery like Leduc were gone by the 1980s, so exploration focused on relatively low risk extensions to known plays.

During this latest extended boom in exploration, explorers have apparently not been tempted to drill extensively in the white areas, nor have any new exciting discoveries been made there.

SELECTED HISTORICAL HIGHLIGHTS IN WORLDWIDE PETROLEUM EXPLORATION

1789: Sir Alexander Mackenzie noted tar springs on cliffs above the eponymous Mackenzie River, near the present-day site of Norman Wells, Northwest Territories

1846: Abraham Gesner of Canada distilled kerosene from coal.

1853: Ignacy Lukasiewicz, a Polish pharmacist, developed a process to distil kerosene from seep oil. This was the start of the oil industry as we know it today.

1854: The use of kerosene for lighting provided incentive to dig several wells of roughly 50 m depth at the foot of the Carpathian Mountains in Poland. They are termed “oil mines”.

1857: Arguably the first oil wells in North America were drilled (dug?) in southwestern Ontario near Sarnia. Production for the first wells came from oil trapped above the bedrock beneath thick layers of peat and clay.

1859: The first wells to produce directly from consolidated bedrock were drilled in Titusville, Pennsylvania.

1870: The first supergiant field was initiated in Baku, Azerbaijan, to exploit the abundant oil seeping to surface.

1878: The first recession in the oil industry occurred when the invention of the electric light bulb by Thomas Edison negated the need for kerosene for lighting.

1886: Oil markets rebounded with the introduction of gas-powered automobiles in Europe by Karl Benz. The use of oil for steam locomotives also began.

1898: Automobiles made their appearance in Canada; consumption of oil grew rapidly, as did reliance on American sources for the Canadian market.

1901: Texas was ushered in as a major oil producer with the “Spindletop Gusher”. Its prodigious productivity sparked a worldwide frenzy in oil exploration.

1902: The first oil exploration well in Alberta was drilled at the site of an oil seep in Waterton Park (Cameron Creek).

1906: First recorded well (Steveston No. 1) drilled in the Fraser River delta; it was abandoned at 1200 feet.

1906: The first wells in British Columbia were drilled in the Fraser Delta on what were thought to be oil seeps and on a reported gas blow from a diamond-drill hole.

1908: Beaver Valley No. 1 was drilled, Cariboo area.

1909: Akamina No. 1 was drilled, Flathead area, southeastern BC.

1909: Natural gas was discovered in a well drilled near Calgary at Bow Island; the first gas pipeline was constructed to Calgary shortly after.

1909: Oil was discovered in Persia, now known as Iran.

1910: Oil was discovered in the "Golden Lane" of Mexico.

1914: Oil was discovered at Turner Valley south of Calgary, near the site of gas seeps and perpetual surface flares. An oil seep was discovered near Rolla in northeastern BC.

1914–1918: Oil became a strategically important commodity with the highly mechanized armies deployed during World War I. A shortage of steel and manpower prevented the exploration of prospects like the oil seep near Rolla.

1919: A well was drilled near Crowsnest Pass of southeastern BC to test the obvious structures and oil seeps of the area.

1920: Imperial Oil discovered oil at Norman Wells, NT, at the location noted by Alexander Mackenzie.

1921–1922: Several test holes were drilled in the Peace River district of BC based upon reported oil seeps and structures observed from surface mapping. One well drilled at Pouce Coupe blew out and killed a crew member. The presence of oil was confirmed.

1924: The second oil boom at Turner Valley, Alberta, started with the blow-out at Royalite No.4.

1927: Conrad and Marcel Schlumberger recorded the first electrical resistivity well log in Pechelbronn, France. It would be difficult to overstate the importance of this technological development for geologists and the oil industry in general.

1930: A well that did not provide encouraging shows was drilled to 2355 feet, six miles south of Kelowna.

Ca. 1930s: Vast oilfields were discovered in the Middle East, giving it great strategic and geopolitical importance.

1942: Adolf Hitler's ambitious plans to take the Russian oilfields in the Caucasus were stalled and eventually thwarted, on the battlefields of Stalingrad.

1943: Oil began to flow from Norman Wells to Whitehorse in the CANOL pipeline as a strategic supply for the US Army. The pipeline was dismantled after the war.

Ca. 1947: The first seismic surveys were conducted in the Aquitaine Basin of France. Exploration entered a new phase because subsurface structures could be visualized in two dimensions.

1947: Imperial Oil discovered oil at Leduc No.1 near Edmonton (after many dry holes drilled without the benefit of the new technology of seismic imaging). As a result, the Canadian oil industry was set upon a solid footing and exploration accelerated to other parts of the Western Canada Sedimentary Basin, including northeastern BC. In the years following the Leduc discovery, pipeline construction boomed, opening up more lands for exploration.

1953: The Pembina Field, the largest in western Canada, was discovered in a sandstone reservoir in north-central Alberta. Explorationists in western Canada realized that oil could be found not just in reefs or large structures such as thrust sheets but in a great variety of rocks and trap types.

