

The Early History of Power in the Yukon: The NCPC Years

Interviews with:
E.W. Humphrys, James Smith, David R. Duguid, Henry Breaden



Mayo Hydro Project, the storage dam under construction, October 1952. *David R. Duguid Collection*

Report and Transcripts compiled by
Helene Dobrowolsky
Midnight Arts
December 2004



Yukon
Development
Corporation

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Acknowledgments

I am indebted to a number of people for their help. Graham McDonald pointed me to some helpful sources and contacts. The very informative interviewees were Ted Humphrys, the first engineer hired by the Northern Canada Power Commission (initially the Northwest Territories Power Commission); James Smith, former Commissioner of the Yukon and later Chair of the NCPC Board; David R. Duguid, a former employee of Montreal Engineering – later renamed Monenco – who worked on several projects in the Yukon; and Henry Breaden, who spent most of his working life keeping the lights on in the Yukon.

All four men helped out in other valuable ways. Mr. Duguid also allowed me to scan several photographs, from his private collection, showing the construction of the Mayo Hydro Project. Mr. Breaden unearthed several relevant photos and documents and later sent along additional stories. These are appended at the end of this report. Mr. Humphrys sent a short history of power in the Yukon that he had prepared as well as some other materials and Mr. Smith allowed me access to his personal records deposited at Yukon Archives.

Joyce Bachli of Mega Reporting Inc. did her usual conscientious job in transcribing the interviews. The staff at both Yukon Archives and Dawson City Museum were extremely helpful during my research. Shannon Olson at Yukon Archives and the Northwest Territories Power Corporation helped out by providing two photographs on very short notice. As always, my partner Rob Ingram helped out in numerous ways. Finally, many thanks to Duncan Sinclair for his initial inspiration and encouragement.

Helene Dobrowolsky
December 2004

Introduction

In 2003, I was contracted to conduct an oral history project recording the circumstances and events of the great fire that destroyed the generating plant at the Whitehorse Rapids Hydroelectric Facility. In all, I interviewed eighteen people from a range of professions who were involved in fighting the fire, keeping the power on, handling the clean up and rebuilding, and dealing with the many management issues that arose during that turbulent time. The report, titled *The Great Fire of 1997: the Night the Lights Stayed On*, was submitted in January 2004. A copy was deposited with Yukon Archives to facilitate access by the public and future researchers.

One result of this work was that it became apparent that oral history was an effective and compelling method to document relatively recent events. It was also apparent that much of the history of energy development in the Yukon would be lost as key personalities were aging. Based on direction from the Board of Directors, Duncan Sinclair, the chief executive officer of the Yukon Development Corporation, requested a proposal for a project that would reach back to the time when the Northern Canada Power Commission built and operated the Yukon's three major hydroelectric facilities. After some discussion, this work expanded to include a combination of archival research and interviews with some NCPC pioneers. The purpose of the research is to identify resource material relating to the history of energy development, generation and distribution in the Yukon that is held in various archival institutions and libraries, and to facilitate future efforts to document, interpret and present the Yukon energy story.

The products of this work include:

-) cassette tapes of interviews and all relevant documentation with four former NCPC employees
-) this report which contains transcripts of these interviews
-) a bibliography of sources held outside of YEC and a point form chronology of events relating to the history of Yukon power
-) a large binder containing photocopies of several hundred historic photographs held by Yukon Archives and the Dawson City Museum Archives
-) a CD of photographs scanned from Mr. Duguid's collection, documenting the construction of the Mayo hydro project.

The bibliography and chronology have been compiled in a second report as another part of this project.

Oral History Methodology

The following four interviews were conducted between March and May 2003. With Mr. Humphrys, who lives in Ottawa, I arranged to record two extensive telephone interviews. I visited Mr. Breaden and Mr. Duguid at their homes on Vancouver Island, and I interviewed Mr. Smith in Whitehorse.

Prior to these interviews, I conducted research at Yukon Archives and consulted a variety of sources to prepare an outline of major events in power history in the Yukon. I then prepared a chronology to assist in conducting the interviews.

Two copies were made of each cassette interview with the master copy going to Yukon Archives, one copy to the interviewee and one copy for the YDC/YEC library. One exception to this was the interview with Mr. Duguid. He made extensive revisions to his transcript and requested that the cassette tape be destroyed and that the transcript serve as the main document. After each interview, I prepared a point form outline noting the counter number on the tape recorder and the topic that was being discussed at that time. This was also an opportunity to clarify spellings or ask any follow-up questions before giving the tape and outline notes to the transcriber. Joyce Bachli of Mega Reporting Inc. did a meticulous job of deciphering interviews. Joyce put the counter numbers in the margins so that the outlines could be used as a finding aid to the longer interview transcripts. These numbers have been removed in the edited versions used in this report but the outlines and annotated transcripts are available with the tapes at Yukon Archives.

All interviewees had the opportunity to review and edit their transcripts. Many changes were minor, often tidying up grammar or removing some of the verbal tics that we all have (e.g. “you know” or “sort of”). People also clarified information, removed items that didn’t seem relevant or expanded on certain topics. The addition of substantial new content has been indicated by [square brackets]. I then did a few tidy-up edits to make the manuscripts a little tighter for this report such as removing interruptions or repetitions. None of these affected the content.

After the transcript review, each interviewee read and signed an interview agreement that explained where the tapes and transcripts would be stored and how they might be used. Everyone received copies of all the products of their interview including the tapes, transcripts, interview agreement and a copy of this report.

The Interviewees

E.W. (Ted) Humphrys

In 1948, Ted Humphrys was the first engineer, indeed the first employee, hired by the Northern Canada Power Commission (initially the Northwest Territories Power Commission). He worked for the Commission for much of his career and was involved with the development of many major northern power projects. During that period, the Commission's responsibilities increased, the operating environment changed and finally, in the late 1980s, this crown corporation was dissolved and its assets were devolved to the territories. Mr. Humphrys' long association with power development, production and generation in the North was recognized in 1993 when the Snare Rapids Hydro Plant was dedicated as the Ted Humphrys Power Plant.

James Smith

This long-time Whitehorse businessman was appointed Commissioner of the Yukon in 1966, a position that he held for ten years. In 1975, Mr. Smith took on another great responsibility when he became the first full-time chair of the Northern Canada Power Commission. He brought a northerner's point of view to this job and was keenly aware that he had to answer to the people back home. Mr. Smith successfully lobbied for a greater northern representation on the NCPC board and, eventually, for the devolution of the control of the various power projects from the federal government to the Territories.

David Duguid

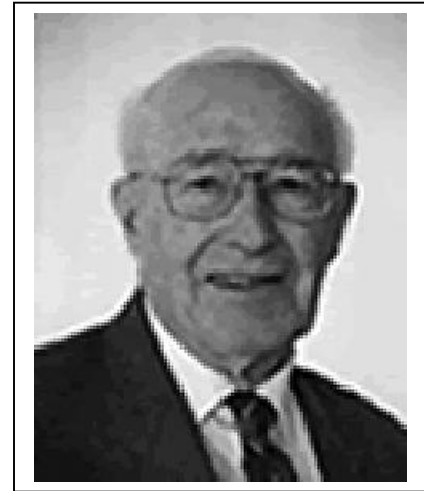
Born in Scotland, where he received his education as an engineer, David Duguid immigrated to Canada after World War II. He worked for Montreal Engineering, later Monenco, from 1951 until his retirement in 1981. During that time, he was involved with the construction of the Mayo Hydro Project, the rebuilding of the Marsh Lake dam, the Aishihik Hydro Project and construction of the fourth wheel at the Whitehorse Rapids Hydro Project. After his retirement, Mr. Duguid carried on consulting for NCPC and, then Yukon Energy until about 1991.

Henry Breaden

Mr. Breaden grew up in Mayo, spent nine years with the sternwheeler crews, and then worked as a ferry operator and mechanic. In 1957, after completing courses in diesel electric engineering and hydro power plant equipment with ICS (International Correspondence Schools), he began work at the Dept. of National Defence diesel generating station in Whitehorse. When the Whitehorse Rapids Hydro Plant was completed in 1958, he moved over to NCPC and for the next 30 years, worked in various capacities all over the Yukon. As well as being a wonderful source of northern stories, he has a keen interest in Yukon history and has made many contributions to the e-newsletter, *Moccasin Telegraph*.

E.W. (Ted) Humphrys

In 1948, Ted Humphrys was the first engineer, indeed the first employee, hired by the Northern Canada Power Commission (initially the Northwest Territories Power Commission). He worked for the Commission for much of his career and was involved in the development of many major northern power projects. During that period, the Commission's responsibilities increased, the operating environment changed and finally, in the late 1980s, this crown corporation was dissolved and its assets were devolved to the two territories. Mr. Humphrys' long association with power development, production and generation in the North was recognized in 1993 when the Snare Rapids Hydro Plant was dedicated as the Ted Humphrys Power Plant.¹



... we did come up with the idea or the proposal to build a hydro plant somewhere to supply the Whitehorse area; but because of the grandiose plans of this Frobisher-Ventures project, ... one of the things included was that they were going to flood out the City of Whitehorse area, the officials in Ottawa said we should scotch the idea of any concept of the Power Commission building a plant anywhere in that area to supply the Whitehorse area, because it was assumed that this Frobisher thing was really going to take over and run the whole issue of power in that part of the Yukon.

The first part of two telephone interviews, recorded March 3, 2004 by Helene Dobrowolsky in Whitehorse speaking to Mr. Humphrys in Ottawa. Transcribed by Joyce Bachli, Megareporting Inc. on 29 March 2004. Final review by Mr. Humphrys, including additional written content, completed December 2003 with text edits by H.D. Substantial changes or additions are set off in [square brackets].

Tape 1, Side A

Dobrowolsky: It's March the 3rd, 2004. This is Helene Dobrowolsky in Whitehorse talking to Mr. Ted Humphrys in Ottawa. The "E.W." is that Edward William?

Humphrys: Right.

Dobrowolsky: Mr. E.W. or Ted Humphrys, I thought perhaps we could just start out talking about you and your career, and then, we can perhaps go into more detail about NCPC and the various projects. So, an easy one – could you please tell me when and where you were born?

Humphrys: I was born in Alberta in 1913.

Dobrowolsky: And were you a rural boy?

¹ Mr. Humphrys' portrait is courtesy of the Northwest Territories Power Corporation and was taken from their website: <http://www.ntpc.com/yellow/corporate/board/ted.htm>.

Humphrys: Well, yes, in that I was born on a farm but I grew up in a village in Saskatchewan.

[Note: Mr. Humphrys later expanded on our discussion of the early history of his family and wrote up the following section.]

Family History

During the first decade of the 1900s, my father, William Humphrys, and a younger brother, (Frank) were bachelor farmers in the Canning Manor area of southeast Saskatchewan. My father's mechanical bent (as inherited from his father) led him to acquire a fairly large steam tractor engine and grain separator, and do custom threshing for other farmers in the area. Thrashing was an important (and remunerative) annual event in grain farming areas in those days and extended well into the fall months. My father would then spend much of the winter in Vancouver with siblings.

In 1909 or so, he became acquainted with a group of investors who had formed a syndicate to finance a mechanized grain farm in Alberta, founded on the lore of the time that grain farming on fertile prairie land in the Calgary area and near the railroad would be very profitable, as witnessed by the emerging commercially viable townsites (e.g. Carlstadt-Alderson). My father joined the syndicate as manager (operator) of the proposed farm. They purchased a tract of land near the village of Carlstadt (later renamed Alderson), midway between Calgary and Medicine Hat, Alberta, and two internal combustion engine tractors and land tilling equipment. One of the tractors was Holt caterpillar, forerunner of the ubiquitous "Cat" of today – Holt became the Caterpillar of Peoria, Illinois.

During 1911 my father started tilling the land and arranged construction of a bungalow type house and other buildings on the property. The syndicate evidently did not know, or ignored that their land lay within the arid Palliser's Triangle, an area known to be subject to periodic drought. They may have been victims of rampant land speculation.

My father returned to Cannington Manor in January 1912 to marry my mother (Olive Maher), a 26-year-old daughter of a local farmer. After honeymooning in Vancouver, they moved directly to the newly-built house on the farm where I was born in 1913. After three successive crop failures, it became apparent that the Palliser's Triangle drought had set in so the project was abandoned with little or no salvage value – except for me. With the advent of World War I and protracted drought, progressive decline of Alderson and similar communities set in, since the grain business was their foundation and *raison d'être*; by the 1940s, Alderson had ceased to exist.

In his search for an alternative activity to make a living, his mechanical bent led my father to purchasing a small flour (grist) mill in the village of Jasmine, Saskatchewan, about 100 miles northeast of Regina and well out of the Palliser's Triangle area. After about three years of marginal financial success, he decided to move the mill business to the neighbouring village of Kelliher, Sask. That was developing into a more viable community.

William Humphrys & His Work with Early Electrical Generation in Saskatchewan

During the Jasmine years, my father became acquainted with an entrepreneur salesman (Louis C. Spitzer) who had an elementary knowledge and interest in electricity and the fledgling electric utility business. He was a sales agent for a recently developed self contained, stand alone source of electric lighting, particularly applicable in isolated rural areas such as farms and/or small villages. This device had the general name of "DELCO," and was developed and manufactured by the Detroit Electric Light Company (hence the name D.E.L.Co.).

It was an ingenious compact unit comprising a single cylinder air cooled vertical engine driving an integral 32 volt direct current (DC) generator and an associated battery bank of 16 lead acid glass jar cells

(not unlike the modern 12 volt car battery). With appropriate wiring connected to the battery, lighting would be available at anytime with the turn of a switch. The system had a rated capacity of 800 watts. The engine/generator had to be operated from time to time to recharge the battery or supplement supply if several lights or appliances (e.g. working machines or water pumps) were in use; while the engine could be started by means of a hand crank. It could also be started by a switch mounted on the engine by which the generator element was converted to an electric motor drawing its supply of electricity from the battery bank, a bit of early “hi tech.”

The battery was the weak link in the system in that after a few years of use, or neglect – most often the latter – it would fail just as the modern car battery does. Since battery replacement was expensive, many installations fell into disuse. However in the latter years of the First World War, the price of wheat had increased so many farmers became fairly prosperous, creating a market for DELCO.

By virtue of his association with Spitzer, my father began applying his mechanical know-how to installing DELCOs and wiring premises for electric lighting. This led to a decision, probably abetted by Spitzer, who had some second hand equipment for sale, to establish a central electric light system in Kelliher in conjunction with relocating the mill. Through Spitzer, a couple of engines and belt-driven 110-volt DC generators were acquired and installed in the engine room of the newly-built structure erected to house the milling equipment.

There followed a busy year for my father and his helpers (1919-1920) building the elementary electricity distribution system in the village, and wiring residential and commercial premises for electric light. The electric light plant was operational from dusk until one a.m. and on Monday mornings to supply washing machines which had become popular appliances, frequently made by retrofitting electric motors to hand operated machines. When the mill was busy, electric power would be available continuously. After a few years, regular all night service was provided by installing an engine that could be shut down at daybreak by an alarm clock – like turning the key in car! Later on more powerful and efficient diesel engines were installed. Thus an infant electric utility was created!

Education

Hence I grew up and spent my teen years in Kelliher with my final high school year in Prince Albert, Sask., followed by three years in the mechanical engineering faculty of the University of Saskatchewan in Saskatoon, Sask. The University of Saskatchewan did not offer electrical engineering at the time but had a reciprocal arrangement with the University of Manitoba. So I transferred to the University of Manitoba in Winnipeg and graduated as an electrical engineer in 1935.

Early Employment

Jobs for new grads were scarce to non-existent in the mid ‘30s, so I returned home in Kelliher while I “searched for a job.” However, shortly afterward, the electric light plant/mill complex was destroyed by fire, so I spent the summer of 1935 assisting in rebuilding the electric light plant (the mill portion was not rebuilt) – thus I became a pseudo mechanic, electrician, machinist and lineman.

Having learned to climb power line and telephone poles, I was offered summer employment in 1937 and ‘38 with the Saskatchewan Power Commission as a relief district operator. I was slated for a permanent posting at the first available opportunity but, with the advent of World War II, the power commission did not expand, hence a potential career with S.P.C. did not materialize.

I spent the next couple of years in Kelliher at the electric light plant and doing electrical contracting work, until the summer of 1940 when I was offered a job in Ottawa with the British Supply Board, later the Inspection Board of UK and Canada, that had been established to supervise and inspect the manufacture of munitions in Canada. I carried on with the Inspection Board until 1948 when I obtained a position with

the newly-formed Northwest Territories Power Commission (NWTPC), as the Commission's electrical engineer, and its first salaried employee, as of September 1, 1948.

Northwest Territories Power Commission (NWTPC)

The NWTPC was a federal crown corporation created (as of Sept. 1, 1948) to undertake, administer and operate electric power projects in the NWT, primarily for the benefit of what was thought to be becoming thriving mining activity in the area. The Commission's initial function was to take over ownership and operation of a hydroelectric power plant (Snare River) some 90 miles north of Yellowknife that the federal government, in conjunction with a mining company, had built to supply power for the company's new gold mine at Yellowknife. The concept and management of that project had been assigned to the Water Resource branch of what was then the federal Department of Indian and Northern Affairs. Mr. J. M. Wardle who was a senior officer of the Water Resources branch was appointed Director of a Special Projects Branch of the Dept. and to be the first chairman of the Northwest Territories Power Commission. The Commission's Act legislated for a three member Commission so in due course, two additional members were appointed, Mr. Tom Patterson of the Water Resources Branch and Mr. George Lowe of the federal Dept. of Finance.

The Commission's first project under its own auspices was a diesel electric plant and distribution system in Fort Smith, then the administrative centre for the NWT (apart from Ottawa!). The Act was promptly amended to extend its jurisdiction to the Yukon Territory, which led to development of the Mayo and Whitehorse power plants. By a later amendment of the Act, the NWT Power Commission became the Northern Canada Power Commission and its authority extended to other parts of Canada such as the Governor-in-Council (i.e., the federal government) may authorize, examples of which were diesel electric projects in Field, B.C. and Moose Factory, Ontario, and the administration of federal grants for power related projects in the Atlantic provinces, as well as Manitoba and Quebec (Hydro Quebec Electrical Research Institute).]

[original interview resumes]

Dobrowolsky: So, what were your initial responsibilities? Did you play much of a hands-on role in terms of traveling north and assisting in the development of the Snare River plant?

Humphrys: Well, in the operation of it, yes. Yes, I was the main kingpin and was running it as the general manager and chief engineer.

Dobrowolsky: So, you would perhaps look after any contracting out that needed to happen in terms of servicing?

Humphrys: Yes, as purchasing officer, personnel officer and general administrator. Servicing or procurement of the machinery or repairs or equipment or materiel.

Dobrowolsky: When would you have traveled north for the first time? When did you make your first trip to Yellowknife?

Humphrys: I started with the Power Commission on September the 1st, and made my first trip to Yellowknife and the Snare River power plant on September 10, 1948. The plant was officially commissioned on October 4, 1948; Mr. Wardle and Mr. Muir, manager of Giant Mine) together closed the main switch that energized the transmission line to Yellowknife.

Then I made periodic trips, probably at least twice a year, later on more frequently.

Dobrowolsky: So, what was Yellowknife like at that period? What were your impressions of the community?

Humphrys: The city was just getting underway. It had been developed about five years before, just after the war. It was still a pretty elementary town. There was a small hospital, a school, a bank, and the “Signal Corps” of the Canadian Army had an establishment which was the communication facility. Communication with the “Outside” (i.e. the rest of Canada) was by signals, in effect telegrams, transmitted to and from the south (probably Edmonton) by radio.

The Hudson’s Bay Company had a store and there was a small hotel. There was a previous hotel too. So, there were two hotels. One was pretty elementary. The other was a fairly good hotel in the sense that it had two stories, and it boasted a bathroom facility. There were two corridors, a bathroom at the end of each corridor; one was for men and one was for ladies, and that was it.

The “city water system” was just being developed in the town at that time. There was a fairly good little restaurant or dining area in the hotel adjacent to the pub or beer parlour.

Dobrowolsky: Only one? This doesn’t sound like a northern town! (laughter)

Humphrys: Well, no, there was another one in the older hotel, the original or first hotel, about a mile away. That pub operated 24 hours a day and it was called the Old Stope, “stope” being a mining term. It was the real drinking place of the town at the time.

Dobrowolsky: The serious one?

Humphrys: Yes.

Dobrowolsky: For the career drinkers.

Humphrys: That’s right.

Dobrowolsky: I should know this, but I don’t. In the Yukon, there was a tremendous amount of development due to the various wartime defence projects, and I know some of this happened in the southwest corner of the NWT, places like Norman Wells. Did any of this affect Yellowknife at all? Did it go through any airport expansion, or was there any kind of a military presence there during the war?

Humphrys: Not Yellowknife (other than the Signal Corps) but Norman Wells was put on the map in a way by the American Army who were building the [CANOL project].² The only way to get into the Northwest Territories from the south (from Edmonton) was by rail to Fort McMurray in northern Alberta then, by water on the Slave River up to Great Slave Lake and across the lake to Yellowknife, down the Mackenzie River there to the Arctic, and that was more or less the [supply] route of the [CANOL project]. The route approached Norman Wells. The American Army was really opening up the various communities as construction camps, e.g. Fort Resolution, Fort Simpson and Norman Wells and Fort Norman.

² In 1942, the US Army began constructing a pipeline and road from the oilfields at Norman Wells 960 km over the Mackenzie Mountains southwest to a new refinery in Whitehorse. The goal was to refine the crude oil into aviation fuel for use at Alaska Highway airports. This wartime megaproject proved to be an extravagant failure; the refinery operated less than a year and the entire project was later abandoned. The term CANOL was short for Canada and Oil.

Dobrowolsky: Would Hay River have been affected at all?

Humphrys: Hay River was just coming in about that time (1948 or '49), because a highway was being built into Hay River called the "Grimshaw Highway", i.e. from Grimshaw, Alberta to Hay River.

Dobrowolsky: I just wanted to clarify what you were mentioning earlier. You were saying that the NWTPC (it doesn't really trip off the tongue) was established primarily to take over the Snare Rapids Plant, and you mentioned the plant had been developed in cooperation with Ventures Limited and the government. So, would that have been the federal government?

Humphrys: Yes, very much so. The territorial government, it existed, but it was a minor entity. The federal government looked after all resources, etc.

Dobrowolsky: So, would you recall offhand which branch or department of the federal government would have been responsible for this?

Humphrys: I think it was Indian and Northern Affairs. The Water Resources Branch was part of that. A senior member of the Water Resources Branch was seconded, or put in charge of the construction of the Snare River Power Plant and the Grimshaw Highway. The "Special Projects Branch" of the Department of Natural Resources with Mr. Wardle as the Director of that new branch.

Dobrowolsky: Okay, good. So, was the Crown Corporation formed in part to give the government a little bit more distance from the direct involvement with this particular project?

Humphrys: Yes, actually the Northwest Territories Power Commission concept was more or less framed on the likes of what was then called the B.C. Power Commission that had been established in B.C., or in Saskatchewan, the Saskatchewan Power Commission, an operating entity; the government didn't want to be involved in the actual day-by-day operations. The government had an agreement with the mining company (Giant Yellowknife Gold Mines) who had started work on the Hydro plant and the transmission line from the Snare Rapids Plant to Yellowknife (about 90 miles) and the government agreed that when the line was completed and the power plant was completed, they would take over the ownership of the transmission line and pay the mining company for what it cost them to build it. So, as of September 1949, the Northwest Territories Power Commission actually owned the Snare Rapids Power Plant and the transmission line to Yellowknife.

Dobrowolsky: I'm not sure if this is something that you would be entirely familiar with, but as far as the construction of the Snare Rapids Plant, do you remember the initial cost, how much that might have been? I realize this is a very difficult question, a long time ago.

Humphrys: Yes, I think it was something in the order between two and three million dollars. I don't remember the actual figure.

Dobrowolsky: Well, I may be able to locate that elsewhere.

Humphrys: There may be something in the archives in the Northwest Territories, in the museum. There were some photographs, etc. that had been taken at the time of opening the Snare Rapids Power Plant and they were all lodged with the museum or archives.

Dobrowolsky: Would that be the Prince of Wales Heritage Centre?

Humphrys: Yes.

Dobrowolsky: Okay, and I'm assuming that although Ventures Ltd. or the Giant Mine took responsibility for starting construction of the plant, they, in turn, would have subcontracted to companies with a specialty in this kind of development. Do you recall who might have been involved in engineering and construction of the plant?

Humphrys: Yes, the power plant was built and the construction was managed by Mr. Wardle and his associates from the Water Resources Branch in Ottawa. The plant was essentially designed by Montreal Engineering, a consulting firm in Montreal, and it was built by a contractor from Vancouver called J. W. Stewart and Northern Construction Limited.

Dobrowolsky: Good, those are both very familiar names. I think both firms ended up in the Yukon some years later.

Humphrys: Yes, well, both were involved in the design and construction of the Mayo Plant.

Dobrowolsky: So, you mentioned that the primary purpose of the Power Commission, when it formed, was to take over operation of the Snare Rapids Plant. Did it, at the same time, have a mandate for future hydro developments?

Humphrys: Yes. In those days, (1947-48), there was great enthusiasm of how the mining industry was going to develop in the Yellowknife area, which really didn't come off. But the Power Commission's mandate extended to providing power to other mines or communities.

So, after Snare Rapids, we built in Fort Smith, and subsequently in Fort Simpson and Inuvik. I surveyed and was planning to build a plant in Hay River, but the Korean War came along and the government retrenched and put a moratorium on capital construction projects sponsored by the federal government so Hay River plant was put on hold. Eventually, a private firm did move in and built a diesel plant there.

Dobrowolsky: Okay, and just to clarify, would this have been a Liberal Government at the time?

Humphrys: Yes.

Dobrowolsky: Do you recall who was the minister in charge?

Humphrys: I think his name was Glen.

[This would have been the Honourable James A. Glen, Minister of Mines and Resources. HD]

Dobrowolsky: What you were saying about plans for future development, we can get back to this a little bit later, but I certainly get the impression, from reading various studies done during the era and various articles, that there really seemed to be this grand faith that anything could be accomplished with engineering; and as you were saying, there was this boundless optimism, and there almost seemed to be something of a competition, who could make the largest and greatest hydro development. Could you speak a little bit about that?

Humphrys: I don't think there was any competition.

Dobrowolsky: Well, not a competition, but there were certainly some grandiose schemes that came out.

Humphrys: I think you're thinking of the Yukon, and that came on much later.

Dobrowolsky: So, we'll get to that a little bit later on, then.

Humphrys: Yes, there wasn't much competition or enthusiasm for other operations in the NWT. In the Yellowknife area, the first operational mine had been developed by the Consolidated Mining and Smelting Company. It was quite close to – within a couple of miles of the town site – and in order to get power for that mine, the mining company (Consolidated Mining and Smelting Company) who also built a hydro plant in an area called "Bluefish Lake," (about 35 or 40 miles out of Yellowknife). When the enthusiasm developed about mining development, the government didn't want the power resources tied up by one company. That's what led to the concept of developing the Northwest Territories Power Commission so power could be available to supply other mines, as well, and not be constrained by the ownership of a hydro resource by a private company.

Dobrowolsky: That makes a lot of sense.

Humphrys: That was really the concept that led to the development of the Power Commission as a Crown corporation.

Dobrowolsky: Ventures Ltd. also seemed to have played a role in interesting the commission in projects in the Yukon. I wonder if you could talk a little bit about that.

Humphrys: That was just the Mayo Plant, and that was pretty well covered by that article of mine about the NWTPC in the Yukon. I think if you check that up, I think you can get the whole history of that.

Dobrowolsky: Yes, and that essentially states that they were interested in the silver mines in the area.

Humphrys: That's right, at Elsa, yes.

Dobrowolsky: Yes, and approached the Power Commission about doing another hydro project in the Mayo Landing area.

Humphrys: They approached the government. In effect they said, "You've done this in the Northwest Territories how about doing it for us here?" (i.e. in the Yukon)

So, the government in effect said, "Okay"; hence the Mayo Hydro was the first hydro plant built under the aegis of the Power Commission (rather than a government department).

Dobrowolsky: As you were saying, this was the first construction project handled by the Commission. In the meantime, did the actual personnel increase during this time, or was it still basically the three commissioners, plus yourself?

Humphrys: That's right, and we hired operating staff; but as far as the management, it was still the three commissioners and myself.

Dobrowolsky: You were saying a few additional operating staff?

Humphrys: Well, the operating staff at the Snare River Plant and the diesel plant that we built in Fort Smith, and that was it until the Mayo Plant came in, and then, we had to put some staff at that plant, you know.

Dobrowolsky: M'hmm. So, maybe we can just review some of the – as you stated, this history that you prepared does an excellent job of talking about the design and development of the Mayo Plant, but maybe

we could just go over some of the main milestones. So, as mentioned, Montreal Engineering was again involved in doing the feasibility study and engineering investigation. One of the things that's a little surprising, in light of today's climate about these kind of projects, is there didn't seem to be a lot in the way of regulatory presence at that time.

Humphrys: There wasn't. It was very simple.

Dobrowolsky: Well, that made things much easier.

Humphrys: It did indeed. Yes, there was no such thing as environmental concerns. In fact, I can remember after I was working for the Department of Energy, Mines and Resources in Ottawa as the electrical advisor to the minister of the Dept., the concept of environment and ecology and so on was just emerging. But anyway, no, we had sort of a free hand for building power plants. All we had to do was to arrange for the government to pass an Order-in-Council to withdraw from disposal certain Crown lands that would be associated with or involved in the construction of a particular hydro power plant.

Dobrowolsky: So, essentially the main concern was legal considerations about any entailments of these properties or lands.

Humphrys: That's right.

Dobrowolsky: And I guess the whole idea of fish and spawning salmon, none of that really came up?

Humphrys: Not at all.

Dobrowolsky: So, then, when someone is doing a feasibility study, it would be mainly things like looking at the bedrock . . . ?

Humphrys: Looking at the water resources to estimate the amount of water that would be available, measuring the nature of the river as far as the head, that is the amount of the fall, wherever there is a falls that would be involved in building the dam; and then, as you say, what is called the foundation conditions for the dam, such as checking for rock and so on. That was the basic investigation part of it; having got all that information, then the design and construction was fairly straightforward.

Dobrowolsky: So these feasibility studies were conducted. The permits were obtained, I assume, with a minimal of fuss.

Humphrys: There wasn't even a permit. It was simply a – well, as far as the Power Commission building was concerned, they had to get authority by the passage of an Order-in-Council to authorize the Commission to borrow the money (from the government) to build the project. It wasn't called a permit but in effect it was.

[clarifying] From an Order-in-Council, that is from a Privy Council; and the Privy Council is, in effect, a committee of the cabinet.

Dobrowolsky: And what, if any, kind of consultation would have happened with the little Yukon Government at that time?

Humphrys: Well, the only project in the Yukon, of course, was Mayo; there was no involvement with the Yukon Government at all or the Yukon Council or whatever it was called at that time.

Dobrowolsky: There is a statement that you made in your history that the Commission's Joe Long was transferred to Mayo as inspecting engineer and ended up being seconded to Montreal Engineering staff in Montreal over the winter of '51-52 to work on design of the transmission line. So, when you say he was an inspecting engineer, would he have had some sort of government standards or just generally accepted good engineering standards that he was ensuring the work was being done to?

Humphrys: Just good engineering standards, just to make sure that the contractor was primarily doing what he was supposed to do. In effect, the inspection engineer was a member of the staff of the consulting engineering firm (i.e. Montreal Engineering) that was supervising the construction of the Mayo plant.

Dobrowolsky: So, essentially holding the contractor accountable.

Humphrys: Of course, the Montreal Engineering was supervising construction. They had done the design and had a resident engineer on the site, who supervised construction, and the inspecting engineer was sort of a government representative you might say or a representative of the commission separate from Montreal Engineering who, in effect, was a contractor. It was a peculiar position and a hangover from the Snare River project in the NWT.