1953: Oil supply problems during the Korean War led to the development of the Trans-Mountain pipeline from Edmonton to Vancouver and Seattle. A number of feeder lines were created to supply this pipeline.

1955: The first McDonald's, symbolic of the post-war, fuel-consuming, suburban lifestyle, opened outside Chicago. **1955**: The first commercial oil well in British Columbia was completed at Boundary Lake.

1956: The geopolitical importance of oil was underlined when President Nasser of Egypt expropriated the Suez Canal. Supplies of oil to Europe were threatened until tensions were diffused by United Nations peacekeeping troops.

1957: A pipeline was built from the Peace River area of BC and Alberta to carry natural gas to the American market.

1959: After several years of discouraging results, oil was discovered in the North African country of Libya. Several other major sources of oil, such as a revitalized industry in the former Soviet Union, came into the market at roughly the same time and caused a softening of oil prices.

1960: OPEC (Organization of Petroleum Exporting Countries) was formed in an effort to control oversupply of oil to the market and thereby exert some control on prices. Western Canadian oil producers sought market protection from the federal government.

1960: The deepest well in Canada (to that time) was drilled to a depth of 16,540 feet in the Crowsnest Pass area of southeastern BC. Compressed air rather than mud was used as the circulating medium.

1960: A facility dedicated to the storage and viewing of drill cores cut in BC is opened at Charlie Lake.

1965: Substantial oil discoveries were made in Devonian reefs of Rainbow Lake, northwestern Alberta. This intensified exploration along the Devonian barrier reef trend extending into northeastern BC.

1968: A confirmation well at Prudhoe Bay, Alaska, was drilled to demonstrate the potential of this very substantial oilfield. This led to the construction of the Alaska Pipeline and an intensification of exploration in Canada's Beaufort Sea and Mackenzie Delta.

1970: Following the lead of Prudhoe Bay, Imperial Oil made a large oil discovery at Atkinson Point in the Mackenzie Delta.

1971: Large discoveries of natural gas were made in the Mackenzie Delta.

1973: The first sharp rise in oil prices, in constant dollars, since the beginning of the oil industry began when Arab states tightened supplies to anyone who supported Israel in the Yom Kippur War.

1973–1975: Despite the spike in oil prices, activity in northeastern BC declined due to the drop in gas prices and the lack of significant oil discoveries. Bickering between the federal government and provinces over exports to the US also dampened activity as companies withheld investment in exploration.

1975: Activity jumped in northeastern BC and the rest of western Canada with a rise in gas prices. The boom of the late 1970s was on.

1979: The second energy crisis started when Americans were taken hostage at the American Embassy in Iran and Ayatollah Khomeini replaces the Shah. The price of oil reached the highest level of all time in constant dollars in December ($100.28 US in January 2007 dollars).

1980: The Canadian federal government imposed the National Energy Program. This resulted in a sudden and big drop in activity in northeastern BC and most of western Canada except the far north.

1982: Oil prices began a steady drop to the levels before the 1973 energy crisis. Activity in western Canada was not severely affected until 1986 when prices reached their nadir.

Ca. 1982: Vast improvements in computing power allowed the development of 3D seismic technology. This enabled far more precision in imaging the size, shape, and location of hydrocarbon reservoirs than did 2D seismic.

1985: A pipeline was constructed from Norman Wells to bring oil down to Zama in Alberta.

1986: A dramatic drop in world oil prices to the levels found prior to the first energy crisis led to company amalgamations, layoffs, re-evaluations of exploration projects, and a general drastic cut-back in activity.

Ca. 1988: Horizontal drilling technology opened up new possibilities for exploiting tight but continuous formations.

1990: A brief spike in oil prices occurred with the invasion of Kuwait by Iraq. Prices dove back down as Iraq was repelled.

1995: Around the mid-nineties the Asian economies went into a recession, which caused oil prices to fall to their lowest level ever, in constant dollars, around 1998. Another round of consolidations and layoffs ensued.

1998: Oil prices reached their nadir in adjusted dollar value and began their long climb up as OPEC instituted cuts in production. Asian economies recovered, and industrial production grew in China.

2000: The discovery of gas in hydrothermal dolomites in a remote part of BC (Ladyfern) leads to a mini-boom in exploration.

2001: The suicide bombings of the World Trade Centre and Pentagon raised the profile for North American energy security ever higher. Increased investment flowed in BC and western Canada.

2005: British Columbia raises a record amount of money in disposition of oil and gas rights.

2007 (late): British Columbia set a new annual record for money raised in disposition of mineral rights. This was due mainly to new interest in shale gas in shale basins in the northernmost regions of the province. "Resource plays" attract increasing attention in BC, Alberta, and the western US as conventional reserves run down and prove more difficult to replace.

2007: Tightening supplies due to increasing demand combined with continuing tensions in the Middle East led to an oil price of almost $100 per barrel—close to the adjusted record set in 1979.

2008: Interest in BC potential increases due to changes in royalty regimes on production in neighbouring Alberta. Changing demographics and political climate in Alberta pressures the government to make changes.

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