Dobrowolsky: Yes, that's understandable. I have a note here that the prime contractor for the project was Northern Construction and J.W. Stewart Ltd. Now, were these associated companies or sort of the same?

Humphrys: No, it was one company. I don't know the genesis of the company's name. I think it was originally Northern Construction. Why the J.W. Stewart, I don't know.

Dobrowolsky: And it mentions an Andy Seraphim as the superintendent. Was that someone you ever met?

Humphrys: He was a construction superintendent of the Northern Construction and J.W. Stewart Company of Mayo, yes. Yes, I had met him. I don't remember how frequently or how extensively. This was about Mayo. Don't confuse that with the Yellowknife situation where Northern Construction and J.W. Stewart also built the Snare River plant.

Dobrowolsky: No, I understand that.

Tape 1, Side B

Dobrowolsky: I'm on side two of an interview with Mr. Ted Humphrys, and we were in the middle of talking about the Mayo operation. I was going to ask you about your own personal involvement in this one. Did you end up travelling to Mayo during the course of construction?

Humphrys: Yes.

Dobrowolsky: And what was Mayo like at the time?

Humphrys: It was very elementary.

Dobrowolsky: Even more so than Yellowknife, I imagine.

Humphrys: Very much so, yes. There was a little hotel; there was no door on what was called a bathroom.

Dobrowolsky: Oh dear, that is pretty elementary. So, this would have been a fairly small town?

Humphrys: Oh, yes.

Dobrowolsky: And would you have flown up, or did you get a chance to ride one of the sternwheelers?

Humphrys: No, they'd gone.

Dobrowolsky: So, the sternwheeler era was pretty much finished by that time?

Humphrys: Yes.

Dobrowolsky: So, other than elementary, small town, what about the mines at that time? Were they still developing, or were they fairly small operations?

Humphrys: What was called the United Keno Hill Mine; that was what the plant was built for. It was located at an area called Elsa, which was just the mining site. It was about 25 or 30 miles north of Mayo. There was a road there. A road had been established from Whitehorse up to Mayo, and the road continued on to the Elsa Mine. That was the only mining activity at that time.

Dobrowolsky: One of the things I wanted to ask you was, during the course of the Snare River operations and subsequently the Mayo development and operation, did you come across any unique problems to building an operating hydro system in the north?

Humphrys: Not particularly – well, it wasn't a problem, but what we had to design for was the fact that, over the winter, your water supply would be in what is called the reservoir – the lake supplying the water flow – and you had to recognize that. And then, the water that is discharged through the power plant would go down into a small river or stream and you had to make sure that the velocity of that water would be fast enough that it wouldn't freeze over; or if it did freeze over, it would get what's called a "board ice cover" over it, then the water can flow underneath the ice. But you had to make sure that that facility was adequate to conduct the water during cold weather, during the winter period. That's the main difficulty, I suppose, or main concern that you had to think about.

Dobrowolsky: M'hmm, and how about permafrost in the building, was that at all a consideration, or would this have been something that would have been addressed in the design?

Humphrys: Well, it would be addressed in the design. If you were fortunate enough to be able to build on rock, permafrost wouldn't be a problem, and it wasn't a problem as far as the hydro plants are concerned. But it was a problem in smaller communities when building, say, a diesel plant that was just, in effect, like a mid-sized garage and you had to put the plant on what would be called a big gravel pad that would not thaw out.

Dobrowolsky: So, insulate the building from the ground?

Humphrys: That's right, or else put it on piles driven into the permafrost. This was the common thing to do, particularly for housing in the permafrost areas.

Dobrowolsky: One thing I recall when I first moved north in the early 1970s was the drunken power poles, how quite often the poles that were carrying lines would end up kind of tilting.

Humphrys: They were probably set in permafrost, and the permafrost had thawed out.

Dobrowolsky: And what about supply lines? Of course, if something breaks down here, it's not a real simple matter to go to the store and get another one. Did this cause any particular problems?

Humphrys: Well, it caused a difficulty, depending on what you had to get. If it was a major item, it had to be shipped by air. Here again, you've got to separate the Northwest Territories from the Yukon concept because in the Northwest Territories, for the likes of the Snare River Plant or anything else in that general area north of or around Yellowknife, you were dependent upon water transport to Yellowknife; initially, by rail up to Fort McMurray, and then, by river barge up the Slave River and across the Great Slave Lake. Eventually by road (by truck) into Hay River, and then, by barge across Great Slave Lake.

But in the Yukon, it was a different matter, because there was a highway up to Whitehorse and even north up to Mayo by truck at any time of the year. Other than that, you were dependent upon air transport. Air transport, of course, was expensive, but it was also convenient; although it was limited as to the size and weight of material that you could ship at one time.

Dobrowolsky: And I guess the construction of the Mayo plant was also coincident with the building of the all-weather road to Mayo after the war; in that there used to be a winter road, but otherwise I think the community was pretty much reliant on summer sternwheeler service.

Humphrys: Yes, the main problem is that from Whitehorse to Mayo, there were three rivers that had to be crossed by barge ferries. Eventually the bridges were built.

Dobrowolsky: And then, of course, there were those times in the spring and the fall that the ferries couldn't operate.

Humphrys: Yes, but that again is more the Northwest Territories' problem than the Yukon.

Dobrowolsky: So, the Mayo Plant was completed in 1952.

Humphrys: Yes.

Dobrowolsky: So, how would your responsibilities have changed during this time? You had started out being primarily responsible for the operation of the Snare Rapids Plant, and now another plant had been built; and I'm assuming by that point, there was some discussion about other power projects in the Yukon?

Humphrys: Not immediately, no, not until we got onto what became the Whitehorse Rapids Plant, as you're undoubtedly familiar with.

Dobrowolsky: Yes, indeed.

Humphrys: That again is covered in that article of mine about NCPC in the Yukon.

Dobrowolsky: So, by '52, you would have had responsibility for operations of both the Mayo and the Snare Rapids Plant?

Humphrys: Yes.

Dobrowolsky: Let's talk about the Frobisher Project. This was, from the little bit of reading I've done, apparently this quite grandiose scheme which would have flooded downtown Whitehorse, detoured the Alaska Highway and drained the Yukon River headwaters into Atlin Lake and then through tunnels to

Tulsequah on the Taku River to where a huge smelter was to be constructed.

Humphrys: That's right.

Dobrowolsky: Can you remember much about how that came about and the planning for that?

Humphrys: Well, no, I didn't have anything to do with that at all. It had actually been sparked initially by Ventures, and we didn't have any association as the Northwest Territories Power Commission, as it was at that time. We didn't have any involvement with that. The first actual impact it had on the Power Commission is that we did come up with the idea or the proposal to build a hydro plant somewhere to supply the Whitehorse area; but because of the grandiose plans of this Frobisher-Ventures project, as you said, one of the things included was that they were going to flood out the City of Whitehorse area, the officials in Ottawa said we should scotch the idea of any concept of the Power Commission building a plant anywhere in that area to supply the Whitehorse area, because it was assumed that this Frobisher thing was really going to take over and run the whole issue of power in that part of the Yukon. But, I'm not very familiar with the details of the Ventures project. Quite a lot of investigation work was done on that all right.

Dobrowolsky: Yes, as you were saying, there was an assumption that this might go ahead and there would be this major relocation and re-diverting of the headwaters of the river. Again, given the climate of the day, there was no real questioning about the feasibility of this, or is this really a good idea?

Humphrys: I don't know. There might have been by some entities, but I wasn't familiar with it as to who might have done anything. I don't think anybody in the government just said, "Well, okay, let them go ahead and see what they do and we'll deal with it as it comes along."

So, I don't think there was any direct supervision from either the Yukon Government or the federal government about getting an authority or regulation as to what they could or could not do. It just petered out eventually, because the economics didn't make sense, and environmental concerns began to emerge.

Dobrowolsky: So, it really was kind of an outgrowth of this very strong pro-development stance. And again, as I alluded earlier, this idea that these grandiose schemes were not only possible but desirable.

Humphrys: Yes, that's right. There was a euphoria about development at that time.

Dobrowolsky: The other grand scheme I wanted to talk to you about a little bit was something called the "Taiya Project". This was largely an American scheme where they were again looking at using water from Bennett Lake, but I think again major flooding over a lot of the headwater lakes, and then, tunnelling it down to tidewater at Skagway to make the Alaskan Panhandle –

Humphrys: That's right. I don't know about at Skagway but to tidewater at some point.

Dobrowolsky: To tidewater, yes; to the new, the quote I have here is "industrial heartland of Alaska." So, did you hear much about this?

Humphrys: Just vaguely; it was sort of associated with the Frobisher scheme and so on, but it was a separate concept, and I had no reason to be involved or interested in it. So, I can't help you on that.

Dobrowolsky: So, you had no reason to really track this or see how that might affect NCPC's schemes.

Humphrys: No.

Dobrowolsky: So, when it came time to take another look at a possible hydro developments in the Whitehorse area, I understand that this was partly driven by new developments that were going to be put in on the east side of the Yukon River. The new hospital, plus the new largely government housing subdivision of Riverdale, plus there were a number of military camps in the area that were supplying their bases with diesel power. So, how did that come about?

Humphrys: How did what come about?

Dobrowolsky: Well, actively investigating the possibility of putting in a hydro plant.

Humphrys: Well, again that's covered by my article about NCPC in the Yukon.

Dobrowolsky: Yes, okay.

Humphrys: I don't think I can enlarge on that. As I said in that, we were sparked primarily by the fact that the Air Force thought they were going to expand their Whitehorse base, and they wanted the Army, that had already established a diesel plant for their own service, to supply the Air Force's additional needs, and the Air Force wanted more power so the army were going to have to install another engine to supply that; and that's what triggered my concept of developing a central plant.

And as I pointed out in that article, initially we thought about the possibility of a thermal station, using coal from the Carmacks area, which proved to be impractical. Then we started looking for a hydro plant site to supply the requirements of the Air Force and the new hospital, etc. which would permit shutting down the Army's the diesel plant. That was the thinking that led to the Whitehorse hydro project.

Dobrowolsky: You mentioned in your article that various sites had been checked, and you mentioned the Primrose Lake area west of Whitehorse.

Humphrys: Right.

Dobrowolsky: And the geology just wasn't very good for that. I ran into another reference somewhere else that mentioned Kusawa Lake had also been considered.

Humphrys: Kusawa, yes.

Dobrowolsky: And can you recall any other sites that might have been checked?

Humphrys: No, I don't recall – I don't think we were investigating any others at the time.

Dobrowolsky: But I guess, with the great power of the Yukon River right there –

Humphrys: Well, that's it. When we got the information from Montreal Engineering who had been doing the investigation of the Primrose site that it was not going to work out, I turned my thoughts – it was always in the back of my mind that there was a hydro potential on the Yukon River right at Whitehorse. It was so attractive from the point of view of location that I started doodling one afternoon in my office about how the plant might be developed, and came up with the conclusion that it might be feasible. I called up one of the engineers in Montreal Engineering and said, "Listen to this, what do you think about it?"

He replied, "It sounds good to me," and that led to really getting into detail, which led to the development of the Whitehorse Hydro Plant.

Dobrowolsky: So, you would have been already familiar with Whitehorse to a certain degree I guess on your trips to Mayo.

Humphrys: That's right.

Dobrowolsky: And during your visits, had you had much opportunity to look around?

Humphrys: Look around Whitehorse? No.

Dobrowolsky: You were essentially passing through?

Humphrys: That's right, yes.

Dobrowolsky: So, when you were doing your doodles that became the precursor of determining that the rapids were a feasible site, was this based on personal familiarity with the area or looking at maps or ...

Humphrys: Mostly with personal familiarity.

Dobrowolsky: And you mentioned in your article that this time there was a request from the Department of Fisheries to build a fish ladder, –

Humphrys: Yes.

Dobrowolsky: – including a barrier dam downstream of the main dam to help direct the migrating salmon stocks to the ladder. So, was this a first occurrence, or was this by now becoming standard in hydro projects, that Fisheries was paying attention to these kinds of issues?

Humphrys: Well, it was common in the States in the rivers that had known salmon runs and so on and somewhat in B.C., but it was the first one in the Yukon. As a matter of fact, in our original concept of the Whitehorse Rapids Plant, we didn't pay any attention to the fish problem. It was only when the Fisheries Dept. became aware of the hydro project. They had been having some problems with the Americans about fish in connection with the B.C. rivers that flowed into the States and their concept was they couldn't insist on protecting the fish and those particular areas vis-à-vis the Americans, if they didn't do the same thing in connection with the Yukon River with the Whitehorse Rapids. That's what led to developing the fish ladder at Whitehorse.

Dobrowolsky: So, when you mentioned a B.C. Tiver flowing into the States, would this have been the Columbia?

Humphrys: Yes. Well, there are various rivers, but I think Columbia was one of the main ones, but I can't be specific about that.

Dobrowolsky: No. Well, that's interesting. So, in essence, the impetus for these studies had started in the United States, and Canada was kind of following an American lead?

Humphrys: Oh, no, I wouldn't want to put it that way. I don't know when the concept of building fish ladders in the States or anything like that started. I have no idea.

Dobrowolsky: But you feel that as a result of the Department of Fisheries' experience with these American projects, they came to feel that this was essential.

Humphrys: That's right. In fact, as I say, they felt that they couldn't hold their head up high with the Americans if they let something go by in their own bailiwick.

Dobrowolsky: Well, that makes sense.

Humphrys: Yes.

Dobrowolsky: So, I understand this time Montreal Engineering was again very much involved in the design of this plant.

Humphrys: That's right.

Dobrowolsky: Montreal Engineering, I assume they were quite a large company, operating nationally?

Humphrys: Yes, they became that. Originally when we started, they were a comparatively small engineering firm, an offshoot originally of what was called Calgary Power. They were owned by Royal Securities in Montreal. They developed into more and more primarily hydro work and became quite a big organization. Eventually they were taken over or merged with other engineering companies, and they no longer exist as a separate company. They are now a unit or a branch of a big British company.

Dobrowolsky: And then, I read somewhere that Poole Construction of Edmonton was the main contractor that handled the construction of the Whitehorse plant.

Humphrys: Yes.

Dobrowolsky: And apparently they were doing a number of projects around Whitehorse at the time, I believe.

Humphrys: Well, they did some projects at Inuvik in the Northwest Territories. I don't know what they might have done in the Yukon. They might have had something but I don't know.

Dobrowolsky: And what was your involvement during the actual construction? Did you come up to monitor things or have a look around?

Humphrys: Yes, I visited the construction site on several occasions and kept very close tab on it, of course. Montreal Engineering was supervising construction. They had a resident engineer on site, and my interest was primarily as the owner to see that things were going as they should.

Dobrowolsky: And do you feel that that all went fairly smoothly?

Humphrys: Oh, yes, yes.

Dobrowolsky: So, no particular glitches during the course of construction or surprises?

Humphrys: Not on Whitehorse. There was a problem on the original Mayo Plant but that's another story.

Dobrowolsky: Well, let's divert. What was the problem on the Mayo Plant?

Humphrys: On the Mayo Plant, it's hard to describe this if you're not familiar with hydro and civil engineering; but the concept of where the plant was being built involved a tunnel that would conduct the water from the dam to the power plant where it would go through the power plant, and then, flow into the

river just slightly above the townsite of Mayo. While excavating the tunnel, there was suddenly a near collapse. After some geological investigation, it was found that there was what is called a geological fault in the area where the tunnel was being built, which made it necessary to reroute the tunnel to avoid this fault condition. That was the problem.

Dobrowolsky: So, was this a matter of moving things a few metres or a great distance?

Humphrys: No, just a few metres.

Dobrowolsky: Yes, I can see where that would be an expensive surprise.

Humphrys: It was, yes. It's the sort of thing that could be avoided if you did very extensive what's called "drilling information" along the route of the tunnel. That is, by "drilling," a rock drill is used to take up core samples of the ground or the rock. It's an expensive process if you want to do it entirely. So, it's a question of balance whether you go by the geological evidence that you can determine from the surface, or to what extent you should do subsurface investigation. In that case, I guess a bit further investigation would have been helpful, but it wasn't done.

Dobrowolsky: Yes, it's always tricky to find that balance between costs. I understand.

Humphrys: As I often said, "Engineering is no problem if you don't care about cost."

Dobrowolsky: So, speaking of cost, what kind of a budget was NCPC operating under during this time?

Humphrys: Well, there was no particular budget. We simply knew the projected revenue would be from the plant and that was it. It was pretty elementary. We didn't go through a long process of forecasting and getting budgets established, and then, saying, "Well, we can't do this because there's not enough money in the budget" and so on. We simply did it, and either we knew that the capital and operating costs would be well within the revenue available, or else it wouldn't be done. So, it was pretty elementary as far as the financial administration was concerned.

Dobrowolsky: And in terms of building these large projects, was this done on the basis of loans, or how exactly did that work?

Humphrys: Well, generally speaking by loans from the Federal Government, yes. We had to have an Order-in-Council to authorize the building of the project based on the projected cost of the plant. The money would be put up by the Department of Finance, as a loan from the federal government to the Power Commission. There were conditions attached as to the rate of interest would be and the terms of repayment of the loan.

Dobrowolsky: And I assume there was an expectation that eventually this investment would be recovered through the sale of electricity over time?

Humphrys: That's right.

Dobrowolsky: I ran into a figure of 7 million dollars for the cost of constructing the Whitehorse Plant. Does that seem about right to you?

Humphrys: Yes.

Dobrowolsky: And how about the Mayo Plant, about how much do you think the cost of that might have

been?

Humphrys: Well, I don't remember exactly but I think it was on the order of three million.

Dobrowolsky: So, any other kind of particular things about the Whitehorse Plant? Was this pretty straightforward? Were there any different things in the design or different construction techniques?

Humphrys: No, no, it was quite straightforward.

Dobrowolsky: So, this was pretty straightforward in terms of putting together a dam and plant.

Humphrys: It was quite straightforward as transportation was no problem. Actually the White Pass and Yukon Railway built a little spur off the railroad in order to deposit the heavy construction equipment or material almost at the site. A warehouse yard was established right there.

Dobrowolsky: That is a luxury.

Humphrys: It was indeed.

Dobrowolsky: Great, and how about with early operations? I ran into a reference that the first year there were a number of surges due to problems with the governors. Does this ring any bells?

Humphrys: There was a problem there initially, yes, in the early part of the first year of operation. That only happened on two or three occasions I think. It wasn't a long-term thing.

Dobrowolsky: And this was something that was not very difficult to fix?

Humphrys: No.

Dobrowolsky: And I also wanted to ask you about relations between Northern Canada Power Commission and the Yukon Electrical Corporation Limited, which was initially the generator and distributor of electricity in Whitehorse, at least the main town. Then there were these military diesel plants. I know there was one in the Takhini area. Was there another one, as well?

Humphrys: Well, the military (Army) had two or three around.

Dobrowolsky: Yes, I think there was one downtown and perhaps one at the airport.

Humphrys: Yukon Electric, as I recall it, had a diesel plant downtown near the railway station.

Dobrowolsky: That's right, yes, just upriver of there.

Humphrys: Yes, and they had another two hydro plants up in the hills, near Whitehorse. The army had the main diesel plant in what was the army base.

Dobrowolsky: Might that have been Takhini?

Humphrys: Yes.

Dobrowolsky: So, my understanding is around the time that Northern Canada Power Commission completed the hydro plant, the locally-owned Yukon Electrical sold the utility to Canadian Utilities

Limited of Alberta.

Humphrys: That's right.

Dobrowolsky: And then, apparently NCPC sold power to Yukon Electrical Co. Ltd., who in turn distributed it.

Humphrys: That's right.

Dobrowolsky: And what kind of working relationship was this? My impression was that this was not always really smooth and straightforward.

Humphrys: Well, I don't know that there was any difficulty. It was a contractual arrangement. We supplied the power at a certain rate, and they paid us for it. There may have been some local problems that I wasn't aware of.

Dobrowolsky: And was the late '50s around the time that the first utilities board was established? Is this something you would have had any involvement with, or would this again be more of a local thing?

Humphrys: It was very local. I didn't have any involvement with it.

Dobrowolsky: Okay.

Humphrys: Again, there are two separate entities here. There's the Northwest Territories, and they have a utilities board, and I guess the Yukon had a utilities board. I don't remember about the Yukon. I know about the establishment of the one in the Northwest Territories; but I can't recall if and when there was one in the Yukon, but I guess there must have been. That must be in the archives or somewhere.

Dobrowolsky: Yes, I can certainly look that up. I was just wondering if this was something you had any kind of idea about. And then, I ran into a number of studies by a geologist, I think it was E.B. Owen, who seemed to have been checking out an amazing variety of rivers and sites throughout the Yukon in terms of hydroelectric potential, I believe for NCPC. Do you recall much of this?

Humphrys: As I recall, Owen was a junior geologist in the Department of Geological Surveys in Ottawa, and he was one of the people that went to Mayo at the time of the problem with the tunnel to determine the geological situation. Much later, the power commission did survey or look at a number of potential hydro sites in the Yukon. I don't remember that Owen was involved with that, though. There were no major geological studies done on these various potential sites. They were just sort of preliminary feasibility studies that covered a number of potential sites.

Dobrowolsky: Yes, they seem to be fairly short, like between about six to twelve to thirty pages.

Humphrys: Well, there were extensive reports, and I imagine they're all in the archives.

Dobrowolsky: M'hmm, yes. So, again, was the sense that these would be identifying potential hydro resources in the event of future developments, necessitating additional plants?

Humphrys: Possibly. I think it was sort of building an inventory of knowing what's available in case of need. One of the elements that might have been sparking some of that was the concept of the Alaska Pipeline through the Yukon and the possibility of supplying hydro power to run the pumping stations on the pipeline on the concept that it would be better to use the hydro power to run the pumps, rather than the

gas in the pipeline so that the gas could be sold at the terminus at a valuable price. I think that was the driving force to check out some these sites or check out and inventory them.

Dobrowolsky: Well, that all certainly makes sense. Mr. Humphrys, I'm going shut this down. I've kept you on the phone for over an hour-and-a-half. This has been really helpful, but what I would like to do is continue on in another session. I'd still like to ask you some more about the continuing situation in the Yukon and your own involvement. So, if it's okay with you, I'd like to set up another telephone meeting.

Humphrys: Oh, sure.

Dobrowolsky: Well perhaps what would be useful for me would be to have some time to go over this interview. Then I can flag any kind of follow-up questions from this, and then, we can continue along, perhaps early next week sometime?

Humphrys: Yes, I think next week would be all right. You could fax me a proposed date or something like that.

Dobrowolsky: Thank you very much for this. This has been extremely helpful.

Humphrys: Bye now.

END OF INTERVIEW, PART ONE

E.W. (Ted) Humphrys, Part 2

Telephone interview recorded by Helene Dobrowolsky in Whitehorse speaking to Mr. Humphrys, March 9, 2004 in Ottawa. Outline notes prepared by H.D., 9 March 2004; transcribed by Joyce Bachli, Mega Reporting Inc. on 8 April 2004. [Additional information in square brackets.] Mr. Humphrys' edits were completed in December 2004 then typed and added by Helene.

Tape 2, Side A

Dobrowolsky: It's Tuesday March the 9th, 2004. Helene Dobrowolsky in Whitehorse talking to Mr. Ted Humphrys in Ottawa, and this is a continuation of an interview that we were doing a week ago, talking about Mr. Humphrys' long association with the NCPC. When last we spoke, we were talking about the Mayo Plant and the building of the Whitehorse Plant. Now I understand that the Mayo facility was expanded in the late 1950s. Another 3,000-horsepower turbine generator unit was installed.

Humphrys: That's right.

Dobrowolsky: Do you remember at all what was the reason for that decision?

Humphrys: The United Keno Hill Mine wanted more power, and they were going to expand, I've forgotten exactly what they had in mind, but it was a matter of providing more power for their expanded operation.

Dobrowolsky: So, as the mine expanded and they were using more machinery, they needed more power?

Humphrys: That's right.

Dobrowolsky: And was this a fairly straightforward thing to do? Were there any special challenges or rebuilding required?

Humphrys: No, no, it was quite straightforward. No particular problems arose, I don't think, as far as I can recall.

Dobrowolsky: So, when you put in another one of these generators, as well as putting in the machinery in the plant, do you also have to make another penstock? Did any other revisions to the actual water part of the facility have to be done?

Humphrys: There would have to be another connection to the tunnel and I don't remember what we did about that. We may have created another penstock connected to the tunnel or to the first penstock to supply the second unit.

Dobrowolsky: So, by this time in the late 1960s, how had things changed at NCPC? It sounded like when you started the Commission was, to use one of your terms, quite elementary, yourself as the engineer and three commissioners who were doing this part time, as well as their other government jobs.

Humphrys: That's right.

Dobrowolsky: So, how did things change at NCPC over that time?

Humphrys: Not very much, it remained that way. The commissioners were government employees in one capacity or other. I think the chairman might have been the deputy minister of the department at the

time, and other commissioners were senior government officials. I continued my role. By this time, I was designated general manager and chief engineer, and we'd added staff to our head office, primarily as assistants in the engineering section, and one or two additional people in the accounting section. That's about the only major changes. There was no great change.

Dobrowolsky: So, it was primarily an increase in operational staff, –

Humphrys: That's right.

Dobrowolsky: – and you were taking on more of a, it sounds like, supervisory role.

Humphrys: Yes, well, I don't know if I was taking on more. I just continued.

Dobrowolsky: You just had a better job title.

Humphrys: Yes.

Dobrowolsky: So, when you were talking before, you mentioned that you were making four to six trips north every year to inspect these various NCPC projects. Was that still something you were doing?

Humphrys: Yes.

Dobrowolsky: So, you still managed to get in quite a bit of "fieldwork".

Humphrys: Yes.

Dobrowolsky: Maybe while we're in the process of talking about NCPC, could you tell me a little bit about the decision to move to an office in Edmonton or to set up an Edmonton branch office? How exactly did that work?

Humphrys: That came about much later after my time. I left the commission in the late '60s, and sometime before I'd left the Commission, there was a developing recognition that the administration was in Ottawa, but there were two major operating centres in the Northwest Territories and the Yukon.

There was a feeling that it'd be better if the head office or the headquarters could be established in the north, and the question was whether it should be in Whitehorse or in Yellowknife; and after a good deal of soul-searching and investigation and I think they had a consultant studying the problem, and the conclusion was that they should be in Yellowknife.

However, that hadn't come to fruition. It was still under study, but in connection with the concept of moving the headquarters or the operating administration to the north or to the west, it evolved into saying, "Well, it would be better to be in Edmonton, because there's sort of equal access to the Yukon and to the Northwest Territories out of Edmonton, coupled with the fact that most of the hiring and procurement of materials and so on for both operations, either the Yukon or the Northwest Territories were mostly sourced in Edmonton. I think that's what primarily led to the decision to move the headquarters to Edmonton.

By that time, my successor, the general manager, was Mr. John Lowe, I had hired him originally as a senior engineer, my number one assistant; and he succeeded me. It was he who actually masterminded the move of the Commission headquarters to Edmonton, including buying property and putting up a building, a head office building in Edmonton. In due course, the whole of the Ottawa operation was physically

moved to Edmonton. Most of the staff moved, but not all. There were a few staff that elected to stay in Ottawa, either because their husbands or their wives had jobs in Ottawa and various reasons, but all of the senior staff moved.

Dobrowolsky: So, quite a big change.

Humphrys: Yes, that was a major change.

Dobrowolsky: Just to nail down a couple of little things, on your little biography that I have here, I have you resigning from NCPC in 1969.

Humphrys: Yes, that's right.

Dobrowolsky: So, John Lowe would have been your successor shortly after that time, and the move would have probably happened in the early 1970s?

Humphrys: That's right.

Dobrowolsky: But I do understand you kept an association with the NCPC even after you left to take another position, and it says here, "as advisor to the Chairman of the Commission." Could you let me know what that involved?

Humphrys: That's right. Well, initially after the transfer to Edmonton, one of the members appointed to the Commission was an Assistant Deputy Minister in the Department of Energy, Mines and Resources [A.D. "Digby" Hunt], which was the division that I was with at that time. He was made a member of the Commission staff. He pretty well relied on me to look after his interests insofar as the Commission was concerned. That carried on for two or three years. I continued as a sort of advisor until that Assistant Deputy Minister, was no longer on the Commission. Instead of acting as an advisor to his successor, I became involved with a new Chairman of the Commission [Mr. Jack Beaver] until Mr. Smith became Chairman. About that time I retired from the government in 1978, I was still somewhat involved with the Commission as an advisory role. Then Mr. Smith asked me to stay on as an advisor, because I was retired from the Department of Energy, Mines and Resources. So, that's how it developed.

Dobrowolsky: And when you're talking about Mr. Smith, this is the appointment of Yukon resident James Smith as the first full-time Chair of the Commission in 1975?

Humphrys: That's right.

Dobrowolsky: So, by being an advisor, I'd assume by this point you would be very much the corporate memory, owing to your long association with the Commission right from the beginnings.

Humphrys: That's right.

Dobrowolsky: What kind of matters were you asked to advise about?

Humphrys: The general operation of the Commission insofar as major events were concerned and any necessary acquisition of new equipment to meet increasing loads because of the increasing power demands throughout the territories. I was sort of a technical advisor as to what should be done and how it should be done and so forth.

Dobrowolsky: And I guess it must have come up a few times, "This is what we've done in the past" or

“We’ve already looked into various hydro possibilities here, here and here.”

Humphrys: That's right.

Dobrowolsky: Tell me about the job you went to when you left the Commission in 1969.

Humphrys: Well, I became the Electrical Advisor in the Department of Energy, Mines and Resources. There were three divisions in the Energy Department: electrical, nuclear, and coal and petroleum (mostly coal). So, the Assistant Deputy Minister of the Energy Department, wanted an advisor for each of those three divisions, and I was the one that applied for and was appointed the Electrical Advisor.

Dobrowolsky: So, I assume this would be for electrical projects over the whole country?

Humphrys: That's right.

Dobrowolsky: And do you happen to remember the name of the Deputy Minister you would have been working for?

Humphrys: The Assistant Deputy I was working for was Gordon [McNabb]. He had been a very prominent man in the development of the Columbia River projects in previous years.

Dobrowolsky: And then, you also mentioned another DM, who had been working as the Chair of NCPC before you left. Do you recall who that might have been?

Humphrys: The Deputy Minister when I left was Ernest Côté, who had succeeded Gordon Robertson as the Deputy Minister of the Department of Northern Affairs and National Resources.

Dobrowolsky: And as part of their job as Deputy Minister, they would also be the Chair of NCPC?

Humphrys: Yes, their main function was Deputy Minister of the Department and ex-officio Chair of the Power Commission.

Dobrowolsky: I understand. So, would Mr. Robertson have succeeded – was it Mr. Wardle who was the first chair?

Humphrys: No, Major General Hugh Young had succeeded Mr. Wardle, and Gordon Robertson succeeded him as Deputy Minister of the department.

Dobrowolsky: And then, it was Mr. Robertson, and then, Côté, and then, Jim Smith?

Humphrys: Well, there was a point where Mr. Jack Beaver became a member of the Commission followed by Jim Robertson.

Dobrowolsky: Well, it would be interesting to know, because a lot of that information isn't readily available. So, while you were working as the Senior Electrical Advisor for Energy Mines and Resources, what were some of the projects you would have been involved with during that time?

[Note: Mr. Humphrys later sent a list of the Commission Chairs and their terms. This document is in the Appendices section.]

Humphrys: Well, the major one that I became involved with was one of supplying federal money from

the Government of Canada to support construction of what was called “interconnecting high-voltage transmission lines” in the Atlantic Provinces. The government had passed an act called the *Atlantic Provinces Power Development Act*. My prime function was the administration of supplying the funds, which were grants of money to these different projects in all four Atlantic Provinces over the years under the aegis of the *Atlantic Provinces Power Development Act*.

[Note: This *Atlantic Provinces Power Development Act* was passed by the Progressive Conservative government, led by John G. Diefenbaker, on January 31, 1958.]

Dobrowolsky: So, in essence, this project you were talking about, was this extending the local grid?

Humphrys: In a way yes, expanding the local grids, yes, and to interconnect some of the grids in the different provinces.

Dobrowolsky: So, that was really the foundation of the modern system we have now where there is this vast interconnecting grid and the ability to draw in reserves from ...

Humphrys: I wouldn't say it was the foundation of it, but it contributed to its development.

Dobrowolsky: And did this also involve a fair bit of travel as part of this?

Humphrys: Yes, a fair amount, primarily to the Atlantic Provinces.

Since the Minister of the Department of Energy, Mines and Resources was somewhat interested in the energy development, and by that, I mean electric power throughout the whole country; so to keep on track of what was going on, I was responsible for liaison with the power authorities in the different provinces; so I made periodic trips to the provinces to discuss and check what was going on there. As an example, one case in Manitoba, we contributed money to part of the transmission system that was being developed to transmit power from new hydro developments in northern Manitoba to their main grid based in Winnipeg.

Dobrowolsky: So, how did you find your previous experience with NCPC served you in this new job and how much of it was brand new? I suppose just operating within the department and that government structure, that must have been very useful in knowing how all that worked.

Humphrys: Yes, I'd grown up with the electrical utility industry, so it was part of my blood anyway. So, I just continued applying what knowledge and interests and communications I had gained for over many years.

Dobrowolsky: Now, the tail end of your time with NCPC coincided with the Anvil mine in the Faro townsite starting up in the late 1960s and, of course, this created a huge new power requirement. Did you have much to do with the installation of the third hydro unit at the Whitehorse Rapids Plant?

Humphrys: Not with the actual installation, I had a lot to do with the planning of it and getting the necessary authority and awarding the contract for construction. It was well underway by the time I left the Commission, and my successor, John Lowe, took over the final responsibilities.

Dobrowolsky: So, was there much looking at alternatives in terms of either setting up another plant –

Humphrys: No.

Dobrowolsky: – or this was just the most logical way to proceed?

Humphrys: That's right. Provision had been made for expansion of the Whitehorse Hydro plant in the construction of the original plant. A third penstock was installed but hadn't been put to use. This was activated to supply the new generating unit that was being added to augment the capacity.

Dobrowolsky: And then, at the same time, a large diesel plant was installed next to the hydro station.

Humphrys: That's right.

Dobrowolsky: Now, would this have been mainly for winter when water levels would have been lower?

Humphrys: Primarily – in a way it was partly standby and partly to supplement capacity if the water supply declined, as it might do during the winter period.

Dobrowolsky: So, this was mainly a backup unit?

Humphrys: That's right.

Dobrowolsky: And if something happened that there was increased demand, then it was available?

Humphrys: That's right.

Dobrowolsky: Well, and of course, as well as the diesel and the power unit, there was also the 225-mile transmission line from Whitehorse to the mine at Faro?

Humphrys: That's right.

Dobrowolsky: Another big project.

Humphrys: Yes, that was a separate contract, yes.

Dobrowolsky: Do you remember any of the firms that worked on these projects?

Humphrys: The original plant in Whitehorse was built by Poole Construction of Edmonton and they had the contract for the addition of the third unit too. The transmission line to Faro was awarded to a contractor based in Edmonton called Ace Construction.

Dobrowolsky: Great! So, is there anything else you can think of about that particular project that would be interesting to get on record? Were there any special challenges, or, again, was it all fairly straightforward.

Humphrys: It was fairly straightforward. I guess the main thing that happened was the forest fire that destroyed the original townsite of Faro and the electrical distribution system in the town. It was virtually completed and it had to be reconstructed. That was, again, after my time, but I think that was the main difficulty that might have – or not difficulty, but main event that occurred.

Dobrowolsky: Of course, I forgot about the fire.

[Note: The forest fire that devastated the newly-built community of Faro happened on Friday, June 13, 1969.]

Dobrowolsky: I guess by the early 1970s the plans were developed to construct the Aishihik Hydro Development. Now would this have been all pretty much after your time?

Humphrys: Yes.

Dobrowolsky: So, by that time you were out of the picture and not involved in that part of it.

Humphrys: That's right.

Dobrowolsky: So, in your role as advisor to the Commission, did you hear much about any other subsequent developments and studies within the Yukon?

Humphrys: Well, only that, I think I mentioned before, there was talk about the Alaska Pipeline being developed to transport gas from the Alaska area down to, say, the Edmonton or southern area. There was thought about the advisability or the economic advantages of developing hydro power, if it was feasible, to supply power to the pumping stations along this proposed pipeline, (which of course never came about) but that concept led to doing an inventory-type survey of the possible hydro sites in the general Yukon area. There was a fairly extensive study done on that over two or three years and the reports of that I think would all be in the archives in the Yukon.

Dobrowolsky: Yes, the Yukon archives or various libraries have most of them. I think a lot of them were conducted by a geologist called Owens. I think we talked a little bit about this last time.

Humphrys: He might have been involved in some of them, yes.

Dobrowolsky: Two of the ones that I remember from the mid-'70s that were semi-controversial was discussion of putting dams at either Five Finger Rapids or Eagle's Nest Bluff on the Yukon River. Do you recall any of that discussion?

Humphrys: No, that was all done by the Northwest Power Development Corporation or something, that we talked about before, proposals that would flood the Whitehorse area and so on.

So, those proposed dams that you just mentioned were all part of that general concept.

Dobrowolsky: The great, grandiose scheme to flood most of the southern Yukon.

Humphrys: Yes.

Dobrowolsky: So, just to round off the progression of NCPC and the Yukon, the Edmonton office was established in the 1970s. Do you recall when an office was set up in the Yukon or any of the circumstances around that?

Humphrys: Well, Mr. Smith had become the Chairman of NCPC and because he was located in Whitehorse, in due course, one or two people were hired to represent the Power Commission's interests or the Power Commission's business on behalf of Mr. Smith. That's about all I can tell you about the Yukon office.

Dobrowolsky: I just ran into a little reference I found here that in 1972, the NCPC members were: the Chair was Mr. H. Basil Robinson, and then, the two other Commission members were A.D. Hunt and J.F. Parkinson.

Humphrys: That's right.

Dobrowolsky: And then, yourself and a Mr. T.M. Patterson were advisors to the Commission, and John Lowe was still the General Manager.

Humphrys: That's right. Tom Patterson, he was a member of the Commission. There was Tom Patterson, Joe Parkinson and Digby Hunt; and the Chairman was Basil Robinson.

Basil Robinson was the Deputy Minister of the Department of Indian Affairs and Northern Development.³

Dobrowolsky: DIAND? Would that have been Indian Affairs and Northern Development at the time, what they called "DIAND"

[Note: At this point there was some discussion re the changing names of the government departments responsible for Water Resources. I later checked into the succession of departmental name changes on the Library and Archives Canada website and established the following chronology:]

- 1949 The Department of Resources and Development replaced the Mines and Resources Department.
- 1953 Formation of the Department of Northern Affairs and National Resources (2-3 Eliz. II, c. 4)
- 1966 The Department of Indian Affairs and Northern Development (14-15 Eliz. II, c.25) was established replacing Northern Affairs and National Resources.
- 1973 Northern Development Program became the Northern Affairs Program and was substantially reorganized to better meet Northern Policy guidelines enunciated in 1972.

Dobrowolsky: Yes, there were a lot of name changes. I guess every time a new party formed the government, they would do their own reorganization.

Humphrys: Well, it was a bit of a progression, too, as to what the responsibilities were.

Dobrowolsky: Now, were NCPC and Energy, Mines and Resources particularly, political bodies I guess you could say? Were many of the issues that you dealt with considered of political significance?

Humphrys: No.

Dobrowolsky: Or you weren't really affected by the policies of the government of the day or a change in party when a new government came in?

Humphrys: The main thing that happened was the thing in the Maritimes, the development of the *Atlantic Provinces Power Development Act*. That was an outgrowth of the change in government to the Diefenbaker government.

The change there led to the passage of the *Atlantic Power Development Act*. That was the major political thing that I can think of that affected the NCPC in that the NCPC was assigned some functions in the administration of that act.

Dobrowolsky: So, you were mentioning that you retired in 1978 from your position with Energy, Mines and Resources. Did you still retain any kind of a connection with NCPC after that?

³ H. Basil Robinson served as Deputy Minister of Indian Affairs and Northern Development from 1970 to ca. 1973.

Humphrys: Yes, as I said earlier, that was when Mr. Smith asked me to continue as an advisor because of my historic and general knowledge of the Commission, I guess. So, I continued on that for I don't recall how many years now, but at least into the early '80s.

Dobrowolsky: And then, I guess the next event in NCPC was eventually it ended up devolving its operations to the Yukon and the Northwest Territories. Do you recall much about how that came to be?

Humphrys: Well it was more or less an outgrowth of the concept of moving the administration of the Commission into the territories, either the Yukon or the Northwest Territories instead of Ottawa or Edmonton. John Munro was the Minister of Northern Affairs and Natural Resources at the time.

Tape 2, Side B

Dobrowolsky: We're back in business. It's side two of a telephone interview with Ted Humphrys on March the 9th, 2004. We'd been talking about the decision to, I don't know if it was so much to dismantle NCPC but definitely to transfer its responsibilities to the territories.

Humphrys: Yes. This really arose primarily from the increasing demand to lower the cost of power in the two territories, and there was a move afoot to try and get the Federal Government to either make a grant or relieve the Commission of the obligations to pay interest and amortization of the loans that had been extended to the Commission to build the power plants and so on. There was no enthusiasm for the idea in Ottawa about doing that. But the pressure was starting to get fairly heavy politically, with the result that John Munro, who was the minister of the department at the time, made the decision that the Commission should be more or less dissolved and its responsibilities taken over by the two territories. The outgrowth of that was that negotiations in respect to the two different territories, with the Department of Finance primarily, eventually resulted in the actual devolution taking place. The target wasn't so much to dismantle the Commission per se, as it was to reduce or modify the financial obligations that the Commission was burdened with. The solution was, as I say, to devolve the responsibilities to the two territories. That's what came about.

Dobrowolsky: So, when the territories took on the ownership and authority for NCPC projects, did this also involve taking on responsibility for those loans, or were those forgiven as part of the process?

Humphrys: Well, it was a combination of both. There was a certain amount of forgiveness, but there was also a reduction in the matter of the responsibility of the Federal Government vis-à-vis the Department of Finance. So, it was a combination of both.

Dobrowolsky: So, they assumed some financial responsibility but not all?

Humphrys: That's right.

Dobrowolsky: I know that there were two separate pieces of legislation enacted to make this possible. There were two acts: the *Northwest Territories Power Act*, I believe, and a *Yukon Power Act*.

Humphrys: Well there was legislation that created the Northwest Territories Power Corporation that replaced the Northern Canada Power Commission. In the Yukon, an Act created the Yukon Development Cooperation with its subsidiary the Yukon Energy Cooperation.

Dobrowolsky: And then, there's two other pieces of legislation I've run into names of. The *Northern Canada Power Commission, Yukon Assets, Disposable Authorization Act* of 1987 and something else called the "*Northern Canada Power Commission Share Issuance and Sale Authorization Act*". I don't

know if one of those might have been for the Yukon and one for the NWT.

Humphrys: Well, I don't know about them but I think you are right on that. That legislation came about as a result of the devolution process. I wasn't involved in that at all. Dave Morrison might be able to tell you more about that than I can if you are interested in the details.

Dobrowolsky: Yes, you had mentioned that he had been involved in that process. So, in essence, I guess, as the Northern Canada Power Commission wound down, so would your continuing role?

Humphrys: That's right.

Dobrowolsky: So, have you had a chance to visit the North since your early days when you used to come up quite regularly?

Humphrys: Well, if I can just go back, as you say, it wrapped up my interests or my connection with the Power Commission as such. It terminated involvement, or whatever you can call it, (advisory role) insofar as the Yukon was concerned; but I was invited to be a historic advisor to the new Northwest Territories Power Corporation. I was invited to and attended the quarterly meetings of the Northwest Territories Power Corporation, and that carried on until about six years ago, 1998.

The Northwest Territories Power Corporation at that time was headed by – the chairman or president Pierre Alvarez, who determined, I guess, not that my usefulness had pretty well come to an end, but I was sort of supernumerary, so they did me the honour of designating me Chairman Emeritus and with an invitation to attend all future annual meetings in June wherever they were in the Northwest Territories (primarily in Hay River). That carried on until – well, in effect, it's still in effect in the sense that I have communication with the Northwest Territories Power Corporation in the sense that they send me papers and so on about their meetings. And I haven't made any trips north since March of 1993.

Dobrowolsky: Well, this might help. I understand that "In 1993, the Snare Rapids Hydro Plant –I'm reading here – was dedicated the Ted Humphrys Power Plant in recognition of your 45 years of association with the development, production and distribution of electric power in the North."

Humphrys: Yes.

Dobrowolsky: So, were you there for that event?

Humphrys: Oh, yes. Yes, they invited me and my wife and gave me the opportunity to invite two other guests, which I did. I invited the widows of the two senior engineers that I'd had on my staff, a Mrs. Nan Olsen and Mrs. Gloria Long.

Dobrowolsky: That's wonderful that you did get that recognition, because you certainly have had an amazing career with the North.

Humphrys: Well, I've been around for a while.

Dobrowolsky: You certainly have!

Humphrys: As I said at the time when they made me Chairman Emeritus at the gathering where this was announced and so, on I said, "I think they didn't know how else to get rid of me".

Dobrowolsky: I'm sure that wasn't the reasoning. So, are there other engineers in your family? Do you

have any children?

Humphrys: Yes, I have one son. He's not an engineer, but a lot of engineering know-how rubbed off on him from the old man. He is a town planning and development expert.

Dobrowolsky: So, that would certainly use a lot of the same skills I would assume.

Humphrys: Yes, that kind of knowledge. He's become a very competent do-it-yourself type guy with some of the engineering instincts that I had that had come down through the family from my grandfather to my father to me, and then, to Brian, my son and now to his son, i.e. my grandson who is studying to be an electronics engineer.

Dobrowolsky: So, was that something that you enjoyed in your spare time? Did you have much spare time for hobbies, such as making or building things?

Humphrys: Oh, a certain amount, yes. I had a good workshop in my basement, and I was always puttering around in it.

Dobrowolsky: And throughout your career, your base was always Ottawa?

Humphrys: Yes.

Dobrowolsky: Well, this has been a great honour to talk to you and fascinating to learn so much about this era of development. For the next stage of this, we'll be making up a transcript of your interview. So, within the next couple of weeks, I'll be mailing that to you and give you a chance to look over it and particularly make sure I have things like name spellings correct; and if you happen to think of any other items, that got missed or should be clarified, then maybe we can do a brief follow-up just to wrap this up and fill in any loose ends.

Humphrys: I think I can find that from my records.

Dobrowolsky: Excellent, and thank you again for this, and I'll certainly be in touch soon with the transcripts. I forgot to mention that I do have a budget for honouraria for this project, so I'll also be sending you a small cheque as a token thank you for your time on this. I certainly appreciate it.

Humphrys: That's very kind. You don't need to worry about that, but it's very kind of you to think about it.

Dobrowolsky: Well, thank you again.

Humphrys: Okay. I look forward to receiving the transcripts!

Dobrowolsky: Okay, thank you very much, Mr. Humphrys. Bye-bye.

Humphrys: Bye now.

END OF INTERVIEW



Mr. Smith, ca. late 1960s or early 1970s.

James Smith

This long-time Whitehorse businessman was appointed Commissioner of the Yukon in 1966, a position that he held for ten years. In 1975, Mr. Smith took on another great responsibility when he became the first full-time chair of the Northern Canada Power Commission. He brought a northerner's point of view to this job and was keenly aware that he had to answer to the people back home. Mr. Smith successfully lobbied for greater northern representation on the NCPC board and, eventually, for the devolution of the control of the various power projects from the federal government to the Territories.⁴

Interview recorded by Helene Dobrowolsky on March 25, 2004 at Mr. Smith's home at 3 Alsek Road. Outline notes prepared by H.D., 26 March 2004; transcript prepared by Joyce Bachli, Megareporting Inc. 12 April 2004. [Additional information in square brackets.] Reviewed by Mr. Smith, 12 August 2004.

Side A

[The recorded interview starts in the middle of a discussion about the mandate of the Northern Canada Power Commission.]

Smith: I think what I'm trying to say, Helene, is that the Northern Canada Power Commission was not really set up to be a stand-alone public utility. It was set up primarily to be an instrument that would be used by Northern Affairs in the process of governing Canada's north. That's what it was set up for; and as a consequence, it was set up without any what I call proper capitalization of any kind. It was strictly to be a debt-funded operation.

The first project that they had, which you well know, was the building of a plant on the Snare River to look after the big mine in Yellowknife; and for that project, that kind of financing was fine. It was 100 percent, a great idea; but then they start to do other things, and they never changed the fundamental financing of the company. Instead of having some kind of a proper capitalization, they just carried on with this 100 percent debt funding, and that was all we saw, a millstone around the Commission. So, it never had any real freedom of movement. It had to say, "Okay, we want to do this project."

So, you put all the paperwork together, and then, you went to Treasury Board and Finance to borrow the money, you know, to go ahead and do this. So, you got halfway through the project, and the magnitude of what had to change to accommodate some other thing. So, here you had to go through that process again.

The financial end of the day-to-day operations of the Power Commission took up about 50 percent of the energy of the Power Commission Board at all times. I would suggest that you get your hands on Board

⁴ Photo courtesy of Yukon Archives, Yukon. Public Affairs collection, 90/58 #28.

minutes at some point. Half of their time was spent on this type of thing. And at a point after they had got this project in Yellowknife completed, for reasons that God only knows that are lost in antiquity now ... Gordon Robertson was in charge in those days.

Dobrowolsky: He was the Chair?

Smith: It might not be a bad idea to talk to him at some point. But I think their next move was to Mayo. Now, there might have

... the NCPC is a far more responsive organization to the people it serves than what it ever was when it was headquartered in Edmonton. They were away from the pressures of their political masters in Ottawa, and they were away from the day-to-day operational pressures of the customers that they served; and if you can think of any finer way to have a business that is very, very highly personal, because electricity is something that you've got to have. When you have the people that are running the thing totally removed from the people who are using the product, you've got problems on your hands, and that's what NCPC had ...

been something in between, but Mayo was a stand alone project; and their system of financing, I think, worked not too badly there at all. You know, they made out okay. After Mayo when the big expansion of Whitehorse started to take place about the mid-1950s, sewer and water was installed. They made up their mind that one of the ... There were three regional hospitals to be set up, one in Frobisher Bay, one in Inuvik and one in Whitehorse; and along with that, they set up Native residential schools in those three locations. Now, there were others, as well, but they set them up there, as well. And then, they started to look at what else was needed in these communities, and heat was one of them. So, here in Whitehorse the Whitehorse Rapids was developed to accommodate all of this. They would sell electricity for distribution in Whitehorse, they would supply heat to the Whitehorse General Hospital and to the two hostels that were built over here in Riverdale. Now they were not only in the electricity business, but they were now in the heating business; and it just was a kind of a snowball thing, you know, it kept on growing with no thought in mind as to how you should have changed the corporate structure, particularly the financing of it, to accommodate these things.

So, all this kept on building up and building up so that you had – when I left, I think our annual debt payments were about 95 or 105 million dollars a year, and our income to accommodate all of these debt payments, plus running, was probably something in the neighbourhood of around 150 million dollars a year. So, you can see what you were faced with as far as running the place. It could not be run as a business at all. It was run as an instrument of government policy, and they got into Aishihik, and you found out all the problems with Aishihik. I have no idea what transpired, but instead of the thing costing 20 million bucks, it cost 40 million bucks. And there was just as much problem financing that extra 20 million as what there was accomplishing building the plant.

I suppose what I'm saying is that what NCPC was originally set up to do and what it ultimately wound up doing was the difference between day and night. Somewhere in the 1950s I think it would be, it might have been the early '60s but I think probably the mid-'50s, the Northwest Territories government was still headquartered in Ottawa, and every department of the federal government that was located in the north was setting up their own buildings, their own electricity systems, their own utility systems; and somebody somewhere said, "Look, you know, we should take all these utilities and put them under one roof;" and without looking into the consequences of this, somebody signed a paper that turned over I think – and you'd have to look into this, my numbers may be wrong – but I think it was 26 plants scattered all over hell's half acre.

Dobrowolsky: Were these were mainly diesel plants?

Smith: I'll show you on the map here.

[tape off and on]

Dobrowolsky: We were just up looking at your map, showing the incredible scope of NCPC operations all over the north, and you were saying in terms of its original mandate and what it was later asked to take on, that NCPC faced a great challenge in terms of reconciling the two, is that right?

Smith: I have to use my imagination here, because this tremendous expansion to all these small plants took place before I came on the scene, but it's my understanding, Helene, that NCPC was not asked if they could take these plants over. There was a document simply signed and handed to them that, as of a certain date, they would be responsible for the following plants. I think it came in maybe two or three shots. Do you see what I'm getting at? And nobody asked them if they were prepared, if they had the staff and the communication, anything. It just arrived, you know, kind of as a Monday morning gift so to speak; and from where I sat, when I arrived on the scene, I never felt that we had really properly digested all this great big meal that had come along.

Some of these plants were very highly sophisticated. For example, Inuvik was not only a power plant, but they put in a big Utilidor system when the town was built. I don't know just what the thought was with regard to this Utilidor system, but it was very, very highly elaborate. To some degree, it was experimental, and the Northern Canada Power Commission found itself in charge of this huge operation.

Dobrowolsky: Now, were these the aboveground pipes handling everything, the sewage, the water, the utilities?

Smith: That's right. There was heat, sewer, water. The electricity was not in the Utilidor. It was on poles above ground. I don't know how to express this, Helene, but somehow or other, here was NCPC once again used as an instrument to help to deliver Canada's policies and programs in the north without any adequate preparation at all to do it; and you can only carry on this for so long before you have major problems. And I will say that after the NWT government moved to Yellowknife and, once again, this was before my time, I think some of the problems were mitigated to some extent because there was now at least an onsite government that was more responsive. In other words, if there was a problem somewhere that really involved other things, you know, other than NCPC, you now had somebody on the ground to talk to.

The fuel deliveries in a lot of these places were everybody's responsibility. In other words, the RCMP looked after their own fuel, NCPC looked after it, and the school looked after its own. When the NWT government got hold of this, they consolidated this. This was one major thing was consolidating the fuel supply in all these small communities, and NCPC didn't participate in all of them, because our demands were so high; but at least now, there was a fallback situation. In other words, if one of us ran out the other one probably had something to help to balance him off with until the following year's sealift could help; and remember, some of these places they would miss the sealift. So, you had to have at least two years' supply of fuel on hand. Some of these things were solvable, Helene, some of them were solvable.

Dobrowolsky: Yes.

Smith: Others were literally unsolvable. You just had to live with that particular scene, and that's all that there was to it.

Dobrowolsky: I feel like we've kind of jumped right into the middle here; and if you don't mind, I'd like to just back up a little bit and talk a little about you and your background and how you eventually became

involved working with NCPC. So, if you don't mind, we'll do a few simple biographical questions. Could you please tell me when and where you were born?

Smith: I was born in New Westminster, B.C. on the 31st of December in 1919. Now, that's getting pretty ancient!

Dobrowolsky: A New Year's baby, excellent! And tell me a little bit about your education, your growing up. Did you grow up in New Westminster?

Smith: Well, right on the edges of New Westminster, in Burnaby, and I went to Edmonds Street School there and Burnaby South High School, and I graduated from high school in 1938. And I had no opportunity of any further post secondary education, because my mother and dad simply were not in a financial position to do anything about it.

I had been working on weekends and holidays in a little butcher shop close by, and this got me into the meat business. And when I left high school, I went to Duncan on Vancouver Island and worked in the meat business there for a couple of years. And then I had a chance to come north as a meat cutter, and I came to Atlin in 1940. I worked there for seven years. I moved to Whitehorse in '47, we had a chance to come over here to look after an operation.

Now you know it as the Yukon Inn property; but when I arrived on the scene, it was the Charlie Baxter's farm that had been leased to the Government of the United States to put the post engineers camp on it; and one of the owners, or one of the executors of Charlie Baxter's estate, was one of the people that was trying to put together a motel, a hotel, food operation, they looked to the tourist trade, and I was asked to come over here to be the manager of it. I spent 20 years there, and it became a very highly successful business, Helene. On a square footage basis, there was no property in the Klondike that ever produced the money that that five acres down there did.

Dobrowolsky: I remember it had just gone from being the Tourist Services to the Yukon Inn when I moved up in 1973, but it was quite extensive. You had a grocery store and a hotel and ...

Smith: When I left there in 1966 to take the Commissioner's job, we had 120 people on the payroll. It was a big operation, and it was successful. The original owners sold out. They started it in 1947 when Dorothy and I came here, and they sold it in 1953 to a Chinese businessman from Vancouver, Bruce Sung. It was a good move, because he had money to invest in it. You know, the original partners, they were not wealthy people. They were well-to-do people, but they didn't want to put any more money into the place. Bruce Sung came along and bought it and immediately brought money with him. We opened up the first supermarket here. When I tell you it was successful, Helene, I mean it was a very, very successful business.

So, when I left in '66, they sold out to Kelly Douglas, because the thing needed now a major infusion of money and the Sung organization was just not capable of that kind of an infusion. So, they sold to Kelly's, and of course, Kelly's knew what they were buying, because they had been our major supplier. I did not know Arthur Laing very well. I had met him; but sometime in early 1966, I would say about March or April, he was here in connection with something. It escapes me now.

Dobrowolsky: Arthur Laing would have been the Minister of Indian and Northern Affairs.

Smith: He was the Minister of Indian and Northern Affairs at that time, and Gordon Cameron had given his notice that he would be leaving the job. And I didn't talk to Mr. Laing directly about the job; but one of his assistants, Gordon Gibson, whom you hear about these days from the Fraser Institute, told me that

one of the things that the Minister was on the lookout for was someone to take over the Commissioner's job. That was about the length of the conversation. But sometime during the summer, Arthur Laing phoned me one day and he said – oh, he came up here and interviewed a whole group of people in connection with the Commissioner's job, and I was one of them. This would be about May or June, I guess.

Dobrowolsky: In 1966?

Smith: That's right. And he phoned me one day, I think it would be in June or July, and he wanted me to know that my background was being checked up to see whether I had been one of the boys that dumped the inkwell in the desk at school and things of this nature, and he wanted me to be aware of this. So, nothing more was said, and sometime around about September, he phoned one day, and he said that he was putting through the necessary paperwork to appoint me as a Commissioner of the Yukon. He never asked me if I wanted the job or anything else. Anyway, there are lots of funny things in connection with it, Helene. We shouldn't talk too much about them. But I guess they went into my family background, and some of my relatives in the old countries were visited by somebody from Scotland Yard.

And of course, they really got the wind up, "Jesus, what has this guy done? Has he murdered somebody? What was really going on?" Anyway, my parents were deceased by this time, but some of their family and friends were also, you know, thoroughly grilled. One of the relatives that still comes here, when you see this chap, McGivern, that comes and sits in the court here from time to time, his grandfather and my dad were very, very good friends. So, his dad was one of the ones that was grilled thoroughly about my background, and also, they got tangled up with the Presbyterian Church. My parents were Presbyterian. I never did find out about all these things. I will some day maybe, Helene, but there were all kinds of fun and games.

Anyhow, it wound up with Dorothy and I taking the job. Dorothy was very, very hesitant about it, and I don't blame her. I wasn't exactly running for the job myself either; but I thought, "Well, Tourist Services wants to sell to Kelly Douglas, and I'm not too sure that maybe I should, you know, stay with them or not."

Dobrowolsky: Just to clarify, Dorothy is your wife whom you met while you were working in Atlin?

Smith: That's right. We were married there in 1942. So, it worked out all right, Helene. I'll be very honest with you; they were the 10 most exciting years of my life. It was a very hard job, it was tough; but it was a very satisfying job, and I had good Ministers. I had Mr. Laing and I had Mr. Chrétien and, I've forgotten who the third one was now. He's still alive. But they were really very, very good people to work with.⁵ And Helene, I was left alone. You know, I guess kind of the unwritten word was, "As long as you don't cause me any trouble, you can do any damned thing you want." That was, literally speaking, the way the thing was set up.

Dobrowolsky: So, before the Commissioner's job, did you have any experience in local government at all?

Smith: I was the President of the Board of Trade for a couple of years, 1952 and '53. I sat on City Council for a term I think of two years in about '54 or '55, and then, I was a Territorial Councillor from '57 through '61. So, I'd had lots of experience as far as from the outside looking-in. You know, I had no day-to-day experience. But also, I had run a pretty big business here, Helene. By the standards of

⁵ The three Ministers of Indian and Northern Affairs serving during Mr. Smith's term as Commissioner of the Yukon included: Arthur Laing (1966-1968), Jean Chrétien (1968-1974), and J. Judd Buchanan (1974-1976).

businesses here in the Yukon at that time, I would say that, putting government off to one side, the only bigger employers would be the mining companies, United Keno Hill and White Pass. So, you know, I can't say that I went to the job unprepared.

Dobrowolsky: Well, obviously, very strong managerial skills.

Smith: Well, not only that, Helene, but I knew everybody in the Yukon. The only people I didn't know in the Yukon in those days were those that hadn't got here yet, you know, and this made a hell of a difference, too. And the one session or the one term I spent on Territorial Council, I got along very well with Fred Collins, who was the Commissioner at that time; and I had had lots of opportunity, as a consequence of that friendship, to really get an insight into just how this thing was being run from Ottawa and what have you. So, I wasn't unprepared for the job, and I enjoyed it, and I will be forever thankful to Arthur Laing for giving me that opportunity. Very few people got those kinds of chances.

Dobrowolsky: So, when you say you had an insight into what the job involved, just what did the job involve? Because the role of the Commissioner was very different in those days than today where it's almost more of an honorary position.

Smith: You were the Chief Executive Officer of the Yukon Territory. That's exactly what you were, and you were responsible to the Minister of Indian and Northern Affairs period. It was a big mouthful, but I was lucky, Helene. I had a lot of good people working with me, a hell of a lot. Some of them I acquired, some were there when I went there. The one thing I lacked was experience in really understanding how the federal system worked. I had Frank Finland there, and that relieved me of all that. He was the guy who knew how to deal with the Feds and taught me the ropes, but he moved away. He was away for a while, and then, he came back during the time I was there. He was a tower of strength for me.

I was lucky enough I had a great internal auditor, a guy by the name of Mel Foster. Christ, he could smell problems before they occurred. Also, I had a statistical and planning advisor. He was an East Indian chap, Raghunathan,⁶ and this guy was worth his weight in gold. I had Chris Pearson, who was there, who was the Clerk of the Council, and he did a tremendous job for me, Ken Baker in charge of highways. You know, I had a tremendous group of people, Helene. You can't do the job yourself.

But my idea with these people is, you know, "There's what you've got to do. Go and do it, you know, and tell me about it when the damned thing is finished. In the meantime, don't come anywhere near me, because, you know, what the hell can you do? You know, if the thing is going wrong, there's no point to come and tell me about it. Do something about it!"

And I think I can say fairly, that subject to public scrutiny at the time – I think the 10 years that I was there, not just from me, but I think we had 10 years of good government. Nobody had to stand up and defend any scandals or anybody with their finger in the till or any of the kinds of things that you see going on now. When I see this committee investigating in Ottawa, you know, they've got people there, god, Helene, it just turns my stomach. It's just terrible. So, I guess I'll put it to you this way: They were 10 tough years, but they were very, very gratifying years and, of course, I wanted to quit. So, I went to Chrétien. I was in Ottawa one day, and I had a talk with him. I said, "Look, Jean, I've been at this job for seven years. It's time for me to get out of this thing."

"Jimmy, are we not treating you right? What are we doing to you? This just gives me another problem." Those were his exact words. So, I explained to him, you know, that there was nothing the matter at all. It

⁶ His full name was Ramanathan or "Raghu" Raghunathan. Patrick Michael, Yukon Legislative Assembly, personal, communication, December 2004.

was just that you can only be in these jobs for so long. So, he never said too much, but anyway, he avoided coming to grips with the thing for three solid years. That's how successful he was.

When Judd Buchanan took over, the first day he was on the job, he phoned me. He said, "Jimmy, I know you want out. I promise you we'll get you out," because in the meantime, they had offered me the Chairmanship of the Northern Canada Power Commission on the understanding that this was kind of a pre-retirement job for me, and I had had that for a year before they let me out of the Commissioner's job. So, I had the two of them. This didn't go down good at all, but I must say that I don't say that in any criticism of Chrétien at all. He was a good guy to work with as far as I'm concerned. My difficulties with him, if you want to call them "difficulties", were pinning him down to say "yes" or "no". And his normal commentary to me was, "Jimmy, the answer is 'no,' but we'll listen to the arguments." This was after you had worked on something for maybe three months.

Dobrowolsky: "We'll let you get it out of your system but the answer will still be 'no'."

Smith: But irrespective of that, I made out fine with Chrétien; and of course, in the background, until he died, Arthur Laing was always there. He left Indian Affairs. He went to Public Works. He was there for a long time. He went from there to Veterans' Affairs, and then, he went to the Senate; and he was always in touch with me. The current territorial building, Helene, Arthur phoned me one day – this was when he was in Public Works – and he said, "Jimmy, I have a request in front of me to sign to Treasury Board seeking nine-and-a-half million dollars to build a federal building in Whitehorse." And he said, "One of the reasons is that you and your people have occupied so much of the present federal building that there's no room left for the Feds. So," he said, "my idea is to give you the nine and-a-half million dollars, and you build a building for YTG and get out of the Feds hair and leave them alone," you know. That's how we got that building. It was all over with in three minutes.

Dobrowolsky: Wow! Could you talk a little bit about the political and economic climate during the time that you were Commissioner?

Smith: The economic climate was tremendous. We were doing nothing but good. The mining industry was booming. The tourist industry was booming. I mean, every damned thing we touched turned to gold, everything. And there was just no – when I say there were no stumbling blocks, that's not right. But the climate for people to invest money in the Yukon was very, very attractive, Helene. Investment money was welcomed here, and my idea was that my job was to see that the cash registers in the Yukon kept on ringing. That was the object of the exercise, and we were tremendously successful.

The political climate: The politics at the federal level were run by Erik Nielsen. Now, during my time in the Commissioner's office, they were never in power, because there was always a Liberal government. But that had no real bearing, you know, one way or the other, because I had to work with the government in power. It didn't matter what their politics was. Now, at the local political level, I had anywhere from seven-to-fifteen wild-eyed rebels on the Territorial Council, and my attitude was that I had to turn these wild-eyed rebels into conservative reactionaries, fast.

Finally I used the Yukon Act to get three of them into what I called a "programming committee". And I would suggest to you that this was the best stroke I ever did in my life in that part of it, because that shut them all up. They were there to construct the budget, and they had to pilot it through the Territorial Council themselves.

My attitude was: "Look, don't come crying to me. You've got to convince your colleagues to pass this budget now."

So, instead of spending three months trying to get a budget passed, we got the whole – we used to pass budgets in a week. That was it. Helene, I must tell you, my theory was just what I've told you; these wild-eyed rebels, you turn them into conservative reactionaries by giving them responsibilities. It took three weeks to convert them from their wild-eyed rebellion to being conservative reactionaries once they had in front of them, you know, there was no place else to go, that was their desk. "You'd better damned well do it."

Education, health, welfare – what was the third one we had? Well, I've forgotten the third one now. But all of a sudden things, you know, things changed awful fast, and that's what really, you know, convinced the Feds finally, you know, to give them the whole damned thing. Forget about it, give them money and let them screw the thing up or do whatever they want with it. But it was a great exercise, Helene, and sometime if you want to, I'll give you the two folders, and you can read the full description. It was a great time. I enjoyed it.

Dobrowolsky: I realize this isn't NCPC stuff, but I do think it's very interesting. The administrative structure of the Yukon was quite different. This was before we had a party system. I guess in a lot of ways, the federal government was the ultimate authority in terms of okaying our budget, okaying our programs.

Smith: Everything, no question at all about it. Prior to my taking over, remember, except for Gordon Cameron, who was there for a couple or three years, it was always a federal public servant, which made it that much more difficult for any freedom of movement as far as the Yukon was concerned. It was the federal way or no way. We had some good Commissioners. Fred Collins was a good Commissioner, and Fred Fraser who was before him was a good guy, too. They all had their pluses and minuses. Most of them weren't around long enough to be very effective, but Fred Collins was around for long enough. I think Fred was here for about seven or eight years, and he did a good job. I liked Fred. We made out fine together. After I became Commissioner, he used to write me every week and instruct me what I should do.

Dobrowolsky: Wasn't quite ready to let go of that job. So, you mentioned that you were appointed to the NCPC towards the end, near the end of your term?

Smith: Yes, I was appointed a year before – June, 1975, I didn't retire from the Commissioner's job until June of 1976.

Dobrowolsky: So, how did that work, trying to do both those jobs at once?

Smith: Ask my Dorothy and she will tell you in about three words. It didn't. Oh, that was a hell of a problem, just hopeless. In fact, if it had carried on much longer – you know, I explained to Judd Buchanan, I said, "You know, Judd, if this carries on very much longer, why I have to quit the Power Commission job. I'm not doing anything. All I do is attend board meetings and get reports. I'm not exercising any authority of any kind."

Anyway, Judd came to the rescue and got me out of there. It was time for me to go, though, Helene, and I knew it in my bones that I could not carry on on an indefinite basis. Jake Epp – when the Conservatives came to power, Jake Epp became the minister, and he's the man who removed the Commissioner from having any administrative authority.⁷

⁷ In the federal election of May 1979, the Progressive Conservatives came to power with a minority government and Jake Epp became the Minister of Indian and Northern Affairs. On October 9, 1979, DIAND Minister Jake Epp released the famous "Epp letter" in which he issued new terms of reference to the Yukon Commissioner. The effect

It was the right thing to do, Helene. It wasn't done under what I would call maybe the best circumstances. In other words, really there wasn't any preparation. Do you know what I'm getting at? There was nobody really prepared for the whole thing; and while I can't say anything firmly about this, I personally feel that the Clark government did this in the manner in which they did because they had more or less of an election promise, you know, to do it, and they didn't know how long they were going to be there. So, if they were going to do it, they had better do it now.

Now, over the years it has sorted itself out not too badly; but at the time, I'm glad I was out of there when that instruction came, because I would have been part of the flotsam and jetsam that came about as a consequence of it. When you make these major changes like this, particularly in government, Helene, this doesn't only have an effect up at the top. This goes down, down, down until it was right down at the bottom of the hierarchy. And I think the administrative side of YTG paid a very high price, and in turn, the Yukon paid a very high price for the manner in which this was brought about. Not the fact itself, the fact itself; it was time. It was ready to be done. Nobody sat down and said, "Okay, here we are today, and here is where we want to be tomorrow. How do we get there? And once we've got there, what are the consequences of it being there?" Nobody sat down and did this at all, Helene.

Dobrowolsky: So, there was no transition?

Smith: If it had been left to me, Helene, I would have established a transition team. I would have set up some kind of a body that was going to superintend this transition, and certainly the Commissioner of the day would not have been on it. They should have taken guys like Frank Fingland and Raghunathan and one or two others and set them up as a transition team. I hesitate to suggest how long the transition would have taken, but it wouldn't have been done in 24 hours the way it was done. It was just by the grace of God that we came out on the other side, you know, literally unscathed; but that wasn't due to any good management of any kind. It was just good luck. I personally feel that YTG is still suffering from it today, Helene. I just don't feel that ... I don't know how to put this but when you make a drastic change of this nature you go from a benevolent dictatorship to a fully responsible government. This is okay, say, maybe to duplicate the French Revolution. Maybe it's all right to talk about these things, but the actual implementation of it is where the real test comes, and there was never any kind of an implementation program of any kind. It was just knee-jerk, "Mr. Commissioner, get the hell out of the way, and Mr. Government Leader or whatever the hell you are, it's now all yours." That was how it worked. Anyway, that's all history.

Dobrowolsky: Oh, my! Okay, let's move on to NCPC. So, when you were offered this job as Chair and Chief Executive Officer, what was your understanding of your role at the time?

Smith: Well, really I worked with Basil Robinson on this. He was the deputy minister. It was pretty well Chrétien's wish that I be appointed, that when I left the Commissioner's job that I should be appointed to some further, you know, federal position; and the federal positions that they had in mind were located in Ottawa, and they didn't make any offers to me, but I took a look at it. First and foremost, I was not bilingual. That's the first thing. And secondly, I wasn't too sure that I wanted to move my family to Ottawa. There's nothing wrong with going to Ottawa, but if we were going to move there, we should have moved there, you know, sooner. We shouldn't have been doing it, you know, when I'm within 10 years of retiring. NCPC was a kind of a compromise on this. They were located in Edmonton, and it wasn't really necessary for me to be a resident. I mean I could still stay in Whitehorse.

was to greatly reduce the powers of the Commissioner and give the Executive Committee or Executive Council increased responsibilities. This event is now seen as the advent of responsible government in the Yukon. Stephen Smyth, *The Yukon Chronology* (Whitehorse, 1991).

It had a lot of pluses, you know, from my personal point of view. I had sat on the board of NCPC, so I knew some of the difficulties that they were faced with; and in my conversations with Judd when I was appointed to the thing, the understanding was that I would take this thing on, you know, for a few years. We never said any actual number of years; and at that point, you know, if I'd had enough of it, why we'd sit down with the Feds, you know, and they would make some other arrangement. I think their attitude was, and I appreciated it, they did not want to be seen to be dumping me on the middle of the street at the corner of 4th and Main.

Dobrowolsky: Learning to play the harmonica.

Smith: You know, being so close to retirement, and I appreciated that. I felt that the federal government treated me very well, Helene. They really did, and I don't blame them for what I inherited with NCPC. Looking back on it now, Helene, I guess I probably should have been tougher and more forthright with the Federal Government in getting them to hand the Power Commission over to the two territories. If I failed in the job, that was it. When I came to the realization that this had to be done, then, you know, I made my position very clear to the Feds. There was reluctance, of course, you know, but they finally saw the light, and they came to realize it. And this is the best thing that ever happened to the Power Commission, Helene, was to split it up, the best thing that ever happened to them.

Dobrowolsky: So, what was the timing around that? You were saying this would have been towards the end of your term with NCPC?

Smith: Oh, yes, around 1975, '76, in that area; but once again, nobody would sit down and lay out a proper transition period or put people in charge of the transition. We just chopped it, and that's all there was to it.

Dobrowolsky: Sorry, would that maybe have been the mid-'80s, because the devolution to the Yukon took place in '87 and to the Territories in '88; but had they been talking about it as long as 10 years?

Smith: Oh, yes, the whole thing, as far as I was concerned, Helene, it was a done deal when I left the thing in '76. It took them all that time to get around to it but there was nothing constructive done at that time. You know, it was just a bloody joke. It took them two years to, you know, get around to it. It would have been all right if their time had been spent on something constructive, but it wasn't constructive at all, just spent on bloody fruitless argumentation as to how the desks were to be split up or something, you know, and what the hell's the difference.

Side 2

Dobrowolsky: This is side 2 of an interview with Mr. James Smith on March the 25th, 2004. We've been talking generally about your work as the Chair and CEO of the Northern Canada Power Commission. You were kind enough to let me look at a number of your papers from that time when I was in the Yukon Archives yesterday, and one of the things that impressed me was that you seemed to be a very hands-on Chair. You seemed to pay regular visits to every single diesel plant and hydro operation, and you were commenting on everything from dust in the yard, to "This place needs another coat of paint." What did you perhaps bring to the job that your predecessors might not have?

Smith: Well, I brought local knowledge; and I absolutely refuse to be critical of my predecessors, because they just did not have that opportunity. They hadn't had that opportunity prior to being involved with the Power Commission. And on top of that, all of them had it as a part-time job. It was, generally speaking, the deputy minister of the department who undertook to be the Chairman of the Power Commission; and in the early days of the Power Commission, when it was used, you know, strictly as a

developmental tool, this was probably a good idea. But they should have set the job up as a stand-alone job 20 years before they did.

When I came on the scene, of course, the whole thing changed dramatically, because here was a guy, you know, that had to live with the consequences of the actions that were taken. And at the board meetings, you know, I'd tell these board members, "Don't start arguing with me as to what the hell this is all about. I live with the goddamned thing. You guys go on home, and nobody ever hears from you again until the next board meeting three months from now." We also got a lot of northerners out of the board, which helped dramatically.

And I would say that I have always been a hands-on operator. That's the way I was brought up is if you were going to be responsible for the thing, you had better know what the hell's going on, and I made it my business to find out what was going on at NCPC, and I became very knowledgeable about it. In fact, I gained the knowledge that did me a lot of harm in some ways in dealing with my operational staff, because I was out in the field finding out what was going on. They were sitting in office in Edmonton, you know, listening to somebody on the telephone telling them what was going on.

And in retrospect, why, I was the author of my own problems in this regard because shortly after I took it over, I realized that the thing was not working the way it was, and I should have been far more forthright in going to the ministers that were in charge, you know, at that time and insisting that the thing be split up and given to each of the Territorial Governments; and the consequence of that, Helene, has been that the NCPC is a far more responsive organization to the people it serves than what it ever was when it was headquartered in Edmonton. They were away from the pressures of their political masters in Ottawa, and they were away from the day-to-day operational pressures of the customers that they served; and if you can think of any finer way to have a business that is very, very highly personal, because electricity is something that you've got to have. When you have the people that are running the thing totally removed from the people who are using the product, you've got problems on your hands, and that's what NCPC had; and I've got to take responsibility for not pushing the thing faster, you know, than what I did, no question at all about it.

Dobrowolsky: So, one of the things that came up in your papers, and you were alluding to it a little bit, reporting methods within the organization.

Smith: Chaos!

Dobrowolsky: Tell me what you really think. Don't be diplomatic!

Smith: Ah, it was hopeless, Helene, just hopeless. The organizational set-up that they had, there was nothing wrong with it as such, but it didn't work; and when I look back on it now, the manner in which it was done, it really was designed to be a kind of a self-preservation thing for the people in the head office and self-destruction for the people out in the field. That's exactly what you had. There it was.

Dobrowolsky: In terms of people not being held accountable?

Smith: Day-to-day operations.

Dobrowolsky: Day-to-day operations?

Smith: Oh, yes; most of the places, Helene, except for Whitehorse and Yellowknife, operated under what I would say were very difficult conditions; and the authority was so far away and so hard to get any action out of that these day-to-day difficulties that were really small in most instances, by the time you got

around to doing something about the darn things or got authority to do it, they had become major problems. That's just the way the thing operated. Now, Whitehorse and Yellowknife were a little bit different, because they were big enough to have, you know, fairly senior management on the ground, and it wasn't too bad a situation. And Pine Point, of course, that was another matter altogether, because we served the C, M & S there.

Dobrowolsky: And that is who?

Smith: Consolidated Mining and Smelting, they ran the plant at Pine Point, and they provided the technical expertise and all the rest of it. Really our people in Pine Point had the best of both worlds. They had NCPC, you know, kind of as their – what would you call it – their point of reference; but they also had the C, M & S people right on the scene to help them with all the technical problems and all these kinds of matters. Pine Point was a good old operation, Helene, but it was a good operation, because C, M & S was there to see that it was a good operation. That's exactly what you were faced with. By the time you had got to a place like Inuvik, boy, when I say, "Chaos reigned," well, that's putting it lightly!

Dobrowolsky: Now, apparently there were also – I don't have the dates right here, but there were also regional offices.

Smith: That's right.

Dobrowolsky: And you don't feel that they were particularly effective?

Smith: They were never given enough authority for one thing; and also, they weren't staffed with senior enough people. What had happened over the years is that as a person proved themselves out on the field, they were rewarded with a job in head office. So, you wound up with the lesser-qualified people being left in the field and the really qualified people being moved to head office, where their effectiveness was minimal. They became paper pushers. And head office was staffed with a hell of a lot of good people, who had made their way in the corporation out in the field; but now they were removed from the field, and the people who took their place were nowhere near as qualified as the people who had moved into head office.

Dobrowolsky: I see the problem. So, just as the political environment of the Yukon changed a lot during your time as Commissioner, my sense is that the operating environment of NCPC also changed quite a bit at that time. When I spoke to Ted Humphrys, he was saying that at the time they built the Mayo Plant, there was no question of needing any kind of special permits and as far as he knew, there wasn't even much consultation with the Territorial Council. They just went ahead and did it. Then you have a project like Aishihik, where a lot had changed, and I was wondering if you could speak about that a little bit.

Smith: Well, I straddled Aishihik, you know. When I came on the job, Aishihik was essentially, you know, up and running, Helene. But one of the major things that had happened was that, say when they built Mayo, they got a permit or they did it under a thing called the Canada Water Act.

Dobrowolsky: The Dominion Water Act– yes.

Smith: Then by the time they got around to building Aishihik, it was the Northern Inland Waters Act that had taken over; and all of a sudden, the minister announced that the Northern Canada Power Commission would be subject, you know, to the Northern Inland Waters Act.

Dobrowolsky: Do you recall which minister this was?

Smith: Chrétien; and this was great, you know, this was a great political thing for this to happen. The only thing is that nobody knew what this meant, because this Water Board had been set up and all of a sudden, this Water Board says, “Well, you know, if you’re going to build a plant at Aishihik we want to know this, we want to know that.” Fisheries became involved in the thing. We’d never heard of them before; and all of a sudden, you know, all of this enlightened regulatory authority appeared on the scene, and NCPC was not prepared in any way nor was Montreal Engineering.

Nobody was prepared for this at all. It was just like when they, you know, handed the Commissioner his walking ticket and told him to take the rest of the day off. The same thing happened with the Northern Inland Waters Act at NCPC. Nobody said to NCPC, “Look, here are the things that you’re going to have to do in order to accommodate the needs of the Northern Inland Waters Act.”

As I say, this had all been beyond me by the time I got on the scene, but they had a hell of a time, not only finding out what, you know, the Water Board wanted but then, finding people with the competence to do what they wanted. This became a major undertaking, and then, of course, in the construction of the darn thing, I’m talking a little bit out of turn here, I’m not too sure of myself here, but I do believe that during the construction phase, there were quite a few modifications, you know, requested and insisted upon by the Water Board, that added time and cost to the project.

Now, this had nothing at all to do with the major cost overruns, but I guess what I’m saying is that all of a sudden, the world of the early twentieth century was kicked out the window and the day of almost the next century arrived. Do you know what I’m getting at? Here it was and being an instrument of the Government of Canada, they could hardly exempt NCPC from the Northern Inland Waters Act. So, it was a pretty traumatic situation, and I became involved in this to some extent when I was still in the Commissioner’s job; and of course, my people had great difficulty in figuring out just exactly, you know, what was really called for here, you know, what was really going on here. And it was ultimately accommodated; but, once again, nobody had sat down to say, “If we apply the Northern Inland Waters Act here, what is the cost going to be?”

And make no mistake about it, those costs didn’t impact, you know, very much on the actual construction of Aishihik, but they have impacted on it dramatically ever since.

Dobrowolsky: My impression was that as a result of the Northern Inland Waters Act, this local Water Board was formed. They had no regulations. So, it took them a while to get operating and going, and my impression was that this did end up holding the project up for a couple of years during a time when inflation was booming. Original costs went up a lot higher, labour, supplies; and undoubtedly, there were other factors, as well.

Smith: Well, I think if you really get into it, Helene, the other factors really had more to do with these cost escalations than, you know, at the time what was caused by the Northern Inland Waters Act; but at the same time, these other costs, Helene, in my opinion, had to do with this, you know, more or less controllable kind of things. Do you see what I’m getting at?

Dobrowolsky: M'hmm.

Smith: But when you got to the Northern Inland Waters Act, you couldn’t control anything. You know, the plant was planned with a certain range of water levels on Aishihik Lake in order to get 35 megawatts out of that thing, and all of a sudden, this went out the window. The Northern Inland Waters Act said, “No, it’s great but this is the range within which we’re going to allow you to operate.” And this, of course, really threw a [wrench] into the whole works, and it was a hell of a mess.

But in retrospect, I'll put it to you this way: These regulations had to come, and it just so happened that the Northern Canada Power Commission's needs to supply the never-ending appetite of the Anvil Mine for electricity clashed. Do you know what I'm getting at? Here was the immovable force meeting up with whatever you want to call it, and NCPC was not in a position really to be very flexible. You know, here they were catching hell from a minister in the morning to supply power, and in the afternoon, they were catching hell from a minister to accommodate the Northern Inland Waters Act. The minister found himself in a hell of a situation; and of course, all the rest of us were, you know, in the boat along with him.

But I feel that in retrospect, the Northern Inland Waters Act was a good piece of legislation. Once again, there was no phasing-in period. You know, nobody sat down and said, "Now, look, does it make sense to institute this thing, you know, the day it comes into force; or should we have certain sections of it come in at a certain time?" Do you know what I'm getting at, that nobody sat down with this thing? Somebody put a thing in front of the neighbour and said, "The coming into force date is to be such-and-such." That was it.

Once again, in my terminology, they didn't get their homework done; but the end result of the Northern Inland Waters Act, in my opinion, has been basically good. You can't fault the Act. What you fault is the guys who were charged with this implementation. They should have phased the damned thing in and said, "Certain sections will come into effect today. Certain other sections will come into force, you know, two years from today." Do you know what I'm getting at? That's where the thing went down the tube.

Dobrowolsky: Yes, too much too soon.

Smith: Well, it's the same old story, Helene, you have a political master who has a political agenda, and that is different entirely from the guy out in the field who has a work agenda. When I was in the Commissioner's office, of course, I had Cyprus Anvil on my back. You know, "Are we going to get this electricity in September or October or November? Is it going to be a year from now? You know, what's going on? We've just bought ourselves a new umpteen million dollar piece of equipment that needs this electricity; and now the thing is on its way, and the electricity ain't going to be there when it gets there."

This was when I was in the Commissioner's office, and I had lots of rough days, you know, in trying to bury the hatchet between the Northern Canada Power Commission and Northern Affairs and Cyprus Anvil; because Cyprus Anvil wheeled out such a tremendous impact on the economy here at that time, that you couldn't say, "Sorry, you know, we can't do something."

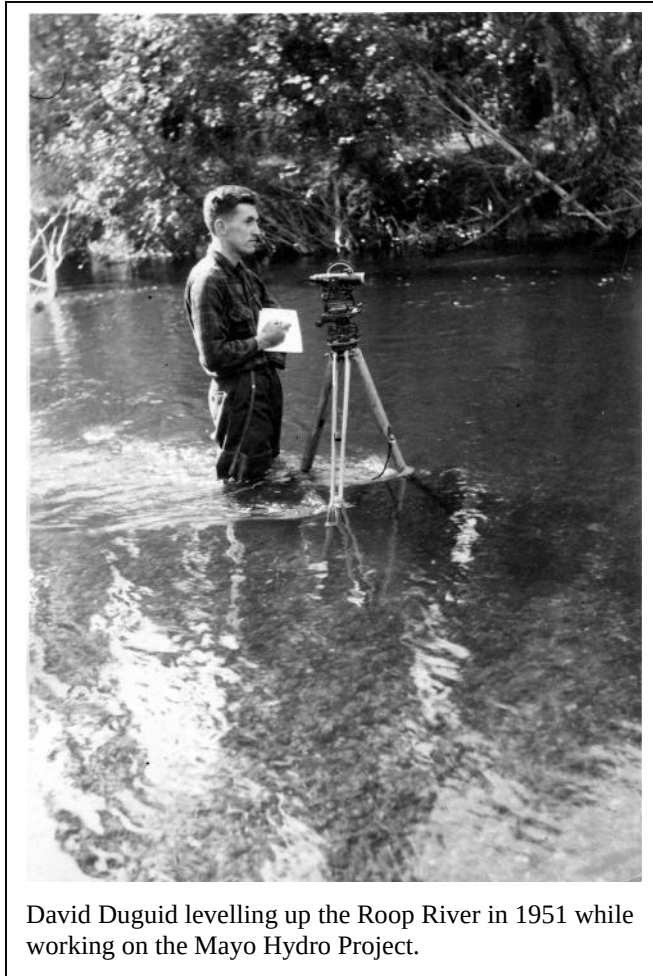
Thurmond, who was the guy I dealt with, was a topnotch guy, you know, at Cyprus Anvil, and they were good people. But that was the tough end of it was that pressure for the electricity, and then, the pressure from the regulatory authority that their word had to be obeyed. It was a great learning experience.

Dobrowolsky: That's an excellent way of putting it, very diplomatic. I think now might be a good time to take a break here. I think what I would like to do is we'll wrap this up. I'll have a transcript made of our interview; and then, I'd like you to look over the transcript, and that would give you a chance to fill in any gaps that we might have missed or it might help prompt some things you might have forgotten. Does this make sense?

Smith: It's fine with me.

Dobrowolsky: Thank you very much.

END OF INTERVIEW



David Duguid levelling up the Roop River in 1951 while working on the Mayo Hydro Project.

David R. Duguid

Born in Scotland, where he received his education as an engineer, David Duguid immigrated to Canada after World War II. He worked for Montreal Engineering, later Monenco, from 1951 until his retirement in 1981. During that time, he was involved with the construction of the Mayo Hydro Project, the rebuilding of the Marsh Lake dam, the Aishihik Hydro Project and construction of the fourth wheel at the Whitehorse Rapids Hydro Project. After his retirement, Mr. Duguid carried on consulting for NCPC and, then Yukon Energy for another 10 years.

Recorded by Helene Dobrowolsky at Mr. Duguid's home in Chemainus, B.C. on May 5, 2004. Transcribed by Joyce Bachli, Mega Reporting Inc. on 6 June 2004. Transcript review completed by Mr. Duguid, 10 August 2004.

Note: After the interview, Mr. Duguid kindly took the time to do a careful review and edit of his interview. I have not indicated places where he has tidied grammar or clarified information. If substantive new information has been added, however, I have indicated this in [square brackets]. Since he has made so many changes and corrections, Mr. Duguid has asked that this transcript serve as the main document for this interview and the actual tape be destroyed.

Tape 1 of 2, Side A

Dobrowolsky: It's May the 5th, 2004. This is Helene Dobrowolsky interviewing Mr. David Duguid at his home in Chemainus, B.C., and we're discussing his career as an engineer with the Northern Canada Power Commission. Mr. Duguid, could you please tell me when and where you were born.

Duguid: In Bo'ness, Scotland in 1922.

Dobrowolsky: And when you decided to become an engineer, what prompted that?

Duguid: My father was an engineer in the British Army.

Dobrowolsky: And what type of projects did he work on?

Duguid: Well, he was with what became the REME, Royal Electrical and Mechanical Engineers, and he

was effectively a mechanical engineer; and he started in the first world war as Sergeant-Artificer and rose, in the second world war, to Major General, who started the IEME in India.

Dobrowolsky: And “IEME” is?

Duguid: Well, it’s the Indian Electrical and Mechanical Engineers, like the REME [and was responsible for repair of military equipment in the India and Burma sphere of operations].

Dobrowolsky: Right, right; so, was it electrical engineering that particularly attracted you or just the field generally?

Duguid: No, I did start in electrical engineering because I was interested in radios, building your own radios and all this sort of thing, which was pretty new. And then, I went into the army and was essentially trained in radar, which was very new at that time. Then I served with anti-aircraft batteries down in England, and then, later with field workshops in Holland and Germany towards the end of the war.

Dobrowolsky: One little bit I skipped, where you studied engineering?

Duguid: At Edinburgh University.

Dobrowolsky: And this was a four-year course?

Duguid: The BSc engineering degree was a three-year course, and then, when I got out of the army, I went back and took an extra year of civil engineering, which I felt would give me more of an outdoor life instead of in a big factory in an industrial town.

Dobrowolsky: Good thinking! So, what prompted your interest in emigrating? What made you decide to come to Canada?

Duguid: Well, I think my generation had – during the war there was one goal, and that was getting the war won, and everything else went into second place. Suddenly, the war was over, and we hadn’t got a career track ahead of us mapped out, and we would be competing with other engineers, who got their seniority and so on during the war. And I had some distant relatives in Canada. So, three of us actually decided to come out up about the same time. One friend was a Fleet Air Arm pilot and the other was in the RAF [Royal Air Force].

Dobrowolsky: You mentioned you had distant relatives in Canada. Was there a particular location in mind, or it was just this amorphous land of opportunity you were heading for?

Duguid: Well, yes I think that was the main thing. No, it was good to at least have one family member you could make contact with, and he had a farm near Edmonton. So, of course, I visited him and got some of the local knowledge.

Dobrowolsky: What were the first jobs you held when you came over here?

Duguid: Well, I got a job with the Alberta Highway Department, building, surveying and supervising the construction of a new road up to Cold Lake. And then, at the end of that season, I came to Vancouver, and

Perhaps the scariest reconnaissance was by helicopter with Joe Long of NCPC to a potential site at Fraser Falls on the Stewart River. While examining the site from a gravel bar in the river, we noticed the water level was rising rapidly, with the noise of the spring breakup giving us warning to get out fast. As we rose above the river looking back at the bar where we had been standing a minute or two before, we saw it was being flooded and covered with moving ice.

became a sessional instructor in civil engineering at UBC. That went on for a couple of years, along with some work on the research side of the Fraser River model, which was being built at that time.

One summer job I had was taking a survey party to Kitimat to do a survey for the townsite and the ship turning basin in Minette Bay.

Dobrowolsky: So, this period that we're talking about is essentially from about 1948 to 1951?

Duguid: That's right.

Dobrowolsky: Yes. Okay, and then, what happened? What was your next move?

Duguid: I wanted to see some more of Canada, so I took a job with Montreal Engineering, which one of my friends had already joined. MECO were consultants in the electrical power, design and construction industry; and so they sent me to Mayo to work on the Mayo Hydro Project on the storage dam supervision.

Dobrowolsky: So, what kind of firm was Montreal Engineering? Was this a precursor of a big national firm with lots of regional offices or just one big company in Montreal?

Duguid: Well, it was a originally set up to provide engineering for a number of private utilities, in the electric power industry, including Calgary Power and Newfoundland Light & Power, also CAEE de Venezuela and quite a number of other properties, which were originally put together by Isaac Walton Killam.

Dobrowolsky: Oh, I know that name. I studied in his library, at Dalhousie University.

Duguid: Is that so? Well, then it grew to take on outside clients and one of these was the Northern Canada Power Commission.

Dobrowolsky: Now, is this a particular Canadian scenario or is this fairly common, that a power corporation would hire an outside engineering firm for design and supervision of construction, rather than have that kind of expertise in-house?

Duguid: Well, it was, and probably depended in part on how big a system the electric utility was. If it was a really big one, then the obvious course was for them to start their own design and supervision of construction department and directly then do the design and take contracts for the contracting work. If they were small, then it would pay them instead to use one of these consultants to do the work, and then not to have to hold engineering staff between projects. So, it really depended on size [although even some large utilities might not have a steady work load for their engineering staff].

Dobrowolsky: So, it just made sense, in the case of Northern Canada Power Commission, where they were dealing with a few discreet projects at that time, not to develop this massive staff infrastructure?

Duguid: That's right.

Dobrowolsky: So, how did you get to be chosen to go to Mayo? Did you volunteer or were you pushed?

Duguid: Oh, no, I was quite ready to go and when I went for an interview in Montreal, they said that this was where I would be going and I was quite happy about that.

Dobrowolsky: Good. So, did you have any ideas or conceptions of the north before you came up here and how did that differ from what you first encountered?

Duguid: Well, I didn't really know what to expect and I hadn't read anything about the gold rush, you know. So without such a background, I suppose I wasn't surprised at anything. Of course, the impact of it being a sort of "after the gold rush society" became clear; and there were legendary miners with names like "Bedrock Mackenzie" and "Hardrock MacDonald" and "Deep Hole Johnson," which maybe says it all.

(laughter)

Dobrowolsky: Yes. So after a coffee break, we're back in Mayo and I believe when we left off, you were talking a little bit about your first impressions of Mayo. Perhaps I could just back up a little bit and go into your understanding of the construction project you were doing in Mayo and exactly what was your particular role in this?

Duguid: Well, it was what would be really classed as a small hydro project, very small really, because the load was only the mine at Keno and the town of Mayo.

Dobrowolsky: This was the silver-lead mine at Keno and Elsa, yes.

Duguid: Yes. So, the Mayo River is a fairly small river and very much affected, of course, by the seasons. So, it was necessary to have a storage reservoir and this was achieved by building a timber crib dam to raise Mayo Lake by about 10 or 15 feet, and so that in the winter when there was, in effect, no runoff, they could continue to have water down at the Mayo power plant, which was just outside the town of Mayo. And it was the storage dam I was primarily involved in and when it was finished in the early part of the second year, then I moved down to the completion of the power plant near Mayo.

Dobrowolsky: So, was this a seasonal type of job, you came up to work during the summers or was some work still proceeding over the wintertime?

Duguid: Well, it was certainly trying to squeeze in the maximum work when the temperatures allowed it; but pretty well from December, January, February, there was nothing that could be done really and the engineering staff returned to Montreal.

Dobrowolsky: Which month did you go to Mayo? This was in 1951, I believe?

Duguid: I think it was about February or March.

Dobrowolsky: You were there just in time for spring?

Duguid: That's right and then came out just before Christmas; went back in probably March to April.

Dobrowolsky: When you went in to work on this dam, was there already a general design for this, or was this something you were working on, on the spot.

Duguid: Oh, no, there was a design and a contract had been let to Northern Construction Company of Vancouver.

Dobrowolsky: Essentially, were you supervising the project and ensuring it conformed to the standards of the design?

Duguid: That's right. Yes, there was about five or six engineers, all mostly between 25 and 30, and the resident engineer in charge was Conrad Mulherin from the Maritimes. This was the second hydro project he had worked on. The previous one was in Snare, Northwest Territories.

Dobrowolsky: And he was also a Montreal Engineering employee?

Duguid: Yes, yes, there were about five or six of us.

Dobrowolsky: And I'm assuming you would have been working, to a degree, as a team; but would different members have different responsibilities or specific specialties or areas they were in charge of?

Duguid: Yes, that would be – normally one would be, perhaps, in charge of the powerhouse, another in charge of the spillway, and I was in charge of the Mayo Lake storage dam.

Dobrowolsky: And were all these things happening more or less concurrently?

Duguid: Yes, yes.

Dobrowolsky: Tell me about the challenges of northern construction in a very remote community.

Duguid: Well, there were some things. Of course, there is the shorter construction season and the lower temperatures, which affect pretty well everything. And, for example, one of the years we were there, I think that the low temperature was about 70 below Fahrenheit. The permafrost was one of the problems. It's far better understood these days, but it wasn't then. For example, at Mayo Lake dam, the one abutment, in particular, was underlain by permafrost, which caused some problems, and in fact, extended the construction period into the second year and necessitated driving sheet steel piling into the permafrost to make sure that there was no leakage of water, which could erode.

Dobrowolsky: So, the piling was going beyond the permafrost to bedrock?

Duguid: No.

Dobrowolsky: Or was it more to kind of seal off the area and insulate it?

Duguid: That's right. The bottom would in fact be – what was done was to use steam points to drive down to a point where the piling could be well imbedded and then, it would freeze back and make it quite watertight.

Dobrowolsky: Now, steam points are a method that's often used in gold mining to thaw permafrost to dig ground.

Duguid: That's right.

Dobrowolsky: You were mentioning earlier you had employed a local expert to do this?

Duguid: Oh yes, Bill McComb, yes. He was working a creek up on Mayo Lake and I don't think it was a successful operation. So, he was quite happy to come and work for us on steam points.

Dobrowolsky: So, there was the permafrost problem. What about the supply line, how did you organize getting necessary materials?

Duguid: Well, the road to Mayo Lake was very rough and we had to do some maintenance all the time on it; but other than that, everything could be brought in there, including the timbers for the timber crib dam, which came from one of the areas in the Yukon that can grow timber up to 12 or more inches in diameter, I think probably the Pelly. But it was all local timber, squared in section.

Dobrowolsky: So, run me through the schedule of the steps in building this dam and what was required along the way.

Duguid: The storage dam?

Dobrowolsky: Yes.

Duguid: Well, the first thing you had to do was to unwater the site; and since it was such a big lake for a fairly small inflow, it was possible to shut it off completely with an earth dike.

Dobrowolsky: This is what you were referring to earlier as a cofferdam?⁸

Duguid: That's right. And normally with the cofferdam, you would have to provide a bypass, so that the stream could go on flowing; but in this case, it was anticipated that there would be no trouble; the water wouldn't rise that much by the end of summer when the dam was to be completed, and it didn't. So, that made it very simple for coffer damming. And then once you got into the river you had to prepare the bottom for the timber cribs, and rock had to be brought into to fill the cribs. And then, we ran into the trouble of the permafrost and abutment, which hadn't been anticipated and which had to be really fixed by the sheet steel piling, and that was done in the following spring. [There was also some difficulty in providing durable rock to fill the cribwork and so it had to be hauled in from Keno].

Dobrowolsky: Okay, let's talk about fish. I know you have some thoughts on this subject. This was a salmon-spawning river, was it not, the Mayo River?

Duguid: Yes, and I think mainly big Chinook salmon from the Yukon River, which by the time – I guess it's so far from the sea that it's really only the big ones that could make it; and so, by the time they got up there, they were bright red and big, 20 to 30 pounders. And since the river was so clear, you could see them in the shallows. The spawning beds above the power dam, this is not the storage dam, the power dam down at Mayo, would be cut off, and they would only have a fairly short distance of the Mayo River below and down to the Stewart River that would be available as spawning beds.

So, being a keen angler, it worried me at that time; also that the Mayo River would be completely cut off at the storage dam site. Fortunately, there were still some creeks coming in to the river, so it didn't dry up; but it obviously affected the grayling and that was one of the negatives that I perhaps wasn't very happy with.

And previous to that, you see, my experience of hydro projects was in Scotland. And there, the Scottish Tourist Board had a very tight rein on what you could do and the result was that there was never a real environmental opposition and nowadays, they are regarded as tourist attractions, having fish ladders and other facilities.

⁸ A temporary barrier, usually an earthen dike, constructed around a worksite in a reservoir or on a stream, so the worksite can be dewatered or the water level controlled so that construction can proceed in the dry. Source: www.hydro.mb.ca/our_facilities/build_gen_station/glossary.html

Dobrowolsky: So they were really ahead of the rest of the world by decades, because it took a while for that sensibility to develop in North America.

Duguid: That's right. And later on, it became something that I felt, you know, should be addressed actively. Of course, by the time Whitehorse Rapids was built, which was several years later, then they did do the fish ladder and it was successful. In fact, it was the longest wood fish ladder in the world or something.

Dobrowolsky: Yes, and has become a very popular tourist attraction.

Duguid: Yes. Well, I think that's the case; and the other thing in Scotland, of course, there was the tendency to have buildings, which were in granite or stone instead of some of the sort of things we were putting up in Canada.

Dobrowolsky: The trailer-like structures? (laughter)

Duguid: Yes.

Dobrowolsky: So, you don't need to talk about this if you don't want to but when we spoke over the telephone, you mentioned that you actually had some conversations about this matter with Fisheries officials?

Duguid: No, I didn't. This was much later. It's always worried me in the back of my mind that this had happened; and way on, when John Lowe was general manager, I mentioned to him; and of course the environmental concerns were quite to the fore by that time, that maybe something could be done, and it would show that NCPC had some environmental concerns. I mentioned what was done in the Capilano River in Vancouver, where they actually took smolts up over the dam, trucked them and so on. Anyway, he quite liked the idea; but later on I learned that Fisheries had said, "No, it wouldn't be successful," or something like that. Anyway, they were against it, even though NCPC was prepared to pay for it.

Dobrowolsky: What time period would this have been about? Are we talking now into the '60s?

Duguid: Oh, yes, this was quite a bit later, because it was after – I'm trying to remember. Anyway, it was at least ten years later. It was after Ted Humphreys had retired and John Lowe had taken over.

Dobrowolsky: As the chief engineer for NCPC?

Duguid: General Manager.

Oh, before we leave the previous point, I did mention that I had again heard that subsequently, with a change of staff at DFO [Dept. of Fisheries and Oceans], they were doing something to mitigate the salmon problem, but I haven't heard what it was. You haven't?

Dobrowolsky: No, no, but I'll find out.⁹

⁹ The Mayo salmon enhancement program, sponsored by Yukon Energy working in cooperation with Nacho Nyak Dun First Nation, has focussed on improving the habitat of young Chinook salmon along the lower Mayo River. A number of small channels are being excavated to provide a safe habitat for the juvenile salmon until they migrate down the Stewart and Yukon rivers to the Bering Sea. The Yukon River Panel Restoration and Enhancement Fund has also contributed to this project. <http://www.yukonenergy.ca/news/releases/archive/4/>

So, you finished your first season with the dam pretty much built and what happened next in terms of your part of the work?

Duguid: Yes, well I went back up to the storage dam – there had been some flow past in the permafrost section during the winter and it sounds amazing that water had, in fact, thawed a path through the permafrost because there was no piles at that time, and the coffer dam had to be shut again. Anyway, so we came back, put in the piles and finished it off and took out the cofferdam.

[In reminiscing on hydro engineering in the north, I cannot leave the impression it was all work and no play. With my principal recreation being fresh water angling, I took whatever opportunities that came along, for example on the Mayo River and Mayo Lake for arctic grayling and lake trout. These species were quite unknown to me before coming to the Yukon.

Another weekend activity was going up the lake in a boat lent to us by Steve Arbutina and panning for gold from gravel lying in cracks in the bedrock exposed in creeks such as Steep Creek. Orlie Simmons found a sizeable nugget but we mostly had to be satisfied with rice-sized gold. It was now possible to understand Robert Service's line that it wasn't wanting the gold so much "as just finding the gold."¹⁰ We only found perhaps \$5 worth each on our days off, but also we found sore backs! The fascination that made the "Gold Rush" possible became clear.

We became friendly with Steve who had worked the creeks for gold for many years but was now trapping for a living, using a cabin well up the Roop River, the main tributary flowing into the Lake at the far end.

Despite his not being happy about the project, he did not hold it against us. I stayed over in his cabin once or twice and was amazed that he was there all winter by himself, from October freeze up to break up about May/June, without even a dog as a companion, and with no reading materials except catalogues: He then came down to the lake outlet where he had a summer cabin. We took the brunt of a flow of conversation that had been pent up for perhaps eight months.]

From Mayo Lake, I then moved down to the main dam site at Mayo.

Dobrowolsky: And there you were working on the hydro dam?

Duguid: Yes, yes, the power plant structures. Oh, there was one thing. I recounted it for your predecessor.

Dobrowolsky: When Graham McDonald was working on the history of water power, yes.¹¹

Duguid: Before I went up to the Mayo Lake dam, when surveying above the tunnel excavation at the power house site, I found while doing this survey, that my benchmark levels were actually moving, and nobody would believe this. They were on bedrock.

So my colleagues said "Well, there's something wrong with this! This chap was teaching in university – a bit theoretical perhaps?"

So, I don't think very much attention was paid, but it got to the point where I could actually stand there with my transit and watch it inch down. Just about that time they reported from the tunnel, which was underneath, that the timbers were cracking and a whole huge part of the bedrock was slipping. It had been undermined by the portal to the tunnel and the blasting that was going on and it had been slipping down;

¹⁰ Mr. Duguid is referring to the famous Robert Service's poem, "The Spell of the Yukon."

¹¹ Yukon Development Corporation, *The Power of Water: the story of hydropower in the Yukon* (Whitehorse, 2001).

and my line of levels had gone across the upper part of it, away up the hill.

So, that part of the tunnel was then abandoned and they moved the powerhouse upstream to where it is now.

Dobrowolsky: So, the tunnel was being excavated on some kind of geological fault, was that what was happening?

Duguid: And so, the geologists from – the federal government geologists came back and took a look at it and said, “My, my.” They were surprised. And the only recourse was to move the powerhouse back and then go upstream in the tunnel until beyond where this fault occurred; and then, make a tunnel into the new powerhouse location.

Dobrowolsky: Yes, and Mr. Humphreys mentioned this, too when we were talking about any special challenges. Yes, that must have been quite a surprise!

Duguid: It was indeed.

Dobrowolsky: So, how much did that slow down construction?

Duguid: Not too much, we still ended up finished at the end of that year.

Dobrowolsky: Were you at an early enough stage?

Duguid: Yes, yes, it was just the first 100 feet or so of the tunnel that had to be abandoned and filled in, and then, the offset – I think there was a few hundred feet of offset to the new powerhouse location.

Dobrowolsky: Good! So, is there anything more you can think of about Mayo and the Mayo project that I haven’t asked you about?

Duguid: I don’t ... I know at one point subsequently there was talk, Ted Humphreys would know this, about putting a second unit in that powerhouse almost immediately; but then perhaps they had doubts about the mine load. I don’t know, anyway I was supposed to be in charge of that; but fortunately, instead, I was put in charge of the Bearspaw in Calgary, which was a very favoured project because you were just on the outskirts of Calgary.

Dobrowolsky: Working in civilization?

Duguid: Yes. I would have gone, but I liked this better and it was a larger project.

Dobrowolsky: I’m just going to take a break here.

(Tape off and on)

Dobrowolsky: ... We had another congenial little break there and when we left off, you had just finished your work with Mayo and moved on to a few other projects elsewhere in Canada. So, maybe before we get into your next foray into the Yukon, you can just give me an idea of what you were doing in the interim?

Duguid: Right. Well, there was the Bearspaw hydro project, which was bigger, I think, than Mayo, which was in the single digits, I forget, it was about four megawatts and Bearspaw was 18 megawatts and it was on the Bow River in Alberta. And while a lot of the same cold weather problems for construction were

present, they didn't last so very long, compared to the Yukon winter. And after that, I went to supervise an oil-fired steam generating plant in St. John's, Newfoundland, the civil part of that. That was in 1955. And after that, I went to India in the State of Assam for about six months on a hydroelectric project at Umtru.

That was 1956. 1956 to 1960, I was on various projects, working from the head office in Montreal, including a thermal power project in Maracaibo, Venezuela; power projects in Nova Scotia, Newfoundland and P.E.I.

Then in 1960, I went to take over a quite large project in Brazeau, Alberta. This was on a tributary of the North Saskatchewan River and it was a multi-purpose scheme to provide both power and storage so that the flow in the river through Edmonton, which was suffering badly from pollution, would be much higher in the winter and thus, pollution wouldn't be as severe. And I was there for two years from 1960 to '61.

At that point, I took a leave of absence from Monenco and I took a degree, a B.A. in economics and political science at the University of B.C.; in the summer vacations, again working for Monenco on various projects. And then, on completion of that degree, I was taken on to run a Vancouver office for Monenco and mainly to supervise, from that office, B.C. Hydro's Duncan Dam, which is one of the Columbia projects in the Kootenays. Also, in that period I was working for various projects and investigations in the Northwest Territories and the Yukon.

[Perhaps I may interject some experiences I had over the years while investigating possible hydro sites. I appreciated the opportunity of exploring remote parts of the North in Yukon and NWT, mostly by floatplane and helicopter.

I was several times surprised at how young the pilots were, and often somewhat apprehensive. For example when examining the Alsek River by helicopter with a pilot who looked as if he was still in high school, we had a ride on the thermals up mountainsides, that reminded me of snowboarding.

On another occasion I was shaken when asked to identify landmarks using my detailed maps and survey information to locate where we were.

On a bush flight from Inuvik to Mayo in a small floatplane, we were forced down by bad weather, landing on a small lake north of Dawson City. Without emergency supplies we had a few days there in the first snow of the fall, before climbing out of the overcast and making Dawson City. At least I had my first taste of roast beaver, shot by the other passenger.

Perhaps the scariest reconnaissance was by helicopter with Joe Long of NCPC to a potential site at Fraser Falls on the Stewart River. While examining the site from a gravel bar in the river, we noticed the water level was rising rapidly, with the noise of the spring breakup giving us warning to get out fast. As we rose above the river looking back at the bar where we had been standing a minute or two before we saw it was being flooded and covered with moving ice.]

Then in 1972 until I retired in 1981, I was Vice-President of the Pacific Division of Monenco; and, again, a number of projects were involved. They are Nonacho Lake Storage in the Northwest Territories, the Aishihik Hydro Project in the Yukon and various others. One of the highlights was reading a paper in Leningrad, after a visit to Siberia to look at cold weather hydro projects in the USSR.

Dobrowolsky: Oh, that must have been fascinating!

Duguid: Yes, it was, it was. And then, finally I retired in '81 and carried on consulting for NCPC and,

latterly, Yukon Energy until about '91.

Dobrowolsky: So, I missed something back there. When you moved from Montreal Engineering to Monenco, or is that some kind of a subsidiary of Montreal Engineering?

Duguid: It's simply they changed the name. You know, everybody was changing to these short –

Dobrowolsky: Catchy, futuristic-type names.

Duguid: Yes. Anyway Montreal Engineering, I suppose, also, in B.C. had too much of a geographical, eastern Canada connotation. So, that was one way that they made that change.

Dobrowolsky: I see. Well, that makes sense. Well, tell me about Aishihik. What stages of this project were you involved in?

Duguid: Well, it was a pretty complicated arrangement; because at that time, Monenco – just before this, Monenco had been buying minority interests in other consulting companies across Canada, which I don't think turned out to be a terribly good move. But one of them was in Vancouver and since they had an office there, I moved in and worked from that office.

Dobrowolsky: So, what was the original company?

Duguid: Crippen Engineering. We did some joint projects like investigation of the Great Bear River in Northwest Territories and a study in Winnipeg for the Water Resources people on determining the optimum range of Lake Winnipeg and that sort of thing. So, when it came to Aishihik, the Northern Canada Power Commission, I think realistically wanted to diversify so that it wasn't doing everything from back east. So they said, "Well, okay, we'll have Crippen do Aishihik with Duguid to be project manager."

Tape 1 of 2, Side B

Dobrowolsky: We're at side two of a May 5th interview with Mr. David Duguid and before we talk a little bit about Aishihik, we were talking very briefly about some very ambitious power schemes for the Yukon; I think, during the – again I'm not entirely sure of the time period but I think, maybe the late '50s, early '60s. Now, you were calling them the Yukon Taku and the Yukon Taiya projects?

Duguid: They were – as I remember it, were brought up in an early study that was done by Federal Water Resources entitled "Yukon River Basin Report," 1962, a sort of blanket study of the Yukon. I've got a copy of it somewhere. It was only to a very preliminary stage. They looked at everything from what you might call a more or less theoretical basis and there was certainly absolutely nothing about the environmental concerns. If I remember right, it called for raising the headwater lakes of the Yukon, and I think one of the schemes even called for flooding out Whitehorse. That gives you an idea of the impracticality.

Now, the only thing that might have been practical would have been something that would raise any lake of the headwater lakes by a very modest amount, you know, a matter of a few feet instead of what was proposed. And I don't know why it would have come up at the time of Aishihik, because it was altogether too large and it just was unacceptable. You know, you wouldn't put a lot of energy into trying to explore whether it was practical or not. If I remember right, it was in the same sort of order as the Kitimat scheme for BC Hydro. You know, it would have required something like an aluminium smelter in Alaska.

Dobrowolsky: I think that was the ultimate goal, to use Yukon resources to power major industry on the Alaskan Panhandle and I think a smelter was mentioned a number of times.

Duguid: Well, I know that Monenco, and as far as I know NCPC, never looked at that as a practical proposition. Anyway, there wasn't the load for it. So, there was no question of that, being of the order of 1,000 megawatts or more. Whereas we were looking at things – investigating projects more in the order of 20, 30, 50 megawatts, which would, conceivably, have been required in the Yukon for new mining ventures or increasing the Faro operation. That's what was looked at and we did a number of studies.

Dobrowolsky: So, were these kind of an inventory of water resources in the Yukon?

Duguid: Yes. I've got a couple that we did that I can show you, and one of them was done – both of them were done for the *Yukon River Basin Study*, which was, I think, sponsored by the Federal Government. I've got a copy downstairs. Maybe I should bring that up.

Dobrowolsky: I actually have a note of that somewhere here. I think that was sometime in the early '60s, wasn't it?

Duguid: I'll go get it. [pause] These were "Inventory of Yukon Hydro Sites (1960-1983)" dated Oct 1983, and "Storage and the Yukon Hydro Electric Potential" dated March 1984.

Dobrowolsky: Well, we were talking a little bit, before you went to look in your library, just about some of the – I guess the planning environment in terms of hydroelectric projects in the Yukon, and we were touching briefly on some of the more grand, megaprojects.

Duguid: Yes.

Dobrowolsky: And you brought up something very interesting from one of these reports, which is essentially although the mega projects are mega expensive, in terms of what they generate, the cost is low in terms of your eventual project, and then, the more smaller, midrange projects, your cost of the power produced eventually is going to keep on rising, the smaller it gets.

Duguid: Yes. [When we examined the cost per kilowatt hour trend between mini through medium to mega, there was a downward curve in the cost of power. This was similar to what Monenco found in an investigation and study program in Brazil. Here also, for mega projects the kw/hr cost was lower.]

Well, of course you have to be sure of the load, and I think the Yukon is very aware of that because their loads have disappeared before at Faro and at Keno. In that case, you're left with a plan that is more than you need; and if the costs haven't been amortized, then that is going to be fairly high cost power for the future. So, it's really a matter of figures, number crunching and assessing what your load – the reliability of your load and will it grow, will it fold? But these two studies were an effort to look at what had been done in the past, put them on this level playing field, if you like, as far as you could, because they were done by different consultants.

Dobrowolsky: So, just to elucidate, we're talking about two studies that were produced by Monenco Consultants Pacific, essentially doing an inventory of Yukon hydroelectric sites, based on a study of all the previous studies that had been done in the past 20 years or so and giving an overview.

Duguid: Yes, that was the basic idea, of the inventory study, but the storage study was a general examination of the need for storage in the Yukon. One thing that was clear was that there are different levels of study. If you're asked to do a study on a specific project then, you know, the first thing you can

do is just look at it and look at the maps and look at the levels and look at the flow in the river without virtually doing anything on site; and that's an investigative study. If you then are interested in the results from that, you have to go and do some fieldwork to verify that there isn't some unknown problem. And then, if you are still interested, you have to do what's called a pre-feasibility study or a feasibility study. The feasibility study is very expensive, because it involves drilling and a lot of fieldwork. So, you don't get up to there unless you're sure of the load and, you know, all the other things that go into making the final decision.

Dobrowolsky: So, in terms of Aishihik, at what point in these various levels of studies did Monenco come into it? Was your company involved in the project from the early stages?

Duguid: Yes. Monenco was asked to look at it, to see what had been looked at in a previous study where it had been more or less written off. It was indicated that there wasn't enough water and there wasn't enough head. When we looked at it from the level of an investigation study, then we felt that it could be viable. We could use the full head of the water by taking the powerhouse outlet down to a lower level than had been thought before. First it was just the falls that were going to be developed. This involved the falls plus the fairly fast river down to where it flattened out.

Dobrowolsky: So, just to clarify, the water system that we're talking about is – what is it, Aishihik Lake, Canyon Lake and then, not too far below Otter Falls as part of the Aishihik River?

Duguid: Yes, the Otter Falls. So, the idea was to use the storage in Aishihik Lake, which is a much bigger lake; and a very modest amount of storage could give you what you might call "seasonal storage," which is having water that you can put down in the winter when the inflow is negligible. It had so much storage potential that it was possible to get from it "cyclical storage" also. This is multi-year storage, most useful where the water supply is subject to wet or dry cycles of several years duration.

That is, if you got two or three dry years, you'd still have enough water so that your plant could continue to meet its load. So, the Aishihik had that exceptional merit of multi-year storage, and it was particularly useful in conjunction with the Whitehorse plant, because the Whitehorse plant has lots of water but a very limited storage range. And the two went together rather well, which I'm afraid didn't seem to get through to the intervenors at the hearings, or to many other critics. Probably we didn't put it well enough I guess.

Anyway, getting back to the point, it was seen that there was more head that could be developed than the very tentative studies before had indicated, and it then became worthwhile doing a feasibility study. And ultimately, NCPC decided that the project would fit into their load picture, and the contract for engineering was made with Crippen Engineering. At that time, I was running Monenco Pacific from an office they rented to me in their building. So, there were really only myself and my helper or deputy there for Monenco.

Dobrowolsky: And who was that?

Duguid: Dave Robinson. He was the contracts engineer and I was the project manager but all the rest were Crippen staff. The chief engineer was a Crippen man with a group of design engineers.

The manager of Crippen had overall responsibility, and I reported to him since it was a Crippen job. And they supplied the resident engineer, all the field staff, which was different, in effect, from what we had done in previous projects. In this case Monenco could not provide field staff. So the arrangement was that Crippen, who were coming off the Mica Dam project in B.C., would provide all the field engineers.

And then I mentioned about the project being delayed, and so, it had become a crash program, because NCPC, by that time, didn't even have the diesel generation to support the next winter's growth to be.

Dobrowolsky: And from what I understand, this was again primarily the Anvil Mine that needed more energy for its increased development.

Duguid: I think that's so. So, they had to bring in some extra diesel plant, which they had hoped to avoid; and the project at Aishihik was flat-out because it had been delayed by a year by the environmental process and the hearings. You know, it hadn't been foreseen that there would be that delay or the cost inflation jump just ahead. If we had known what would happen subsequently to other hydro projects across North America with similar environmental approval delays, a longer schedule and higher budget would have been proposed.

Dobrowolsky: And just to clarify, coincident with the Aishihik project, I think it was the Minister of Indian Affairs and Northern Development at the time had just put into effect the *Northern Inland Waters Act*, which had much more stringent requirements in terms of environmental and various other considerations and no one really knew how the process should be implemented.

Duguid: Yes, that's right. That was absolutely right, yes.

Dobrowolsky: This was kind of a new operating environment and no one really was quite certain how to best manage it.

Duguid: No. And to Leo Brandon, who was the chairman of the environmental hearings, this was obviously quite new. One got the impression he distrusted NCPC and their engineers, and took issue with the amount of storage requested. In fact, perhaps also he didn't understand that we needed the cyclical storage capability for the A/W [Aishihik/Whitehorse] system to reliably meet the load in an unusually dry sequence of years. He only later became convinced, after a computerized system was carried out.

Dobrowolsky: The cyclical?

Duguid: Yes, the cyclical one, the multi-year storage, which, of course, if we didn't get it if we didn't get what we thought was the modest level range from Aishihik Lake, then it made the project much less financially attractive. So, I think Jim Smith has got it right there, that it threw everything. We had an environmental consultant, Gary Bowden, and he wrote a report finding the environmental problems were not severe. In fact it was not clear what exactly was required.

Dobrowolsky: So, it wasn't a very pleasant, cooperative process?

Duguid: I think the licencing process and environmental hearings were rather a mess. And there is no question that when you had the delay pushing you into this awful inflation period, that whatever construction contracts were awarded, delayed completion and cost overruns were virtually inevitable. Indeed, with last minute design changes to meet environmental requirements and the necessity of a crash program to try and complete on schedule, costs ran up and time ran out.

Dobrowolsky: Oh, dear. So, what you were referring to earlier, when we were discussing this a little bit off-tape, was this also coincided during a period that a lot of people refer to it as the "energy crisis."

Duguid: Yes, that's right.

Dobrowolsky: And there was incredible inflation during that period.

Duguid: Yes.

Dobrowolsky: You were mentioning that just the cost of steel and rebar apparently went up greatly during that time.

Duguid: [Yes, steel prices rose by more than 46% per Statistics Canada, and in a peak period such as the summer of 1973, prices were in a range between 10c and 30c per pound. Rather than try and remember the details relating to the cost overrun, and to the delays and crash program, I refer you to the Crippen report “Aishihik Development. Analysis of the Cost Overrun” dated March 1976. This is a fair assessment and also deals with the initiation of the project, the changes in size and design, and the Water Board Hearings. It describes the dramatic cost escalation, the worst right across North America for decades.]

Dobrowolsky: So, this wasn’t a unique situation?

Duguid: No.

Dobrowolsky: So, who was the main contractor for Aishihik?

Duguid: Well, there were two major contractors, one who was doing the control structures; and the other was Harrison, who is a hard rock contractor, a Canadian firm of good reputation. The contract was, however, delegated to their Denver office.

Well, they didn’t make things easy, but they had some reasonable cause; to be charitable they hadn’t anticipated this sort of situation, particularly the crash program. But now they wouldn’t be making what they hoped for.

Dobrowolsky: A handsome profit.

Duguid: Perhaps so.

Dobrowolsky: Just to move back a little, you mentioned there was another main contractor, dealing with the Canyon Lake and Aishihik Lake structures.

Duguid: Oh, yes.

Dobrowolsky: Do you happen to recall the name?

Duguid: I think it was Keene Construction, and they also had a claim, most of which was ultimately approved by the engineers.

Dobrowolsky: By “a claim,” you mean this is for additional expenses?

Duguid: For extras. Yes, and part of them were due to the fact that we were changing the design of, for example, the Canyon Lake Structure right to the end because it had to be environmentally acceptable and we had to change – keep everything low and were limited to a certain amount of water and it had to pass water during the tourist season. The Harrison claim was pretty outlandish; and in the end they backed off, and settled for about what the engineers had said was justifiable.

Dobrowolsky: Well, certainly not the sort of thing you hope for when you’re working on a major project.

Duguid: Not very pleasant.

Dobrowolsky: Now, from a design aspect, this underground facility, this was quite new to the north, wasn't it?

Duguid: Yes, it was. Crippen had done one on the Mica Project.

Dobrowolsky: And Mica is?

Duguid: One of the Columbia River projects in B.C.

Dobrowolsky: So, could you explain just exactly how that worked?

Duguid: [It is not practical to properly explain the Aishihik layout without a picture or plan. The size of Aishihik Lake made it possible to obtain the necessary storage with only a small range of lake levels. The resulting regulated water supply could support a hydro plant which utilised the head at Otter Falls in addition to the steep drop of the river downstream. A total head of about 600 feet would then be available. The flow which passed through Canyon Lake, was conducted along an almost level bench in a two or three km canal in permafrost terrain. It is dropped down an intake shaft to an underground powerhouse, thence by tailrace tunnel and channel for return to the river.

By using the underground concept for intake, powerhouse, and tailrace, several technical problems are reduced or eliminated and the structures are much less obtrusive. For example a very high surge tank is avoided, and there is no powerhouse visible. However, there are more difficulties for construction access and operations.]

Dobrowolsky: And a real construction challenge!

Duguid: There were some construction difficulties. A comparison with the appearance of the structures can be made with the Bearspaw project near Calgary which I can show you.

Dobrowolsky: Maybe for a moment while you're looking, I'll just mention that Otter Falls, which keeps coming up, is something of a Canadian icon, in that this used to be the scene on the old Canadian five-dollar bill. And there were a lot of concerns through the whole life of the building of this project to preserve this lovely wilderness scene.

Duguid: That's right.

Well, here is the 18-megawatt project at Bearspaw [indicating photos] and you can see the big structures, and high gates. It is not a very beautiful powerhouse, and much more obtrusive than Aishihik, and producing about half the power. So, it's more like the Whitehorse Rapids plant.

Dobrowolsky: Right, there are a lot of resemblances to the Whitehorse Dam.

Duguid: And I think the total storage we were looking for was about 12 feet on Aishihik Lake, but it was possible to make design modifications to get the same storage going up six feet and down six feet, or splitting the range as necessary to minimize the environmental impact.

Dobrowolsky: So, quite innovative.

Duguid: If you just run your eye over this letter, the draft which I made out for Harold Kaldor [which is pointing out concerns at the shortcomings of what was the current environmental position on the future of hydro power in the Yukon].

Dobrowolsky: Now, this was in response to a professor, who had some severe objections to the Aishihik project?

Duguid: Yes, in part, he was trying to say, “Don’t build hydro – don’t flood out your valleys,” dealing generally with the future of hydro in the Yukon. “Don’t make the mistakes we made in southern California” type of thing. [He was favouring coal-fired thermal plants as an alternative. Obviously before full recognition at that time of such factors as air pollution, acid rain and global warming.]

Oh, here it is. I can summarize it.

Dobrowolsky: Well, essentially it’s in response to his concerns?

Duguid: Yes. [It seems to me important since it represents early attacks on hydroelectric developments relative to their environmental impact.]

Dobrowolsky: Well, perhaps tell me the gist and if you don’t mind, I would love to take a copy of that.

Duguid: Yes, okay; but note it is only my draft to assist NCPC in commenting on his position.

Dobrowolsky: Well, ultimately it’s their letter and you provided some input.

Duguid: In the draft I pointed out that hydro generation should not be regarded simply as a possible means of meeting the short-to-medium-term power requirements of the Yukon. This would require no more than five-to-ten percent of the Yukon’s total hydro potential. Alternatively, potential hydropower may be regarded as one of the two major resources, which can be developed in a Territory lacking most of the resources of the provinces such as agriculture, forestry, etc.

His study seemed to address the former view rather than the latter and so pays more attention to the five-to-ten percent of the potential than the 90-to-95 percent. In other words, the immediate requirement was modest but NCPC was being prepared for a big load coming forward such as the Alaska Pipeline project, which, of course, never went ahead. But if it had been, there was one proposal to use hydropower for the compressor stations. And instead of using gas from the pipeline, it would be saved for consumers.

Dobrowolsky: Yes, and it was a very different economic climate at the time. We did have several functioning mines, well, getting into the ’70s or early ’80s. There was Whitehorse Copper, the two operations of Cassiar Asbestos, the Faro operation. United Keno Hill was still going.

Duguid: Yes, that’s right.

Dobrowolsky: And I think people were thinking more in terms of other new mines that might be opening rather than the possibility of scaling back. So, it was a very different economic climate.

Duguid: Yes, yes. Well, the fact that the Yukon would have a natural gas supply right there would have been a great help, too, for heating, et cetera.

Anyway, point 2 in my draft: “There appears to be an implicit assumption that hydroelectric projects constitute single-use development of the water resource and conflict fundamentally with tourism, fisheries, wildlife, et cetera. The Europeans, amongst others, have shown in their more sophisticated development of hydro projects that conflicts may be minimized; and with suitable mitigation and enhancement measures, compatible multi-use development is quite practical.”

Well, there was the big difference of opinion, multi-use versus just, “Don’t do it, it’s going to make a mess.”

Examples of multi-use projects already completed were given:

“Big Horn and Brazeau Dams in Alberta, improving winter water quality in the North Saskatchewan River, recreation enhancement at Mactaquac in New Brunswick, are a few multiple use projects that come to mind. Flood control is a common benefit of hydro development. An example of this is reduced winter flood levels in Whitehorse, resulting from the Whitehorse Rapids project.”

Whitehorse used to have real winter flooding, which is caused by the build-up of frazil ice in open water. [Frazil ice is] ice crystals that form when the water is just about at freezing and will then attach themselves to rocks or anything that’s in the river and very often will form ice dams. For example, in some conditions, an ice dam will build up right across the river and right to the bottom and that’s what causes the winter flooding. Anyway, they used to have that in Whitehorse, and Bearspaw was another project that partially was built to stop flooding in Calgary during the winter due to frazil ice dams. And it did help, but it had to have other measures later.

Point 3. “It should be noticed that in the Yukon, hydro development has resulted in a minimum flooding of river valleys by using existing lakes for storage.”

This was his big thing. “Don’t flood your valleys.”

Dobrowolsky: Right.

Duguid: “This applies to Aishihik, Whitehorse and Mayo.” In other words, existing lakes just get some more storage room.

“The provision of storage for many of the potential hydro projects is on the same basis.”

And point 4. “High interest rates appear to penalize hydropower, with its high initial capital cost, as compared with thermal generation.”

However, at the time this was written, interest rates were very high; but when you correct them for inflation, a hydro project’s high carrying charges are offset by the great value of the inflation-proof aspect of the hydro plant’s annual costs at the time of high inflation.

Then, “Operating reliability, simplicity and ease of operators staffing are in favour of hydro as compared with thermal, particularly in the north.”

And then, he talked about fluidized bed thermal, coal-fired thermal power as an alternative; but that was really sort of state of the art and hadn’t been fully developed. So, you still had the acid rain to consider and later, of course, greenhouse gases and global warming.

“Fitting the size of a new hydro plant to the load is basic electrical utility expertise. Building excess capacity well ahead of requirement –,” he was sort of suggesting that NCPC was doing this, which is absolute nonsense.

“Building excess capacity well ahead of requirement is normally avoided like the plague by utilities, especially in times of high interest rates. I think there are not too many examples of overbuilding in Canada and even fewer cases where the utility has regretted building a hydro plant. Certainly, to my knowledge, NCPC have no plans to overbuild.” I mean, a professor should know more than that.

Dobrowolsky: So, he really hadn't done much homework?

Duguid: No, no. I mean that is a big factor when you look at hydro versus thermal. In the one case, you've got the carrying charges and no fuel. In the other case, you've got fuel and lower carrying charges but the hydro plants can be amortized over a longer period, as long as you've got the load for them. [Yukon Energy uses 45-60 years compared with 15-25 years for diesel plants.] Calgary Power have plants that are now 100 years old and, you know, still producing. Nowadays, they don't even have to staff them. They're remote-controlled from Calgary.

Okay, then, I showed you this: "NCPC has been criticized for proceeding with the original Whitehorse Rapids plant in the 1950s, too large, and Aishihik in the 1970s, too costly and not the best selection. The proof of the pudding is in the figures."

[Mr. Duguid later provided the following chart.]

Plant	1982 Cost /kw hr	Est 1986 Cost /kw hr
Whitehorse 1,2,& 3.	2c	2c
Aishihik	5c	5c
Diesel plant	15c	22c

And the other thing I already read you was: "The selection of Aishihik current studies indicate no lower cost medium-size site than Aishihik has been identified, with eight-to-ten cents per kilowatt hour being the current cost of new hydro."

Instead of Aishihik having too high a cost, it seems a bargain now. And I don't think that's understood yet. I really don't.

Dobrowolsky: Well, it's a very complicated topic.

Duguid: It is very complicated. [With the recent increases in oil price, the cost advantage of hydro over diesel is much greater. Low interest rates are an additional and positive factor.]

[I think at this point I would like to include some facts in defence of Aishihik, considering the criticism and bad press it has received over the years. I was reminded of this in 1991 by a request from Yukon Energy to review and comment on more than a dozen newspaper articles relating to the original Water Licence Hearings. I forwarded a letter in May 1991 dealing with accusations ranging from trickery to influence the Water Board, withholding relevant data, presenting misleading material and telling untruths.

As one present at the hearings (unlike the reporter I think) and having helped to prepare the NCPC presentations, I found what amounted to a "conspiracy theory" completely unfounded and insulting. There was a clear lack of understanding of the complexity of hydro plant and power system operations, particularly on the need for storage both 'cyclical' and "seasonal," but there were also factual errors and contradictions etc. As for the "conspiracy," both Garry Bowden and myself who were involved in the presentation at the hearings, recognised this to be absolute nonsense.

In light of all the criticisms, the following facts could help: Despite the overrun, the limited storage range and reduced water supply allowed:

1. In 1982, the estimated cost of Aishihik power was 5c /kw hr compared to diesel power cost of 15c /kw hr.
2. Comparing the Aishihik power cost with the best sites investigated at that time for future development which were in the range of 8c to 10c /kw hr.

3. Quoting from Yukon Energy Corporation's 2002 Annual Report which states "the Aishihik facility has been in operation for 25 yrs and supplies 35% of the total hydro energy of the Whitehorse-Aishihik-Faro system. As an existing renewable and low cost energy resource, the Aishihik facility plays a central role in the provision of electricity to residential, business, industrial and other customers.
4. Aishihik is the alternative to diesel generation which is much more costly and "environmentally unfriendly."
5. I also noted that during the Whitehorse Rapids plant fire of 1997, Aishihik virtually carried the system, avoiding a shut down.]

Dobrowolsky: There were a lot of factors that went into it, from the planning; and as you said, there were some problems with the construction and where you had all these players. Yes, it is a difficult thing.

Duguid: Well, multi-use development was perhaps a fairly new thing, and when I was taking this degree at UBC, I studied a course in natural resource economics from Professor Peter Pearse, which addressed this subject. He maintained it is not either/or. [The water resource in particular should be used efficiently and that means multiple use.] You've got to look at what can be done to mitigate any negatives and enhance positives, taking into account all uses of the resource. [I think personally that some concerns, such as were raised over the Aishihik village, should have been addressed at that time with mitigation measures.]

Dobrowolsky: I'm going to stop because my light is flashing.

END OF TAPE 1

David R. Duguid, Tape 2

Tape 2, Side A only was recorded

Dobrowolsky: This is tape 2, side 1 of a continuing interview with Mr. David Duguid on May 5th, 2004. During our earlier interview in the morning, we were talking mainly about your involvement with the Mayo and Aishihik projects, which were your two main projects in the Yukon up until the 1970s.

And although I realize you were part of a large company that worked all over the world and had many projects on the go, maybe we could go into the next phase, where I gather, when you came to the Yukon, it was mainly to consult on a variety of studies and projects.

Duguid: Yes. Well, I should mention with regard to Whitehorse Rapids, that I was not primarily concerned with the original Whitehorse Rapids, in fact, not really at all. The resident engineer there was Larry Carey. My later involvement was to supervise, from the Vancouver office, the rebuilding of Marsh Lake dam. This had been taken out of service, and we rebuilt it with steel pile sections, having a fish ladder and a boat lock.

Dobrowolsky: Now, I have that date somewhere when that happened. Just to clarify, the new Marsh Lake dam, the steel one, was built in 1975; and these notes I have taken from a *Whitehorse Star* article of the time. It states that Montreal Engineering designed the dam and supervised construction, and an outfit called Dillingham Corporation handled the actual building.

Duguid: That's right, yes.

Dobrowolsky: And the Montreal Engineering supervisor was apparently John Engweiler.

Duguid: John Engweiler, that is correct; he was the resident engineer on site.

Dobrowolsky: What did you do on the dam project?

Duguid: Well, it was using a system, which has been used, I think, in Europe of steel sheet piling, which interlocked, and therefore was very suitable to a sandy foundation. And apart from a little problem in one of the banks, which probably had some well-buried rocks, it went very well; and it really was a very economical solution to the problem. And I don't know if it's had to be refurbished at all but it's done about 30 years, I guess.

Dobrowolsky: And you mentioned that this design also included a boat lock and a small fish ladder?

Duguid: Yes, yes. Well, the boat lock must be still in use and the fish ladder too, I guess, because the water level drop is only a foot or two, you know. No, it was quite successful and it was, I think, built for the budget and on time. I think the only thing that had to be done latterly was to place some additional rock downstream for erosion protection.

Dobrowolsky: Was it sand so much as glacial silt? The Whitehorse valley is renowned for its clay.

Duguid: I think it was sand, because upstream of the dam, the river was slower and, so, any sand would drop out. No, I think, generally that went pretty well and it was a good design and it's probably lasted well. I think the thing is that you have to be in pretty good water to use that sort of thing, to survive, because if it's polluted and a bit erosive or corrosive, then it's going to have a shorter life.

Dobrowolsky: So, that's really not an issue in this particular location, I don't think.

Duguid: That's right. We didn't run into any problems.

Dobrowolsky: So, what was your specific role?

Duguid: Well, I was supervising it from the Vancouver office and John Engweiler reported to me. The design was done back in Montreal.

The other thing we were later involved in, was a competition for the design and supervision for Whitehorse 4.

Dobrowolsky: The fourth wheel.

Duguid: Yes, the fourth wheel and that was kind of interesting, because we had two other hydro companies, or maybe three, as competition. I'm sure Acres was one, SNC was another; and they all came up with slightly different arrangements, and ours won. That was to use the existing small regulating sluice as the intake and take the water right in a tailrace cut virtually to the powerhouse. I wasn't involved in the design or construction of that; but it was fortunately not one of the projects that would have built on to the existing powerhouse, and the way it turned out that would have been most unfortunate, because it could have been involved in the plant fire in 1997.

Dobrowolsky: And instead, it was actually housed in a smaller building farther upstream.

Duguid: That's right. We didn't envisage that. But we won the contract, and just about that time I was retiring. But I was in Whitehorse for six months.

Dobrowolsky: So, when you say around then you were retiring, this would have been when?

Duguid: '81, I guess.

I agreed to go up and start an office in Whitehorse; and so that was why we had six months, which was very enjoyable actually. [During this time I was giving assistance to NCPC Whitehorse office, in such matters as Native land claims, site investigations, etc.]

Dobrowolsky: This would have been a Monenco branch office?

Duguid: Yes. Well, Monenco Pacific, it was given a separate name. That was the end of me, my involvement in any sort of major project. [At the end of the six months I retired from Monenco, and moved to Chemainus, but continued as a consultant to Monenco mainly on NCPC work.]

Then in 1987 following the NCPC to Yukon Energy system transfer, I was invited to work for the latter as an independent consultant.

Dobrowolsky: Now, which particular job was this?

Duguid: Consulting for Yukon Energy; giving advice on the system inherited from NCPC.

Dobrowolsky: So kind of to be a standby consultant on various issues or projects?

Duguid: Well, immediately it showed that there was a difference of interest between Yukon Energy and Yukon Electrical Corporation Ltd. [YECL]. [YECL had been contracted to operate and manage the Yukon Energy system including any expansion and rehabilitation work. The responsibility for any capital expenditures should perhaps have remained in Yukon Energy's hands, since they paid for it all. Yukon Energy approval was required however, on any Yukon Electrical proposals, and they wanted somebody to review these.] I got into that position. Then Yukon Electrical employed Acres, who were competitors of Monenco, as their consultants.

In other words, Yukon Energy was now administering their contract for running of the system by Yukon Electrical, and so any Yukon Electrical proposals, they wanted somebody to criticize or approve or whatever. I got into that position and they then employed – Yukon Electrical employed Acres, who were our competitors.

Dobrowolsky: My engineer can beat your engineer? (laughter)

Duguid: Exactly, exactly what I didn't want. My conflicts with Yukon Electrical perhaps were mostly over the capital projects program for the future. And we had two different consultants with different views. The simplest way to put it is, "We were always for building a Chevrolet and they seemed to be for building a Cadillac."

Well, it's quite understandable. Safety is all-important of course, but in the North there was a great need to provide safe power at the lowest possible cost. Otherwise they were stuck with diesel generation. So that was one of the problems of northern development, and as engineers we recognised that we had to explore all avenues and innovative ideas to keep down capital costs. We did some things, which perhaps others would have seen as not conservative enough. I mentioned the Nonacho leaky rock dam. That was

in the Northwest Territories. That was, as far as I know, a first anywhere in the world.

Dobrowolsky: And what was this exactly?

Duguid: Well, it's a hydro project on a river on which they needed more storage. It's quite a big lake with rock at the outlet, rock control. And the trouble was, there was 150 miles of road to build over the sort of terrain you get in the Northwest Territories, shield rock and muskeg; and it looked as though it would cost an enormous amount. So, anyway we came up with the scheme that since we only needed a small range on the lake, it wouldn't matter if our dam leaked. It could leak as much as the minimum flow needed. So, it didn't really matter if it was going to leak or not, as long as it didn't leak more than that minimum. And then we had a gate, which was manually operated, because it only needed to be adjusted twice a year.

But the problem was how would we construct this. And the scheme came up that we'd construct it entirely in the winter, starting at freeze-up on the lake with enough ice to take a Hercules, which is about four feet of ice. Then all the equipment, dozers, all the fuel oil, everything would be brought in by Hercules and pulled to the dam site at the outlet. Then we had, from that time, only about three months before a Hercules would have to come in again, if you wanted to get everything out.

And the other thing was that the design would have to have nothing that couldn't be done at 40 below, and that knocked out concrete. It knocked out earth fill. The only thing that was really available was rock, and that's what we used. We blasted enough rock, and we put it in, I think, two or three zones with the very heavy stuff on the downstream face and then, smaller rock and so on, so that the leakage was kept reasonable. And although there were a lot of problems, such as not having enough ice for the first Hercules run, so that it broke through the surface but fortunately just a thin layer of ice.

Dobrowolsky: Overflow, yes.

Duguid: Shortly thereafter, the snowplough, which was making a road over the lake ice from the Hercules landing strip to the dam site, dropped through the ice. But fortunately, the wings of the snowplough hung up on the ice.

Dobrowolsky: So you could tow it out?

Duguid: We were able to get it out and use it.

But the main reason that the Hercules had this problem was that winter happened to be very late that year – Murphy's Law – and in order to speed up the thickening of the lake ice, we had a series of pumps, which sat on the ice with their inlets underwater and they spread the water along the landing strip.

Dobrowolsky: So, kind of like making a hockey rink?

Duguid: Yes, exactly, exactly. And the problem was that right at the end when we had enough ice and we had a pilot come out and verify it, there was a warm spell, and then a cold spell; and of course, you've got a thin layer of ice on the water, but fortunately nothing happened. That was a bit dicey, but in the end we got everything in and then out at the end of the operation. [It was done in seventy-five days despite temperatures as low 50 degrees below zero Fahrenheit.]

Dobrowolsky: About when would this project have happened? Give me a decade.

Duguid: Well, it was when I was in the Vancouver office. So, let me see. I think you could say it was in the '70s, yes, somewhere between – it would have to be '65 through early '70s I think it was.

Dobrowolsky: Okay. Now, one of the things you were mentioning that I wanted to get back to. When you were talking about consulting for Yukon Energy while Acres was consulting for YECL, was this mainly, initially at least, over forthcoming projects or potential projects, or were you just scrutinizing the whole business relationship between the two outfits?

Duguid: Well, actually when I went in, YECL, presumably because they were taking on this contract with Yukon Energy, asked Acres to make a report and review the system. So, the first thing I got was, "Well, this is what Yukon Electrical are proposing to do and what about it? Is it reasonable?"

Well, some of it was reasonable in my view; some was questionable. But we managed to resolve that fairly amicably.

But then other differences were more difficult, such as the rehabilitation of the Mayo Lake Dam, to my mind more of the Cadillac touch, and my information was that United Keno Hill had been losing money for six years and they might close down the mine.

The Mayo Lake Dam rehab was done, I think, in the late '80s. We had done one apparently minor repair about 15 years before, I believe. But, anyway, that was a difference of opinion and it just happened that the day they had agreed to the contract, at the next meeting United Keno Hill announced they were closing down the mine.

And then, all it had to supply was Mayo town, you know. So, very difficult really, because when you start arguing about "how safe is safe," you begin to see the problem; and I can understand Yukon Electrical's point of view. If they're contracted to run the system, then they want to be sure it's not going to wash away or whatever.

Dobrowolsky: Yes.

Duguid: But they're not paying for this. That's really the point. They're proposing capital expenditures, but Yukon Energy and the Yukon consumer are paying the cost. It got a bit frustrating again and finally I bailed out.

Dobrowolsky: So, was that the last project you worked on in the Yukon?

Duguid: Well, I wasn't working on it.

Dobrowolsky: Well, I mean in terms of consulting.

Duguid: Well, I advised Yukon Energy on a number of other questions until 1991.

Dobrowolsky: So we were speaking earlier about an inventory of sites.

Duguid: That was '83/'84, when I was still consulting for NCPC .

Dobrowolsky: And this was a combination of an inventory and analysis of previous studies?

Duguid: Yes. Together with the Storage report.

Well, I had retired completely from Monenco by the time they wanted me to consult for Yukon Energy, which was, I think, about '87 and lasted for four years until '91. But I was reluctant to get into that at the start; and if I knew it was going to be a sort of contest between Acres Consulting and D. R. Duguid, I

don't suppose I'd ever have taken it on.

Dobrowolsky: Yes, it's a very awkward position to be in.

Duguid: Yes. Well, I mean, they've got all the specialist engineers, like soils mechanic specialists and, you know, they can always win an argument in that way.

Dobrowolsky: And you only have your five decades of experience to back you up. (laughter)

Duguid: No, that didn't really work out too well.

Dobrowolsky: So, not a very comfortable working environment?

Duguid: No, no. However, it gave me something of a transition into full retirement.

Dobrowolsky: M'hmm. So, looking back on the part of your career that had to do with the north, I mean, obviously you take pride in the Nonacho project.

Duguid: Yes, amongst others.

[It might be misleading to leave the impression that my part in these projects was more important than that of the design engineers back in Montreal. In fact any success we achieved was very dependent on close liaison between field and office from first to last.]

Dobrowolsky: And are there any things about your Yukon work that were particularly career highlights or things you enjoyed doing?

Duguid: There were other highlights such as winning that competition for Whitehorse 4; when we came up with a better and more economical way of developing Aishihik; the discovery and study of the mid Yukon Project. One I forgot to mention was the ice lens cracking problem on the Whitehorse Dike.

[I would like to respond to your question another way, adding some observations about the electric power industry over the last 50 years.

Firstly, I was very happy to be involved in the North, a beautiful and challenging frontier territory with what I feel is a bright future. I am proud of what part I have played in providing reliable electric power for the residents and industry.

The much greater credit goes to Ted Humphrys who saw the advantages of bringing in reliable hydro electricity, which has kept down the cost of power for everyone.

More recently, and not before time in some respects, environmental aspects have been raised. Unfortunately confrontation rather than cooperation has ensued too frequently. My position of mitigation of adverse factors and enhancement of positive effects has not met with much success. All too often oversimplification of complex problems has had the public's ear. Such concepts as multiple uses of water resources and long-term reliability of power supply have not resonated well enough.

As in other parts of the country, the effects of long-term power outages, such as the recent major shutdown in Ontario and the eastern US, are too quickly forgotten. The need to accommodate unexpected shifts in weather patterns over the long run is often ignored.

I was reminded of the drawbacks of overloaded power systems during my time in Assam, for as the load

built up in the evening the generators could no longer maintain the normal voltage of 230v and it dropped by about 50 percent. It was the custom to substitute 120v light bulbs at about seven in the evening, then remember to change back as the load diminished toward midnight so as to avoid burnt out bulbs.

In recent years the politicization of the power industry in North America has had many negative effects and it would appear that too often politicians have taken the “politically correct” course, often interfering with the complex decisions, which depend on the expertise of system managers, built up over the years.

In small systems such as exist in the North, there are some additional problems such as the unpredictability of mine loads, and having no tie to a larger stable system to reduce the effects of variability of supply.

I am an optimist about the future of Yukon and believe that its substantial water power potential will be needed in the future. The high value of this dependable power, and the ability to store it until it is needed, will be seen as a unique asset, particularly if alternatives, which cannot provide continuous power are brought into the system.]

Dobrowolsky: Now, earlier, when you said the “Whitehorse Dike,” which structure exactly were you referring to?

Duguid: Well, the one that takes water into the powerhouse, that is the old powerhouse.

Dobrowolsky: So, you have the dam, and there’s a canal.

Duguid: That’s right, the dike retains the canal. Now, that’s what was happening to it.

Dobrowolsky: Oh, so this photo that we’re looking at, it’s shows this big earthen dike cracking right down the middle.

Duguid: Yes. But the crack was not very deep and didn’t cause any leakage; and by and large, it filled with gravel in the spring, but then it would start again next winter. But it was slowly destroying the top of the dike and we had to do something about it. Well, we tried several things using short test sections and they were partially successful; we tried injecting a chemical Lignosol¹²; using snow fences to build up the snow cover; using Styrofoam as insulation. In the end, we tried using the waste heat from the diesel generators, or hot water electrically heated using off peak power.

Dobrowolsky: So, the cause of this, was it b a freezing and thawing function? Was that what was causing it?

Duguid: It’s the same thing as you see in potholes; you know potholes in the road?

Dobrowolsky: Yes.

Duguid: If the soil is absolutely impervious, like clay where water won’t go through at all, or coarse sand where water quickly drains through, ice lenses won’t form. In between, there’s a range of overburden which will suck water up from down below and will make ice lenses.

¹² A liquor obtained during the papermaking process. As Mr. Duguid later stated, “It’s a by-product and very cheap, and they have apparently had some success by injecting it and it spreads into whatever has been frost lensing and makes it so it doesn’t frost, ice lens. But it wouldn’t dissipate into that material. You just ended with a bulb of Lignosol. So, that didn’t work.”

Now, in order to find out what was happening, we finally built a test section, and that's the section of the dike and we put in – this is just about 100 feet long. We put in two pipes and we ran hot water through them. And that effectively, you see, kept the frost line above the impervious ground.

Dobrowolsky: Oh, I see. So, you kept it from freezing to begin with?

Duguid: That's right.

Dobrowolsky: So, what we're looking at here is almost a pyramidal structure, the dike itself.

Duguid: Well, the dike goes on like this, you see.

Dobrowolsky: Yes.

Duguid: And there's the canal water level.

Dobrowolsky: And then, the area of concern is this kind of rectangular area immediately under the top of the dike.

Duguid: That's right. When it gets in here, it starts forming ice lenses; even though it's above the water level.

Dobrowolsky: Well, it's going to splay open and collapse.

Duguid: Yes. So, using that test section, and frost gauges to show how deep the frost had gone, we tried out the various alternative treatments. This included removing silt above the canal level and replacing with gravel, which in fact made the ice lenses worse.

Dobrowolsky: And then, the styrofoam.

Duguid: There are thicker ice lenses, you see?

Dobrowolsky: Oh, yes, fascinating!

Duguid: And then, we tried the snow fences, and it did help but it – now, you see, this is really bad.

Now, this is what we put in, heating pipes, which were fed by the cooling water off the diesels; and one goes down one leg and one goes down the other, and there is the result.

Dobrowolsky: So, almost the equivalent of a heat tape.

Duguid: Yes, that's right, not really high tech.

Dobrowolsky: Yes. So, you just kept it from freezing enough that this didn't happen anymore.

Duguid: Yes, and this is the paper that I had to read at Leningrad. You know, the place was stuffed with professors, who probably worked out things by theory down to the nth degree. I don't think they quite appreciated the trial and error of what we were doing there.

Dobrowolsky: Well, and the ability to test things in the field at the time, –

Duguid: Yes, that's right.

Dobrowolsky: – which, of course, you can't do when you're just doing in a lab or whatever.

Duguid: No. Anyway, there were two problems with our presentations to the assembly in Leningrad. First, interpretation was sequential, which would have needed double the time allowed. This required a last minute condensation and rewrite. Then our slide projector broke down unable to cope with the local voltage and frequency difference but not till my last slide, though unfortunate for those following as no substitute was available.

Dobrowolsky: So, you got in under the wire.

Duguid: Yes, but I think it puzzled them a bit. That isn't the way that they would have done it.

Dobrowolsky: But, interesting when you have these problems that you couldn't possibly foresee and then, come up with innovative ways to handle them.

Duguid: Well, we would foresee them now, you see.

Dobrowolsky: Yes.

Duguid: For advice we had dealt with National Research Council in Ottawa and Professor Hardy of U of A [University of Alberta], and we tried out these things. And, "Yes," they said, they felt that might work.

So finally the heating option was selected and installed. It appeared to work well, but I have not kept in touch with its performance.

Dobrowolsky: Well, it's always looked fine any time I've driven by.

Duguid: It's still there. (laughter)

Dobrowolsky: Well, I appreciate you giving me so much of your time to talk about this important period. This has been really helpful.

Duguid: Oh, that's good.

Dobrowolsky: And I thank you very much.

Duguid: Well, and I guess one way and another, I have to do some editing because I don't want to restart old disagreements over again. In any case some checking with records, and taking into account much that has been forgotten, is necessary.

Dobrowolsky: Well, as I mentioned earlier, I will be sending you a copy of this transcript and you certainly will have a chance to edit it any way that you see fit. I think that all the issues that you mentioned are not necessarily going to be very startling to anyone or hurt any feelings.

Duguid: Is that so?

Dobrowolsky: Well, you know, all these things have been discussed a number of times over the years and you are just referring to reports that are already out there.

Duguid: Yes.

Dobrowolsky: But I think it's good to be reminded of some of the things that you stated and yes, we can take it from there. But certainly you have the final discretion over what appears in the record.

Duguid: Well, you know, this swing that went over with the environmental awareness, and I was quite in sympathy with stopping some of the things being done in the past, and finding another way. But it just swung over too far and too fast, and became kind of ridiculous in many cases.

Remember the endangered Snail Darter, and something called a Furbish Lousewort. Subsequently, these were not found to be endangered, and in the meantime everything stopped, and you can just imagine the sort of chaos and people losing jobs. Consultation not confrontation is the way to go!

Dobrowolsky: And, you know, I think now things are better in terms of all-over planning and looking at all the considerations.

Duguid: Well, there's another thing I didn't mention and that was at one point when the --possibility of the need for a big hydro was this Alaska Highway Pipeline, we did investigate a dam on the Yukon River at Eagle's Nest Bluff. And previously, there had been a potential dam site at Five Finger Rapids and it was generally seen to be a no-go. So, we were looking for something to avoid that and we came up with this Eagle's Nest Bluff project.

Dobrowolsky: And by "we," you mean Montreal Engineering?

Duguid: Yes, it was Montreal Engineering. We paid for an investigation ourselves because we liked the economics and we liked the fact it could be built in stages as required. It was attractive since you could do enhancement there, and provide recreational and tourist facilities. In fact, it was an efficient multiple use project.

So, we presented this investigation report to NCPC, and they were quite enthusiastic. Of course, it depended on the need coming for that sort of power. In particular, we included what we felt could be done to mitigate any environmental consequences, and proposed some enhancement measures.

Dobrowolsky: I think this is just the two reports right here.

Duguid: Essentially what it was is – you know where Five Finger Rapids is?

Dobrowolsky: Yes, and I know where Eagle's Nest Bluff is.¹³

Duguid: Good. Well, the idea was that you would put a dam in there, and it would be high enough to divert part of the fall down an old channel of the Yukon River.

Yes. The project we named the "Mid-Yukon" and, so, you picked up additional head, considerably more than that at the dam. The dam wasn't very high, about 46 meters. But by using a sort of bypass down the natural, old channel, almost double the head could be obtained and a Five Fingers Rapids site avoided. What we proposed as mitigation was that you could, for example, have a boat lift to protect navigation in the Yukon River, even large tourist boats could be taken up or down. As far as people wanting to white-

¹³ The bluff is located on the north bank of the Yukon River about five miles below the outlet of Little Salmon River.

water it, a channel could be provided to give a wonderful experience. For pleasure boating and canoeing there could be a route similar to the very popular Bowron Lakes circle route in B.C., utilising the river and flooded old channel. We proposed that at the powerhouse location, where we'd have lots of extra power we would provide an outdoor, heated swimming area, and so it went. A fish pass and hatchery would also be possible having the benefit of heated water as required. Perhaps some day?

Actually, when we did this for NCPC, they then gave us the job of fleshing it out, with a feasibility study. It wasn't quite as good as we had hoped. The rock was deeper, and so it was going to cost more. It is still right up there with the other big projects, which were Fraser Falls on the Stewart River and Granite Canyon on the Pelly.

Yes. But, anyway, the Alaska Highway Pipeline disappeared, so, it was all an exercise, and never even got to the stage of First Nations negotiations.

So, anyway, there is a full report out on that study. The report was called "Mid-Yukon Power Development," November 1980.

Dobrowolsky: Well, it sounded like you really exercised your imaginations on that one.

Duguid: Yes, well, it was fun I must admit. (laughter)

Dobrowolsky: I'm getting my little light. So, once again I'm going to thank you very much. This has been great!

END OF INTERVIEW



Henry Breaden, 1978. *H. Breaden Coll.*

Henry Breaden

Mr. Breaden grew up in Mayo, spent nine years with the sternwheeler crews, then worked as a ferry operator and mechanic. In 1957, after completing courses in diesel electric engineering and hydro power plant equipment with ICS (International Correspondence Schools), he began work at the Dept. of National Defence diesel generating station in Whitehorse. When the Whitehorse Rapids Hydro Plant was completed in 1958, he moved over to NCPC and for the next 30 years, worked in various capacities all over the Yukon. As well as being a wonderful source of northern stories, he has a keen interest in Yukon history and has made many contributions to the e-newsletter, *Moccasin Telegraph*.

Interview recorded by Helene Dobrowolsky at Mr. Breaden's home in Nanaimo, B. C. on May 4, 2004. Transcribed by Mega Reporting Ltd., 30 May 2004. Reviewed by Mr. Breaden on June 29, 2004. [Additional information provided by Mr. Breaden on 29 June 2004 is in square brackets.]

Side A

Dobrowolsky: It's May the 4th, 2004. This is Helene Dobrowolsky at the home of Mr. Henry Breaden. Mr. Breaden, I wonder if you would mind telling me when and where you were born.

Breaden: I was born in Whitehorse in 1927.

Dobrowolsky: Now you were born in Whitehorse but I understand you did a lot of your growing up further north.

Breaden: I grew up in Mayo, yes, from about 1929, why, I went to school in Mayo, and that's where I grew up.

Dobrowolsky: And what was Mayo like when you were a child? What kind of a place was it?

Breaden: It was a great place for kids to grow up, because everyone was like a parent. If you got into mischief, why, you were not only accountable to your parents but to the community at large, and of course, they were to administer discipline, too.

Dobrowolsky: Which could be good or bad.

Breaden: Well, depending on your point of view.

Dobrowolsky: And about how big a place was it? How big would the population have been?

Breaden: About 250 people total.

Dobrowolsky: And were a lot of those people working in the mines in the Keno area, or what were they doing?

Breaden: A lot of them were working, yes, in the mines. A lot of them prospectors, a lot of them trappers. And just about – well, of course there were the businesses in Mayo itself, managers for the different businesses and so on. So, we had quite a cross-section.

You know, the superintendent and I had kind of an agreement that he was the fellow with horns and I was the nice guy. I was on the job, always a smile on my face and with my eyes open. Then, I would go into the office, "Graham, there's something here I don't like." And we'd pull out the drawings, and I would point it out. And then, he would put on his horns and go after Montreal Engineering. They never did catch on for months.

Dobrowolsky: And what was your dad doing?

Breaden: My dad was in transportation, running a truck up from Mayo up to Keno.

Dobrowolsky: That must have been challenging in the wintertime?

Breaden: Well, it was challenging anytime of the year; because if you were lucky, that's no more than a 30-mile trip, but it still would take two hours, and that was really good if you made it in two hours; because the road at that time was mud holes in the summer and glaciers in the winter and snow in the winter.

Dobrowolsky: And narrow and twisty.

Breaden: And narrow and real twisty.

Dobrowolsky: And I remember some good hills.

Breaden: Yes, yes, that is true.

Dobrowolsky: So, would he have been freighting for the mine or delivering materials to the mine?

Breaden: No, mainly to... Well, I guess some, but mainly to Keno City itself, to businesses in Keno City. He had what they call a jitney, passengers and freight.

Dobrowolsky: How did you get light and power when you were growing up?

Breaden: The generation of power at Mayo was by the T-Y company, Treadwell Yukon, and it was good but it was from six o'clock in the morning till one o'clock the next morning. And if you had an all-night party going on, why, it meant that at one o'clock, the lights were going to go out and you'd better have candles or a gas lamp handy. Oop, there it goes!

Dobrowolsky: Did they have a generating plant right in Mayo, or were there power lines from Keno to the town?

Breaden: Oh no, there were no power lines at all. They had an Atlas Imperial diesel, quite small really, 110 horsepower, 75 kilowatt output, but that took care of Mayo.

Dobrowolsky: And was there one person, that that was their responsibility, keeping the plant going, or

were there a few?

Breaden: Yes, there was one well-known fellow, Emil Forrest, you would have heard of Emil. Emil was in charge of the generation of power there when I was growing up.

Dobrowolsky: So, this would have been the 1930s?

Breaden: In the 1930s, yes, and Emil was there up until the early '40s when he went over with White Pass. And something that he did, too, he was instrumental in building equipment for the playground in Mayo, for the kids' playground.

Dobrowolsky: A real public service.

Breaden: Oh, yes, yes.

Dobrowolsky: Okay, and then, well, you went to school in Mayo; and after you finished school, what kind of things were you doing? What were you working at?

Breaden: My first job was longshoring for White Pass in Mayo when the boats come in. And I was at that for, oh, I guess, a couple of months, and then, there was an opening on the steamer *Keno* as a deckhand, so I took that job. [First day, August 7th, 1942.] Then I was longshoring at Mayo when the *Keno* came in, plus on the boat, too. And that started me on my endeavours in steamboating.

Dobrowolsky: At that time, I understand, of course the steamboat season was only in the summertime, and these boats would deliver supplies to Mayo, and then, be bringing ore from the mines?

Breaden: Yes, they would be – they would stockpile, oh, around 10,000 tons of ore right out in front of the hotel. And then, during the summer, it was all moved out.

Dobrowolsky: So, you would have to have a very strong back?

Breaden: Yes, and a weak mind.

Dobrowolsky: About how heavy would one of those ore sacks be?

Breaden: About 125 pounds. It worked out to be about 16 bags to the ton.

Dobrowolsky: So, I guess you would have to be very mindful about water levels on the river, just how big a load you could put on the *Keno* and the barge that she was pushing downstream?

Breaden: That's right. Usually they used the *Aksala* in early June, when there was real high water on the Stewart, being that the *Aksala* was a much larger vessel and could handle a bigger load. And then, after the water started going down, they would transfer over to the *Keno*. [100 tons on the *Keno* itself, and 200 tons on the barge.]

Dobrowolsky: Okay, so, this would have been around the early 1940s you would have been doing this work?

Breaden: That's right, yes, yes [1942].

Dobrowolsky: And then, for how long were you doing that?

Breaden: I was steamboating, my last year was 1950, and I got a leave of absence and I'm still on it.

Dobrowolsky: So, after 1950, what did you do?

Breaden: My first job was with the territorial government on the ferry crossing the Stewart, on the Stewart ferry, [McQuesten]. The end of the steamboating had come. So, I bailed out and went with territorial on their ferry, and I was with them for about a year and a half, and then, they asked me if I would go onto the highway, troubleshooting as a mechanic. That was repairing all the ferries and the graders and the road equipment.

Dobrowolsky: And this would have been the stretch of highway between Mayo and Stewart Crossing?

Breaden: Well, mainly between Mayo and Carmacks.

Dobrowolsky: So, this would have been after they had completed the road, or were they still in the process of building it?

Breaden: Oh no, the road had been completed; but because of volcanic ash in the area, it was not uncommon that you'd be cruising along at 50 miles an hour and all of a sudden, you would get into a pocket of this and puff and you were down to 15 miles an hour. But eventually, they were taken out, those pockets, and rebuilding the highway.

Dobrowolsky: So, this road we're talking about, this is the all-weather road between Whitehorse and Mayo, and this really was what brought an end to the sternwheeler era once you had road access year round.

Breaden: That's right, yes. Yes, 1950 was the last year that we ran up the Stewart, '51 that was on the ferry.

Dobrowolsky: How long did you continue with the highway crew?

Breaden: I was there till '53, and then, we moved to Whitehorse, and I went with the Canadian Army in their shops and from the shops into the diesel plant and from there then when the new hydro was built, why I transferred to the hydro.

Dobrowolsky: So, the diesel plant that you worked for, for the Canadian forces in Whitehorse, would that have been the one in the Takhini area, or I think there was also one downtown, wasn't there?

Breaden: The main one was at the base of the Two Mile Hill. That's where the main repair shops were and the main diesel plant.

Dobrowolsky: And were there other plants, as well, at the time?

Breaden: Yes, the Yukon Electric had a smaller plant in right downtown Whitehorse, and about that time, they had put in a plant on McIntyre Creek, a hydro, which is still running today.

Dobrowolsky: Now, what about the former power plant in the Takhini area, was that still running at that time, do you remember?

Breaden: Takhini?

Dobrowolsky: When you go past the big buildings on Range Road, the government buildings, on the opposite side there is those big square blocky building that I understand...

Breaden: No, there were no power plants up there at all.

Dobrowolsky: Oh, okay, my understanding was at one time, that was a power plant structure.

Breaden: There was a steam plant there, yes, for steam heating.

Dobrowolsky: Oh, okay. Well, thank you for straightening that out. So, would this have still been the Canadian Armed Forces before DPW, the Department of Public Works took over all that operation?

Breaden: That's right. Yes.

Dobrowolsky: And was that really your first experience learning about power generation and distribution?

Breaden: Yes, I trained by correspondence for two and a half year intensively, five hours every night, and that's how I ended up with NCPC and the hydro. I had also taken hydro in that course.

Dobrowolsky: What kind of a course was it?

Breaden: It was diesel electric engineering and hydro power plant equipment. There were several different courses, but once I had the basic, then I was able to extend it and get diplomas on different other courses.

Dobrowolsky: And where did you correspond? Where was your school?

Breaden: In Pennsylvania at ICS.

Dobrowolsky: Which stands for?

Breaden: International Correspondence Schools. Yes, they still are around today.

Dobrowolsky: And was that a common thing for people who wanted to learn a particular trade or to embark on this kind of correspondence work?

Breaden: At that time, yes, because during those years, there were no such a thing as vocational school or anything up there, and it was one way of training.

Dobrowolsky: Oh, that's fascinating. So, you would have to be fairly dedicated if you're holding a full-time job plus a family, plus studying on the side?

Breaden: Oh yes. Yes, every night from six o'clock until eleven was hit the books. And then, on a weekend I would do the text examination. Actually, you were allowed 17 days in the time period to complete one text and I was knocking off one a week. My social life was something non-existent.

Dobrowolsky: Oh my, so you had been doing your correspondence course while you were still with the road crew?

Breaden: Well, I was with the Canadian Army and the shops then.

Dobrowolsky: Oh by that time – and this was doing mainly mechanical work?

Breaden: Yes, yes, and the heavy equipment.

Dobrowolsky: And then, based on the credentials you got through your course, you then moved on to the diesel plant?

Breaden: That's right, yes.

Dobrowolsky: So, what kind of an operation was it? What kind of machinery did they have in this diesel plant?

Breaden: They had, let's see, five Model 32 Fairbanks Morse, 300 rpm, and they had one, what they call "OP", which was a far larger engine. And then, we had a couple of disaster units that we called the Caterpillar 398s.

Dobrowolsky: And was this a fairly straightforward operation? Were they fairly easy to keep going, –

Breaden: Fairly well, yes.

Dobrowolsky: – or was it difficult to get parts?

Breaden: We had a routine, you know, of maintenance that we carried out. They're pretty reliable. Those old Fairbanks were very, very reliable.

Dobrowolsky: And how far did the distribution area for this plant extend?

Breaden: Just locally in Whitehorse.

Dobrowolsky: So, that would include the downtown area, plus ...

Breaden: They were tied in with Yukon Electrical; and actually in peak loads, they used to feed back into Yukon Electrical, and then, at other time Yukon Electrical would have surplus. They would feed back into the army, and we could shut down some of the diesels.

Dobrowolsky: Oh, that makes a lot of sense, having a reciprocal arrangement.

Breaden: It does. Trading back and forth.

Dobrowolsky: Yes, yes. So, how long did this continue?

Breaden: Until, let's see, 1958, I put the first hardware on line, it was at four o'clock on the 15th of November, 1958.

Dobrowolsky: And this would have been with?

Breaden: With NCPC.

Dobrowolsky: With the new hydro dam?

Breaden: Yes.

Dobrowolsky: Okay, so, for some reason I had the impression you had done some work on the hydro plant in Mayo, but –

Breaden: Yes, I was in charge of Mayo for two years, and then, they pulled me back to Whitehorse when Anvil Mining started their project.

Dobrowolsky: So, this would have been later in the '50s, then, that you would have been in Mayo, or the early '60s?

Breaden: '60s, yes, actually in, well, '66 – or, let's go back a bit, 1964, I took one of those old Fairbanks 32 from the old diesel plant and set it up in Mayo as a standby, and then, in 1966, I took a complete power plant from Carmacks from Mt. Freegold camp, and we transferred them to Dawson and I set the Dawson plant up. And then, it was just pretty wild. And then, right from there I was slated for to take charge of Mayo, which I did after New Year's.

Dobrowolsky: Okay, now, I just want to back up a little bit. We kind of jumped from your work for the diesel plant for the Canadian Armed Forces to your work with NCPC in the early 1960s. I just want to follow what happened administratively before then. Now, at what point did your employers stop being the Forces and start becoming the Northern Canada Power Commission?

Breaden: Actually, the date was November 5th, 1958. In the fall, Ted Humphrys had interviewed us at the plant, and I was accepted as one of the operators for the new hydro plant.

Dobrowolsky: And this is the dam at Whitehorse Rapids?

Breaden: Yes, and then, I transferred the 5th of November '58.

Dobrowolsky: So, this was an entirely new job you went to, then?

Breaden: It was a new job but still under the government. See, with the army I was under the government, and with NCPC, it was just a matter of straight transfer over.

Dobrowolsky: So, all your benefits and everything go along with you?

Breaden: That's right, yes.

Dobrowolsky: Okay, now, I understand that the dam was built between 1956 and 1958. Were you able to follow that at all while it was under construction or have much awareness of the steps in the building of the dam?

Breaden: Oh yes, we used to go up there and have a look once in a while to see what was doing. When they were putting the first cofferdams in for the spillway, before the spillway was built, why, we used to go up there and periodically have a look and see what was doing. There was always something new, so usually a weekly visit.

Dobrowolsky: Just to keep an eye on what was happening.

Breaden: Yes.

Dobrowolsky: And do you remember any of the construction companies that were working on the dam or any of the people were working on the dam or ...

Breaden: Well, mainly Montreal Engineering, who were overseeing the project and Carey, he was the project engineer, I think, when they were first built. Then, of course, later years, I got to know many of the other engineers with Montreal Engineering, even Dave Duguid down here.

Dobrowolsky: Okay, so, you knew that eventually this would be a large hydro, brand new hydroelectric facility in Whitehorse, and I guess it was pretty obvious that the diesel plant, as a result, would become obsolete.

Breaden: That's right, yes. Yes, there was a new line built between the hydro plant and the hospital for we were going to supply electrical power for the boilers at the hospital for heating, and that continued right down through town on the river side and tied into the army substation. And eventually that winter, we took over the load of the army, and they shut the diesel plant down.

Dobrowolsky: So, this would have been the winter of 1958-1959.

Breaden: That's right, yes.

Dobrowolsky: Okay, and the substation that you mentioned, this also would have been in what is now the industrial area at the base of the Two Mile Hill?

Breaden: That's right, yes. The old refinery area.

Dobrowolsky: Right, right, that's a good way to refer to it. Okay, so you mentioned that you were right there when the dam went on line?

Breaden: Yes.

Dobrowolsky: So, tell me about your first day of work, or your first few days of work.

Breaden: Well, the first few days of work was orientation, which would be, say ten days. We were watered up; we were running turbines and supplying our own power.

Dobrowolsky: When you say "watered up," what do you mean by that exactly?

Breaden: That means – okay, it means the penstocks were pulled from the power canal right onto the turbines.

Dobrowolsky: And the penstocks are kind of the tunnels that channel the water –

Breaden: That's pipes, the large pipes that come down.

Dobrowolsky: Right.

Breaden: Yes. There were initially three that were put in, and two were made use of in the initial plant. And the third one was made use of in 1968-69 when the number three plant was put in. But the first few days was getting used to the synchronizing and so on. Well, with the plant, we were continually synchronizing manually. Now, in going from the old diesel plant to the hydro plant, we were going from manual breakers, which you close manually, down to a handle that you just twiddled and the breaker closed.

Dobrowolsky: So, that must have seemed very high tech?

Breaden: It did, it did.

Dobrowolsky: Is this what they call “pistol grips”?

Breaden: Yes, pistol grip, yes. Well, we were so used to synchronizing at the diesel plant that we would put on [a generator] online, never blink a light, and Montreal Engineering was surprised when I would synchronize and the lights didn’t blink. Well, I would ask them if it was really necessary.

Dobrowolsky: So, you made good use of your experience?

Breaden: Oh yes, absolutely.

Dobrowolsky: Yes, you really had a good sense of what was needed to keep a load balanced.

Breaden: Yes.

Dobrowolsky: So, tell me about your working space. Now, this was the generating facility that later burned, and that was added onto a number of times and it was partly built right over the river?

Breaden: Yes, the initial, it was two units, and the number three was extended on, so the building [and foundations were] extended for the number three turbine.

Dobrowolsky: And was that, at that time, where you had all of your controls and operations, was this the major part of the building, or were there other things happening in there? I guess a lot of the machinery, that’s also where the turbines were?

Breaden: Well, the turbines were underground.

Dobrowolsky: Right.

Breaden: The generators were below the ground level, and then, the control room was a separate room itself. You could look out and see the main floor, but it was a separate room itself, a little bit quieter.

Dobrowolsky: Right, right. And did you find it – well, it sounds like it wasn’t a big jump for you, but what were the big differences of working with a large hydroelectric facility, as compared to the diesel plant?

Breaden: I found it quite interesting and challenging. Initially, we had trouble with stabilization. When we first picked up the army substation, I remember I was on shift, and I had number two turbine on, and the thing took off, up and down, up and down, up – and I had to go out and manually get ahold of it on the governor and control it, and it was so upset, it would not settle down.

Dobrowolsky: And why do you think that was?

Breaden: We found eventually it was the relationship between the Kaplan turbine and the gate opening on the governor. It was an overlapping that the blades, the Kaplan turbine, the blades vary according to load, and of course, the governor is compensating at the same time for that given load, opening more water into the turbine; and what would happen, the governor would overshoot, the blades would follow and the governor would back off, and here we went, back and forth, back and forth. Real wild.

Dobrowolsky: So, how long did this problem continue?

Breaden: It continued, actually, oh, into the 1960s, and I developed test equipment that we could project, on paper, what was happening; and this is what brought about Montreal Engineering to find a solution to it.

Dobrowolsky: So, this was something that you were dealing with for more than a few months.

Breaden: Oh, yes, yes, for years.

Dobrowolsky: And do you think it was an engineering problem or just one of those things that just hadn't been allowed for?

Breaden: Yes, I think so, but it had not come to mind that this could happen.

Dobrowolsky: Right, right. So, eventually, when you were able to lay out this paper diagnosis, Montreal Engineering was able to come in and actually troubleshoot and find a solution?

Breaden: Yes, that's right, because they could see what was happening on the graphs that we were able to make when the turbine would take off.

Dobrowolsky: So, how big was the staff at the power plant, at that time?

Breaden: We had – well, an operator on shift, one man in the office and the superintendent. And that fellow in the office took the spare shift on Friday. So, we would have four, five, say no more than seven fellows with an assistant superintendent. There would be no more than seven.

Dobrowolsky: And do you remember any of the names of that first crew?

Breaden: Oh yes. Yes, there was Jesse Barwise, superintendent. Farley was – Art Farley had come from the diesel plant, and his sister taught art in the schools there.

Dobrowolsky: Liliias Farley.

Breaden: Liliias Farley, yes; and then, there was Al Jamieson, he was superintendent from the diesel plant. He became the assistant in the hydro plant. Then there was Lorne Vance came over from Mayo. There was myself and Harry Parker that came over from the diesel plant.

Dobrowolsky: Now, Jesse Barwise, your superintendent, had he – I have run into that name before. Had he originally started with the Mayo plant when he came to the Yukon?

Breaden: That's right, Jesse was superintendent at the Mayo plant, and he had been prior, over at the Snare, out at Yellowknife, at the Snare Falls plant – the Snare Rapids plant.

Dobrowolsky: So, he had a lot of experience and background.

Breaden: Oh yes, yes.

Dobrowolsky: So, how long did this state of affairs continue, that you were working as an operator at the hydro plant?

Breaden: I guess until about the mid-'60s, and then, they started using me on installations like in Mayo, putting in the diesel plant in Mayo, and then, the next year it was Dawson. And usually I was pretty well

on maintenance in Whitehorse, about the mid-'60s.

Dobrowolsky: So, at that time, NCPC operations were limited to the hydro and diesel plants in Mayo, the operation in Whitehorse, and then, it wasn't until the '60s, wasn't it, that they took over Dawson?

Breaden: Yes, I installed the plant there in '66, and later that winter, they took over the load from the North Fork plant.

Dobrowolsky: And before that, I gather, it was the Yukon Consolidated Gold Corporation?

Breaden: Yes, they had the hydro, the North Fork plant, and they supplied power to Dawson besides their dredging. [Gordon Walmsley who was in charge of electrical for YCGC came over as Superintendent in the new Dawson plant.]

Dobrowolsky: Which, I guess, must have been incredible power hogs, those big dredges?

Breaden: Oh yes, yes.

Dobrowolsky: Okay, so, you – so, it sounded like you were doing a lot of travelling out to the communities. Are there any other particular memories from that time or any particular challenges or interesting things that happened?

Breaden: In the '60s, 1964, there were two of us sent over to Yellowknife, because they were transferring the control from the Snare Rapids plant into Yellowknife by remote control. And so, two of us, this young Parker and I, flew to Edmonton and up to Yellowknife, out to Snare. And we spent a month there while they were making the changeover. We were operating in Snare Rapids. That was quite an experience. And young Parker, I remember when we landed in Yellowknife, he took one look around at all this rock, and he said, "Oh," he said, "I am happy."

I said, "What are you happy about?"

He said, "I am happy that in a month's time we're going to be out of here." Gordon Parker.

Dobrowolsky: So, Yellowknife did not make much of a favourable impression?

Breaden: Well, so much rock and not much else.

Dobrowolsky: Yes, pretty bleak.

Breaden: Pretty bleak.

Dobrowolsky: And I guess Yellowknife itself would have been a pretty small town at that time?

Breaden: Yes, it was no great shakes. But we didn't have much chance to get around there. We were shipped off out to Snare.

Dobrowolsky: And that was pretty much your base while you were there?

Breaden: Yes.

Dobrowolsky: Before we get onto Faro and all the changes that that brought, are there any other things

that stick out in your mind from that time?

Breaden: Well, when I went into Mayo, we had two busy years, because the first year that I was there, there was a huge rock had come downstream and dropped into the tailrace at Mayo.

Dobrowolsky: And the “tailrace” is ... ?

Breaden: That’s the discharge of the turbines. And so, I arranged with Keno Hill for a shutdown, a total shutdown. And we got in with a Cat and got that huge – about a 10-foot diameter rock out of there, pushed that thing out, and at the same time we used two Cats to clean the riverbed down for about a quarter of a mile. But through that one day’s work, we were able to increase our output by about 10 percent because of freedom of flow.

Dobrowolsky: So, just the fact that the water was hindered by all of these rocks and obstacles, it took away from the efficiency of –

Breaden: Yes. Of the generation of the plant itself, yes; but at the same time, we did an underside inspection, and I found that there was severe cavitation in the number two turbine.

Dobrowolsky: And this was the second turbine at Mayo?

Breaden: Yes.

Dobrowolsky: By “cavitation”, do you mean like holes?

Breaden: Holes in the runner blades, about 22 runner blades, and there were holes in all of them. So having done that underside inspection, we knew what we were dealing with, and it ended up with us – Ed Jacobs come up from Whitehorse and his crew pulled the turbine, pulled the generator and turbine, of course, working with our crew. Then, he took it to Whitehorse and rebuilt it, did a fantastic job.

Dobrowolsky: So, when exactly would this have been about?

Breaden: This was the summer of 1967.

Dobrowolsky: Amazing, I’m always impressed by these stories of northern ingenuity, and it’s amazing how many of those stories feature Mr. Jacobs in terms of being able to build or fix just about anything.

Breaden: Oh, Ed was fantastic. I relied on – I had him do an awful lot of work in Whitehorse; and when we had something that really stumped us, why, bring Ed in. He did an awful lot of cavitation repair on our turbines in Whitehorse, he and his crew, yes.

Dobrowolsky: Fantastic. Okay, so, tell me about, well, the important mineral discoveries in Faro and the implications that this had on power generation and distribution in the territory.

Breaden: Okay, in 1968, Faro – well I should say and Anvil Mining, was under construction then and so was the transmission line from Whitehorse to Faro to Anvil, and it meant that we had to have more generation in Whitehorse, and we had to put in a large diesel plant. So, I was transferred from Mayo back to Whitehorse, being of my diesel experience. So, the next year was pretty busy. That Anvil line was always troublesome because of the lower voltage that we were transmitting at. And it was like a big elastic band, which created us a lot of problems. Had it been, say, 230 KV, it would have been about natural the way it should be.

Dobrowolsky: 230 which?

Breaden: Thousand volts, 230 KV, Kilovolts.

Dobrowolsky: Kilovolts, right.

Breaden: But it was 138 KV.

Dobrowolsky: And why was the decision made to use that particular gauge or whatever ...

Breaden: The initial idea was to go from Whitehorse directly to Anvil, but then the politicians got into it, and they wanted to go via Carmacks to pick up the Carmacks area and anything en route. So, it went from about 125 miles to 226 miles. Well, by this time, the transformers and everything had been ordered. They were being manufactured, and that's what we ended up with.

Dobrowolsky: So, you had ordered a lower – I'm not quite sure of the terminology.

Breaden: Voltage.

Dobrowolsky: Lower voltage line, thinking it was going to be shorter?

Breaden: Direct line, yes.

Dobrowolsky: Right, but then when it ended up being twice as long, this, of course, caused problems, getting so much power over such great a distance.

Breaden: Yes.

Dobrowolsky: Now, this would have been when – this would have also coincided with the third turbine coming online at Whitehorse?

Breaden: That's right, yes. The third turbine was online in 1969, the summer of '69, and that's about the time that we pick up the Anvil load. And of course, the diesel plant, that was still under construction until about the middle of '69. So, it was quite an expansion there.

Dobrowolsky: And do you remember any – so, you would have been based in – well, let's just go back to our chronology.

Breaden: Yes.

Dobrowolsky: The exact years you were Mayo would have been ...

Breaden: I went in right after New Year's in 1967, and I was there till September, 1968.

Dobrowolsky: And that's when you started working on the Anvil – the Faro diesel plant?

Breaden: Yes, well, the diesel plant at Whitehorse and the expansion.

Dobrowolsky: Right, right, of course, to handle the extra load from all the powerful mining machinery. Now, when exactly did the fire in Faro happen? Would that have been that summer of '69?

Breaden: Yes, yes, because they had Faro built, and then, the fire when through and wiped it all out again, and they had to start from scratch.

Dobrowolsky: Including, probably a number of the NCPC poles and lines, I would gather?

Breaden: Yes, yes. I don't think the line was hit very much. They got into the buildings, the new buildings there, and they just went like wild fire.

Dobrowolsky: Quite a setback when you're doing all that investment in a new community?

Breaden: Oh, yes. Yes.

Dobrowolsky: So, you had to oversee the construction of the diesel plant at Whitehorse Rapids?

Breaden: Yes, [more looking for bugs in the construction drawings that would cause operation problems.]

Dobrowolsky: And once that was built, what was your role? What kind of work were you doing at that point?

Breaden: Pretty well troubleshooting. You know, the superintendent and I had kind of an agreement that he was the fellow with horns and I was the nice guy. I was on the job, always a smile on my face and with my eyes open. Then, I would go into the office, "Graham, there's something here I don't like." And we'd pull out the drawings, and I would point it out. And then, he would put on his horns and go after Montreal Engineering. They never did catch on for months.

Side B

Dobrowolsky: So, near the end of the first side of this interview with Henry Breaden on May 4th, 2004, we had been talking about your work, essentially based in Whitehorse and doing a lot of troubleshooting, and you were mentioning how you were the nice guy and your superintendent, to use your expression, was "the person with the horns." Now, who would your superintendent be?

Breaden: That was Graham Tench was our superintendent. He's retired in Kelowna.

Dobrowolsky: And had he been with NCPC for a while?

Breaden: Oh yes, yes. He was over at Snare, one of the original ones over at Snare.

Dobrowolsky: And how long was he at Whitehorse? When did he come over?

Breaden: In '66, he took over from Barwise. Now, there was a fellow – between '65-'66, there was Tony [Mousley], another fellow from head office took over. And then Graham took over in '66.

Dobrowolsky: Well, it sounds like between the two of you, you had a pretty effective partnership.

Breaden: Oh, we did.

Dobrowolsky: Now, just before we turned the tape on, we had been talking about the Marsh Lake dam, which was built on the Yukon River near where it comes out of Marsh Lake. Could you tell me a little bit about the history of this dam and the original purpose of it and its role in the NCPC operation?

Breaden: Yes, the dam originally was built by BYN or White Pass.

Dobrowolsky: The British Yukon Navigation Company?

Breaden: That's right, for the riverboats, and the idea was to store water during the winter so that that low period in latter May, early June, when there is no flow really from Whitehorse, that they were able to put through additional flow to give enough room or water for the boats out of Whitehorse and to help in getting the ice out of Lake Laberge.

Dobrowolsky: And Lake Laberge being about – well, some miles down from Whitehorse.

Breaden: Twenty-five.

Dobrowolsky: Yes, it usually lost its ice quite a bit later than the river?

Breaden: Oh, yes.

Dobrowolsky: Maybe a few weeks?

Breaden: Yes, yes. Usually when they made their first trip, possibly the last week in May, first week in June, they would be ploughing ice. It would be candled ice and it would break up, but they would still be ploughing ice. You've probably seen where they used lampblack and crankcase oil to get the sun's rays to open up that lake a little bit earlier.

Dobrowolsky: M'hmm, the lamp black trail.

Breaden: Yes, the lamp black trail, yes.

Dobrowolsky: So, I guess that must have been fairly effective then. According to some of the BYN records, apparently they did get their navigation system operating quite a bit earlier right from Whitehorse.

Breaden: Yes, it drew the sun's heat and it would open a channel in Lake Laberge; and of course, once that channel was open, then the rest of it opened quite fast.

Dobrowolsky: Yes, and then, I understand before, they used to actually have to haul things over the lake ice from Whitehorse to – or from the head of the lake to the foot – and then, they'd have boats docked there to continue on?

Breaden: Yes, usually the *Aksala* was a favoured boat to leave in the pocket just below the telegraph office in the river; and then, they would load the boat, and it would be in Dawson long before the ice was out of the lake.

Dobrowolsky: Okay, so, tell me a bit about how the dam was built? I actually brought a couple of photographs to show you. These are a couple of historic photos taken in the '20's and the '30's of the original wooden dam. I am not too sure exactly what the terminology is, but there are a number of framed, upright structures.

Breaden: That's right, they called them "bents" in between.

Dobrowolsky: M'hmm, and then, these are set at regular intervals. And then, I guess when it was time to hold the water back or store the water, then blockages would be set down in between these bents?

Breaden: Yes. I worked on that dam in '45 and, as you can see, these bents here are piling that would [anchor] them into the river bottom, and they're cross-braced for the pressure of the water; and on the upper side there was a sloped – it was a slight slope.

Dobrowolsky: So, a slope from the upriver to the downriver side?

Breaden: From the top to the bottom. [On top was a walking deck with rails for a handcar used to haul rock which was slid down a chute to the lower side of the dam.]

Dobrowolsky: Oh, okay.

Breaden: And in that was – say at the top of each one of these was a separation that this was done with heavy planking. There was a separation, but there was a piece behind it so that you had a projection here to stop any lateral movement of the planks that were going to go in and it was actually a guide.

Dobrowolsky: So, like a slot that you would put your planks in that would –

Breaden: No, the planks went down horizontally, and we used to – putting them down under water, naturally a plank would pull in and you couldn't move it.

Dobrowolsky: I see.

Breaden: But they had quite a novel idea. They had poles and on the side of that pole was a two-by-four, which would have about – it would extend about a foot beyond the pole so you could drop it down, upstream, and you could bring it up and you could thump the plank down. These were about two-by-eight.

Breaden: Okay, let's say – oh, it's not very straight. Let's say the pole is there, and the two-by-four here.

Dobrowolsky: M'hmm, now this is the pole attached to the upper end of the planks that would go down between these –

Breaden: No, it wasn't attached. And you could drop this – say this would be your plank here.

And the idea was you could bring it up without losing track of it and then, drive it down to drive that plank down because of the water pressure. Now, these would be put in late in the fall, like after the boats were all [finished].

Dobrowolsky: After the navigation season?

Breaden: We had a workshop over here, and in behind the workshop –

Dobrowolsky: Now, this would have been on the – which side of the river? If this is south, I guess this would have been the west side of the river. So, there was a residence and a workshop?

Breaden: Yes, this would be the highway side, yes. This side we had a workshop, and in behind there was this thing I discovered, and it was two two-by-fours, oh about six feet long, and on the centre of it was about a two-by-two platform, and the ends were finished up for handles. And I said to George Nunn, the fellow who was with me, "Heh, look what they used in the old days."

George said, "Old days, hell," he said, "We'll be using that." You see we used to haul rock out on a

handcart and dump it down a chute on the downstream edge of the spillway. Wherever it had eroded, we would dump rock in.

[Our Foreman was a Scot, Bob Taylor, and can you imagine him sending me, a 17-year-old kid for a gallon of Tartan paint in the workshop? No, I never did find it!]

Dobrowolsky: So, this was kind of an underwater dam, too, just downstream of the actual dam?

[HB: An extension of the underwater foundation]

Breaden: That's right, yes, and then, we had – below there, we had another, what they call a “mickey dam”. And we hauled rock out to that with a – it was more like a small barge. We'd run a cable across the river first and that's what we'd run out on; and we would dump broken rock, we had have to break all this rock with sledgehammers and load it onto this small barge and take it out and dump it on top of the mickey dam, because it had to be at a certain level, and the idea was to maintain a back pressure against this upper dam so it is didn't wash out.

Dobrowolsky: Quite ingenious.

Breaden: Oh yes.

Dobrowolsky: And boy, you needed men with strong backs to work out there. (laughter)

Breaden: Yes, yes. When I think about it now, I kind of shake my head. Safety...

Dobrowolsky: Not an issue. (laughter)

Breaden: Not an issue, not a thought. You know, when you were – you just kind of half closed your eyes when you were hitting that rock with 10-pound sledgehammers, because that stuff is going be flying. It could easily take an eye out.

Dobrowolsky: So goggles, hardhats, nothing like that?

Breaden: Oh no, no such a thing, the same as when we started in the diesel plant, hearing protection, unheard of.

Dobrowolsky: Yes, a different era.

Breaden: Oh, yes.

Dobrowolsky: Okay, so, we had the wooden dam that was in use for about 20 years?

Breaden: When was that built? 1923? 1923, and that would be 1968 it was still there.

Dobrowolsky: Now, I thought, for some reason, there was a second dam that went in around the '50s.*

Breaden: No, we didn't – like '58, what they did do was they took out a section in the centre to allow boats to run up through.

*Note: Mr. Breaden later corrected himself as to the construction of a second dam. Please see the second detailed email in the appendices at the end of the interview transcript.

Dobrowolsky: Right, and this would have been after the sternwheeler era had ended?

Breaden: Oh yes, yes, they weren't using the dam at all then. And then, it was left that way. 1958 we didn't need water storage in Whitehorse. The flow was plenty for the load we had.

Dobrowolsky: Right.

Breaden: And it wouldn't be until '68, 1968, that with Anvil coming online, we would need the storage, and that's when they rebuilt that section in and put it back to the original, and that was the section we lost.

Dobrowolsky: Oh, okay. So, just before the tape went on you were telling a story of a bit of a wrangle with an engineer from Montreal Engineering.

Breaden: Oh, yes.

Dobrowolsky: And that this was over the fact that a portion of the Marsh Lake dam had washed out and exactly who might be responsible.

Breaden: Yes.

Dobrowolsky: So, this would have been the rebuilt portion that you're talking about?

Breaden: That's right, yes.

Dobrowolsky: So, was it built to the same specs, the same idea, wooden pilings?

Breaden: Yes, yes.

Dobrowolsky: Of putting the planks down in behind?

Breaden: Yes.

Dobrowolsky: Okay.

Breaden: Well, what happened actually was one of the bents let go, and that took the others. It put the pressure on the second one, and it went out. So, that took three of them.

Dobrowolsky: Right, and what time of year was that that this happened?

Breaden: It'd be September, October.

Dobrowolsky: So, about the time that you would have been ...

Breaden: Starting to store it, yes.

Dobrowolsky: Right. So, what happened then?

Breaden: A big scurry to get pile drivers in there to start driving the piling again and shoring up. Well, that was actually the forerunner of the need of the steel dam that went in upstream, later.

Dobrowolsky: Okay, so we have the original White Pass dam that was rebuilt twice, with one section

taken out, and then, rebuilt, and then, something temporary done.

Breaden: Yes.

Dobrowolsky: When that washed out, and then, the new, more efficient structure?

Breaden: That's right, the steel dam.

Dobrowolsky: And do you remember much about the construction of that, what that might have involved or any ...

Breaden: No, I didn't have anything, really, to do with the construction. There was an engineer in charge of it, and, you know, you're not going to be sitting there, watching the pile driver unless you're right on the job.

Dobrowolsky: Right, right, and would Montreal Engineering have been involved in it?

Breaden: Yes, they were the engineers for it. There was one other man that was overseeing the pile driving, or steel driving, I should say.

Dobrowolsky: Right, right. So, what exactly – perhaps you could talk a little bit about the relationship between NCPC and Montreal Engineering. I understand that Montreal Engineering did a lot of consulting for the corporation, but I almost get the impression that they almost had someone there full-time on kind of a watching brief, or was this just mainly when things were expanding in the late '60s.

Breaden: When things were expanding, why, there were Montreal Engineering engineers around the place. But say, between 1958, after completion, until, say 1964-'65, we were having trouble with that instability. Then we had some engineers in again. And even up to '67, because I remember I was in charge of Mayo, and being that I had done all this testing, they brought me over from Mayo for a week to kind of clue them in on what I had found.

Dobrowolsky: Right. So, Montreal Engineering would essentially be responsible for design of new projects or things that were being expanded or developed or fixed, and would in turn supervise the construction that happened subsequently?

Breaden: Yes.

Dobrowolsky: Good. Okay, and so, then when this new steel dam went in, I think that was around late '60's, as well, was it?

Breaden: No, that was '75.

Dobrowolsky: And how did that change the operations at the dam?

Breaden: Well, it simplified things an awful lot. Before, we had this traveling gantry that raised or lowered gates on the old dam. They had a different system on the new dam entirely that was far superior.

Dobrowolsky: More power-operated?

Breaden: Oh, yes.

Dobrowolsky: Yes, and how did that work exactly?

Breaden: I was just trying to remember how many gantries they had on that thing. I can't recall. I guess I had too many other things going on at that time. (Mainly the new Aishihik Plant)

Dobrowolsky: And essentially its function continued to be storing water for low water periods to keep the three turbines at the Whitehorse dam running efficiently?

Breaden: That's right, yes. Yes.

Dobrowolsky: Okay, so, when you said you went from – maybe your job titles during this period, you went from being the troubleshooter on the road, and then, you were superintendent in Mayo for a bit.

Breaden: Yes.

Dobrowolsky: And then, you came back to Whitehorse, and you said you were sort of a trouble shooter. By that time, were you assistant superintendent?

Breaden: No, no, Al Jamieson was still there, although he was not in very good shape, and I was actually filling partly for Al and mainly trouble shooting, and I did a lot of trouble shooting on drawings. I would go over drawings, and I could see something that was not going to work out, and Ivan and I later, after we had an understanding –

Dobrowolsky: This is the engineer for Montreal Engineering?

Breaden: That's right, I found that I was quite an asset to him, and finally he realized the value of having me around, because I seemed to have a nose for on drawings. And I would pinpoint something and say, "Ivan, there's something here, maybe you'd better have a look at," and I'd point it out.

"Okay, okay," he would follow it up and get a revision before construction. This was the main thing.

Like, we had Dave Robinson was one of the engineers on hydro, when they were building the No. 3 Hydro. I went up to Dave, and I said, "Dave," I flipped open the drawings, and I said, "This is where we're going to put the accumulator tanks for the governors."

He said, "Yes, oh, yes."

I said, "What magical formula are you going to use to get them in there?"

He said, "Okay, what have you got up your sleeve?"

I said, "They just came into the plant and they won't fit. They're going to be sticking up through the floor." So, consequently, if you look at No. 3 now, you'll find the governor accumulator tanks are set down a foot and-a-half. So, it was beneficial, me being nosey.

Dobrowolsky: Well and nothing like the voice of experience. You had a lot of practical experience working at these sites.

Breaden: Yes.

Dobrowolsky: So, how did things go from that period? The building of the – well, putting in the third

unit, the diesel plant, getting Anvil going. What were the next major developments or items of interest?

Breaden: Well, I don't know, one thing is outages, trees on the line, and I had – well, Graham and I both had many wild rides with a helicopter, scouting, troubleshooting to find out where the problem was, get crews in and so on; but it was all part of the work. I took over from Graham in 1974.

Dobrowolsky: And this is when you became superintendent of operations in Whitehorse?

Breaden: That's right. Yes. And maybe I'm lucky, but I seem to have a nose for trouble. When things were going to pot, in my mind's eye, I knew the system inside and out, and I knew exactly what was happening. Yet my crew didn't. I've seen me down there in a tuxedo in the control room, saying, "Okay, I'd like the – close breaker number so-and-so, please."

The operator says, "But, but ..."

"No 'but', close it." Afterwards, then I used to take them on the blackboard and say, "Okay, this is what happened," so that they had that knowledge the next time something like that similarly happened, "Uh-huh, okay."

Dobrowolsky: So, an important function was passing on that skill and knowledge and experience to your crews?

Breaden: Well, yes, I think all my life I have passed on knowledge. I have had knowledge passed on to me, which I grasped and made use of; and maybe I was in the wrong profession. Maybe I should have been a teacher but, at any rate.

Dobrowolsky: So, by this time in the late '60's, the NCPC operations in the Yukon would have still consisted of, well, the hydro, the hydro plant in Mayo, the diesel plant in Dawson after NCPC took over the Yukon Consolidated Gold operations, who, at that time, ran all the utilities in Dawson and Whitehorse.

Breaden: Yes. That's right.

Dobrowolsky: Were there any other things going on at that period that NCPC was involved in?

Breaden: Not in the latter '60's. We didn't go into Aishihik until '70's, and that was completed in September '75.

Dobrowolsky: So, tell me about Aishihik, did you have much involvement in that at all?

Breaden: An awful lot. In my estimation, this is a plant that never should have been built.

Dobrowolsky: And why is that?

Breaden: Well it's fine, if it had – the power plant itself had been built outside of the hill, not underground. They were trying to prove a point of building an underground powerhouse, but it created more problems with moisture and water running.

Dobrowolsky: Well, plus the unusual construction, I would imagine.

Breaden: Yes, whereas if they had gone in at the base of the tunnel, like they had at any other of the

plants, put in their powerhouse there, it would be in the open air and it would be fine.

Dobrowolsky: So, you figure perhaps this was an effort to do some great new engineering thing, and it didn't really work out?

Breaden: I think so, yes. It was the only underground powerhouse in the north, the only one, but awfully troublesome because of moisture. Had it been dry, it would have been okay.

Dobrowolsky: Now, Aishihik was a controversial project for a number of reasons, –

Breaden: Oh, yes.

Dobrowolsky: – one of which was the immense cost overruns from the original estimates. Do you think deciding to build this way may have contributed to that?

Breaden: It could have, because when you consider all the equipment had to go down 360 feet below ground, whereas if they had put in the tunnel and built the plant outside at the lower end of the tunnel, everything would have been able to have been trucked right to the site and hoisted right into place. So, there's bound to be quite a cost there.

Dobrowolsky: I don't know if you had much to do with that end of it, but the other big thing I understand about Aishihik was this was when the *Northern Inlands Water Act* was enacted, and the minister of the day decided that the development at Aishihik should conform to these new environmental standards. When I spoke with Mr. Smith about this about a month ago, his feeling was that this created an awful lot of delays and hold-ups, partly because no one really knew what these standards meant or who was qualified to do the work; and it was something that perhaps was not phased in as smoothly as it could have been. Did this impact on you at your level at all, or was this anything you could talk about?

Breaden: Well, what years are we looking at?

Dobrowolsky: Well, I don't have my notes here, but this would have been the couple of years that they were starting planning for Aishihik.

Breaden: Oh, yes.

Dobrowolsky: And apparently, here's Anvil looking to get more equipment, needing more power, and my impression is that as well as some of the construction delays that happened with the Aishihik project, just even getting the project off the ground, took perhaps a year or two longer than it might have.

Breaden: I don't know. See Frank Mooney was regional manager then, and it was pretty well under his code.

Dobrowolsky: So, by "regional manager," this would have been for the Yukon?

Breaden: That's right, yes, and of course, I used to go out there on occasion to have a look-see so that I'd know what was being put in and be familiar; but I wasn't right in with the thing, like on the planning or anything. I was looking at the days when we would be taking it over and having to run it.

Dobrowolsky: M'hmm. Yes, I can I understand that, it's a whole different focus.

Breaden: Yes.

Dobrowolsky: So, you mentioned that there were all these problems with operating Aishihik, was that pretty much a constant during the time that you were responsible for the plant?

Breaden: Yes, and I would say likely even today. You know, it's something that there's no way of sealing it. And when you're looking at 360 feet underground with an elevator to maintain and all that steel to maintain, it becomes quite a project.

Dobrowolsky: So, it was an interesting but not a very practical idea?

Breaden: That's right. Interesting, yes.

Dobrowolsky: So, how long did you continue on as superintendent?

Breaden: For ten years until I retired in 1984.

Dobrowolsky: So, not too many years before NCPC operations transferred over to [the Yukon Government].

Breaden: About three years; actually, I was maybe one of the instigators of that without being aware of it, because they wanted to know in head office what our thoughts were on diversification of head office and the north. And my submission was that, eventually, that the territories should separate, the regional offices be beefed up to become the head office for each separate division, Yukon and Northwest Territories, and the territories would take over. Well, this did take place and, at one of the meetings – we had seminars annually – where the assistant general manager said, “You’re going to like what the chairman has to say.”

And I said, “How so?”

And he said, “Well, you’ll see.” And this is what did come out, that it was going to take place, the separation of the two between the Northwest Territories and the Yukon divisions and the eventual phasing out of head office, which took place here in the next few years.

Dobrowolsky: So, when you would have heard this, this would have been early 1980s when they first started talking about this?

Breaden: Yes.

Dobrowolsky: So, how did that work? I gather for most of your working career, the head office for NCPC would have been in Edmonton at that time.

Breaden: Well, originally it was in Ottawa, which was pretty awkward because of the time difference. Communications was not that good. Phone is about all you had. So, when they moved the head office to Edmonton, that was quite an asset. Then we got in telex, which was a lot handier.

Dobrowolsky: Than mailing or telegraphs? (laughter)

Breaden: Oh, yes.

Dobrowolsky: So, what were the communications between head office? Where did their responsibilities

end and where did yours start? For example, did they handle billing at head office or was this a local responsibility?

Breaden: Both. Let's say the large account billing was done in head office. The local billing was done in our office. It was actually through us that it was set up that way, because originally head office used to do all the billing, and then, they had me chasing a fellow who hadn't paid his bill, which this is the "Cinnamon Strip", and I went out there and I pretty near got my tail scorched, because they had paid their bill. They had only one month yet to pay.

Dobrowolsky: So this was at ... Braeburn?

Breaden: At Braeburn, yes. But we became real good friends afterwards. I suggested that they pay their account in our plant and we knew what was going on then.

Dobrowolsky: How embarrassing for you! (laughter)

Breaden: Kind of, yes, but we became real good friends.

Dobrowolsky: Yes, yes; and was there much interference or oversight of day-to-day operations from head office, or was that pretty much left in the hands of the local people?

Breaden: The day-to-day operations, yes, was left in our hands. Occasionally head office engineering would tend to get their fingers in. I would tell them where they were wrong and they wouldn't agree with me until I proved them wrong. But what amazed me was after I retired, I went out with them, overseeing contracts in the fall for the next three years and I knew everything. (laughter) It was amazing!

Dobrowolsky: So, sorry, just to clarify, this is after you retired and you were doing some consulting for head office staff?

Breaden: I was overseeing contracts in the Arctic and my first official day of retirement was spent flying from Victoria Island to Banks Island in the High Arctic to go into Sachs Harbour to oversee a contract there.

Dobrowolsky: Oh, so, you never really retired then. You just took on a different role.

Breaden: Well, the first year was three months. The second year was four months. The third year was five months, and I said, "Hey!"

The next spring, they phoned me up in May, "We'd like you to go up to Tuk to have a look at a project for planning."

And when I was up there, I took a look at that bleak country, still frozen up, and I thought, "Breaden, you're crazy," and I made the decision, "I'm going to hang up the saddle." (laughter)

Dobrowolsky: Well, I can certainly understand that. So, you mentioned that periodically there were get-togethers with other colleagues from the NWT. Did you find that useful, having those kind of contacts?

Breaden: Oh, really, it was, because we all had similar problems and we all had different problems; but getting together like that, you get ideas, you know. Maybe someone had a different approach, well, you learn from it; and we had these usually annually.

Dobrowolsky: And this would be going to Edmonton to do this?

Breaden: Sometimes Edmonton, sometimes Whitehorse, sometimes Yellowknife, but it was very beneficial.

Dobrowolsky: Excellent, so, these would be managers from all the regions that –

Breaden: That's right, yes. Yes, the superintendents from all the power plants would come into a central point and we'd spend several days. Sometimes head office used it as a teaching tool for administration and then, other times it was used as a teaching tool for operations. It was all beneficial, great camaraderie.

Dobrowolsky: Great, great. So, it sounds like a lot of government operations, in that the upper, upper levels might have been a tiny bit out of touch; but in terms of relationships with colleagues, it was a very positive thing.

Breaden: It was, yes, yes.

Dobrowolsky: Well, it sounds like you had a most fascinating career. You certainly were right there during a time of a lot of big changes in the Yukon.

Breaden: Yes, I have always said I have lived in the most interesting era. I'm sure of it.

Dobrowolsky: Well, right from the sternwheeler era to –

Breaden: Right from horse-and-buggy to modern computers.

Dobrowolsky: Yes, and now you're a computer expert!

Breaden: I don't know about expert.

Dobrowolsky: Thank you very much for this. This has been great. Thank you.

Breaden: Oh, you're welcome.

END OF INTERVIEW

APPENDICES:

Henry Breaden: Email Correspondence Items

Ted Humphrys: “The NCPC in the Yukon.”
 Chairs of NCPC/NTPC/YEC

Henry Breaden Email Correspondence, June-August 2004

Reading the transcript prompted additional memories and Mr. Breaden sent along the following emails with additional information, stories and photos relating to his career in the north.

Email, H. Breaden to H. Dobrowolsky, 29 June 2004, 2:09 PM

Subject Heading: Thoughts

As I have been going through your documents, some other thoughts went through my mind. In 1964 when Gordon Parker and I went to Yellowknife, Graham Tench was in charge of Snare-Yellowknife. So when Graham took over Whitehorse I knew him, and we developed a fine working relationship while he was there and even today. At the Snare Rapids Plant where we had the base camp, we also had another connected plant, Snare Falls which was further downstream. On a Sunday I decided to hike over a rock hill beside the Staff House. When I got to the top I could see several hills the same as I was on. So I hiked to the next one to see if I could see anything, and on to the next one. Then it struck me that a person could too easily get lost if you did not have a good sense of direction. No matter what direction you looked, the hills all looked alike. Having made that decision I headed back to the Staff House. Prefer the Yukon mountains where you can see about where you are.

As I mentioned, I was always nosey when it came to construction drawings. As an example, when the drawings came out for No. 4 hydro, the transmission line was to go over the dam at the intake structure and then to the diesel plant substation. "I near had a bird on that one!" If we had any icing problems with frazil ice we had to use a crane up there to haul out baskets of ice and debris that divers had retrieved from our trash racks. So the drawings were changed to put the line across the river and into the new substation on the Riverdale side of the river. I might have been a pain to some, but I think we ended up with a more workable system. I guess I was the one wearing the horns during those years!

Marsh Lake Dam

Email: H. Breaden to H. Dobrowolsky, 29 June 2004, 3:10 PM

Subject Heading: Some more thoughts

Just got my mind into gear, and you are right that there was a second Marsh Lake Dam, and the third was steel. There was the original BYN dam that was used to the end of steamboating. The west half of that was taken out to allow small boats to run upriver into the lake. About 40 feet upstream of the original was another built by I think DPW, and for whatever reason I don't know. It was not as solid as the original BYN dam, but again three sections of it were removed for small boats. In 1969 Montreal Engineering rebuilt the centre section and built a boat lock at the west end. It was this one that we lost the centre section in late fall of 1969. After it was rebuilt, must have been 1970 Jim Warbisky and I rescued Dave ? and Steamboat Mary when their power boat got in between the two dams. It was fortunate that we went up to do an inspection and I heard their cries. Their boat was swamped and down against the east end of the old BYN dam. There is always noise of water flowing, but over it I heard something else that I could not identify. They could not get up onto the old BYN dam, and we did not have any rope. But in our storage shack I found a 1½ inch fire hose that I used to get them up onto the old BYN dam. We ran a rope from their boat up to the present dam to secure it, and they arranged to have it pulled out. I was surprised that it was written up in the *Whitehorse Star* for neither Jim or I said anything about it. Somewhere among my souvenirs I have a copy of that issue, for Alice always saved anything that pertained to me.

Will see if I can find that issue which will give us a date.
Sorry for misleading you, but you were right on a second dam.

Mayo Turbine Blow-up

Email: H. Breaden to H. Dobrowolsky, 30 June 2004, 10:19 AM

Subject Heading: Interview Agreement

Dear Helene,

The interview agreement will be in the mail this afternoon. I was also thinking of some hair rising stories that took place at Mayo about 1970 when a turbine blew up. Or when their surge tank froze and split open on the hill above the power house. I left Whitehorse during the early morning at about 50 below zero, and arrived at Mayo at 7:00 AM, a balmy 68 degrees below zero and ice fog in the plant valley that you could hardly see.

I will put them together and you can do with them what you wish, but operations were not always peaches and cream!

Cheers,
Henry

Email: H. Breaden to H. Dobrowolsky, 1 July 2004, 6:55 PM

Subject Heading: Mayo Turbine blow-up

Hi Helene,

For today, here is the first story of the wreck of No. 2 turbine at Mayo. I hope you find it interesting, and you will find that we did have problems on occasion! I will likely send you another hopefully on the split of the surge tower at Mayo when we had to have a look at it at 68 below zero. I was not really an office type although it had to be done, I preferred to be in the middle of the action. As I was Area Superintendent for all the Yukon plants, when I retired they all had a retirement party and presented me with a painting of the Keno that they had commissioned by Edith Jerome of Dawson. They knew it was the first boat that I worked on, and I treasure it. Maybe they were saying, "Thanks for the years of help," or it could have been, "Thank goodness he is going after us putting up with him for so many years?" You may have seen the painting when you were in our dining room?

Have a nice Canada Day Helene,
Henry

Mayo Turbine Blow-up

In the summer of 1967 we had rebuilt the No. 2 Gilks' Francis turbine at Mayo with Ed Jacobs doing the work for us. It was re-installed, but had a quirk that we did not expect. Where the speed ring was connected to the governor control arm in the turbine pit, there was a 1½ inch steel pin that made the connection. The pin was held in place with a ½ inch set screw that gradually worked back out in the next year and a half. Likely at the time it was tightened but maybe not centred and home. This allowed the pin to fall free and the turbine was free to do its own thing! Had the turbine been above 78 percent load, it would have gone wide open as there is a turning point at about 78 per cent. This would have alerted the staff and it could have been corrected and the pin replaced.

But No; the load was likely floating at 78 percent which caused the pin to drop out and the turbine could go either way. From 0 to 78 % the governor is pushing, and from there to 100% it is holding back. The turbine slammed shut creating such back pressure that it lifted the head cover, unsocketing the lower end of the wicket gates and broke off the gates. The turbine played baseball with the wicket gates completely destroying the turbine runner. As the runner fired the gates out against the scroll case, the current picked them back up and back into the runner. At the same time it blew out the gasket between the pivot valve and the turbine which allowed water under pressure to shoot upwards through the main floor grating. Had it been the gasket above the valve, we would really have been in trouble as the slider head gate could not be closed. When I took over the plant after New Year 1967, there was a wooden stairway over the rock and down to the upper gatehouse. But after 15 years it was rotten and I did not want myself or the crew on it. So from the Spillway we built a floating walkway to the gatehouse using 45-gallon drums and wood.

Our operator on shift was Mundy Joe who headed for the north big door, but had second thoughts that maybe the dam had let go. Back through the water that was shooting up through the floor grating that soaked him to the skin. Dave Hill in his apartment up the hill heard the thump and decided to investigate. As he drove up to the front doors of the plant, he met poor Mundy Joe who was really shook up. These two started the Fairbanks 32 standby diesel and picked up the Mayo load and the NCPC hydro camp load, but the hydro plant was down. At Elsa, Keno Hill had to run their own diesels to supply the town. The Supt., Gerry Podhora and the rest of the crew attempted to drop the head gate, but being a slider it would not go to the bottom. Normally you would shut down the plant and close the pivot valves, and under no flow the gate would drop to the bottom.

In Whitehorse, Al Jamieson, Whitehorse Assistant Superintendent was listening to CBC and heard that Mayo was blacked out. He phoned me that something was wrong in Mayo, so I phoned the residence and spoke with Mary, the Supt's. wife. She said the plant was flooded, but it was a while before I could speak to Gerry himself. He said that there was a good 6 feet of water in the basement and they were trying with axes and bars to get the lower door open. I knew because of pressure on that heavy door they would never get it open. My advice to Gerry was: "Gerry, you can't make it, take the cat and a pole and shove that door open. Next was to get ready for a trip.

Harry Jensen who was our electronics tech and I with a pickup headed for Mayo and arrived about 2:00 AM. We saw that Mundy Joe was operating the standby diesel plant and went down to have a look at the plant. No crew were to be found, but I put a pair of hip waders on and down the stairway to the basement. They had succeeded with the door, but there was still two feet of water in the basement, and I was sure that I could see water welling from the No. 2 head cover. We needed a crew, so I went into the office and phoned Gerry advising him, "Gerry, your day has just begun! So get your crew out and let's go!"

First was to see if we could safely close that pivot valve without it letting go. There was a hydraulic pump to close the valve, but the whole plant was down and no station service. The emergency hand hydraulic

pump to close it was in the basement. The pivot valve was all under water and that sheet of pressure water shooting up through it. Not wanting any crew down there I had them run a hydraulic hose up the stairway and bring the pump up on the main floor. We were successful in closing it which cut off the water flow into the plant. Part of the crew went to re-drop the head-gate, and the rest of us removed the inspection hatch bolts to allow a turbine inspection. As the station service transformer had been under water, Harry with a crew ran lines from the spillway structure to give us station service. Had you seen my face when I stuck my head through that inspection hatch, it would be one of amazement I am sure. There was the scroll case peppered from the wicket gates hitting it, and the wicket gates all neatly stacked just before the turbine. The turbine runner was actually in two pieces as the runner vanes had been chewed right through.

Being successful in dropping the head gate, we dewatered and made an inspection of the tunnel to assure that there was no damage done to the tunnel which is some 5700 feet in length. It was secure, so we watered up ready to get No. 1 turbine back in business.

When we had station service back, the next thing was to check that pin in No. 1, but it was OK as it had a flange to prevent it from dropping through. The crew changed oil in the turbine bearing No. 1 and ready for it to go to work. Once Keno Hill was back on power, the crew were tired and it was time for Harry and I to head back to Whitehorse. First thing in Whitehorse was to check the speed ring pins, but we found that they all had flanges. I don't recall when we got some sleep to catch up!

The decision of Head Office was to have Dominion turbine come in and see what could be salvaged, as they were the builder of the No. 1 turbine at Mayo. I was asked to accompany the engineer from Dominion to Mayo and we would do some rotation tests to ascertain if the turbine shaft was still straight.

The day I left for Mayo was the day that the construction was to blow the plug on No. 3 new unit at Whitehorse. That was to blow and remove the coffer dam in the tailrace. I cannot explain it, but all through life whenever I had a premonition of something, I learned that if I did not listen to my inner self that I was in trouble. The last thing I said to Graham before I left was, "I have a funny feeling about No.3, and I think it would be wise to have additional pumps in before they blow the plug."

The engineer and I flew to Mayo and we proceeded to do rotation tests, but as the remaining upper part of the runner still had some projections, they had to be cut off. I got down in the turbine with a cutting torch and was immediately in trouble. I had never cut stainless steel before, and when I heated the steel ready to blow it clear, when I applied the oxygen to cut, it just darkened again. I thought, "Henry somehow you have lost your touch!", so I called Gerry down to have a go at it. It was not very long before I heard a bunch of swearing coming up through the manhole, and I realised we were into something new. We had to melt those pieces off the upper runner to get clearance for rotation. Next was lifting the generator rotor on its jacks and put a special graphite lubricant between the thrust runner and the bearing shoes. It was good for several rotations, but once it was getting hard to start it had to be done over again. We established the shaft was straight and proceeded to lift the generator out of the way. The turbine shaft was lifted out and made ready for shipping back to Dominion Turbine. We were unaware of the hair raising condition that had come up in Whitehorse when they blew the plug. No. 3 was flooding!

I had lost a battle even going to Ted Humphrys where I wanted to leave the original wall between No. 2 and 3, and only to put in a water tight door. But I lost out and the wall was removed.. No use crying over spilled milk, for what was done, was done. No 3 started to flood and DPW, Territorial Govt., Forestry and contractors were asked for pumps which were delivered. The sump pumps couldn't handle it and the water was rising, but was eventually contained. From that day forward, any time I said to Graham, "I have a funny feeling about that," he always said, "I'm listening and let's talk." That same feeling carried me through many tough instances even after I took over from Graham. We had a great relationship, he and I, and many good years together.

With things settled away in Whitehorse, Graham drove to Mayo to pick up the Dominion engineer and myself the next day. Of all things it started to snow real wet snow and half thawing. The Mayo highway was like a skating rink which made it pretty hard driving. On the way back, before Carmacks Graham was tired after battling it to Mayo and I relieved him. The highway was intermittent dry, ice and slush, and from moment to moment you were not sure of yourself as to what was around the next bend. I think the engineer in the back seat was saying a few Hail Mary but was very quiet when the car would go into a slide. I am sure that if you were to find the back of that front seat you would find the imprints of the engineer's fingers, for he was not used to that kind of business. We arrived in Whitehorse and dropped him off at the Taku Hotel, and his last words were, "I don't know how you did it!" So that was another Mayo adventure!

Email: H. Breaden to H. Dobrowolsky, 1 July 2004, 7:10 PM

Subject Heading: Whitehorse Plant

Hello Helene,

There were many years in the early 1960s that I was classed as an operator, but did not really know if I was fish or fowl. I was handling maintenance and repairs at Whitehorse and became concerned with No. 1 hydro generator. It was skating and developing a knock that I was not happy with. Jesse Barwise didn't think anything was urgent, but I persisted in us checking the generator bearing clearances. We had never opened up the bearings before, but on opening we found that the oil was black which it should not be. We called in Ed Jacobs, as we had found cracks in some of the rotor arms. After nosing around he found that the rotor was cracked 3/4 the way around under a weld and machining. Good thing that he found it for the generator could have torn out the rotor and stator windings. The crack was in the lamination just above the thrust and guide runner. It was the movement between laminations that had caused the blackened oil. Now we were into a major job of pulling the exciter and generator, taking the pole pieces off the rotor and making a timber cradle to ship it back to the factory at Westinghouse.

I gained exceptional experience working with the Westinghouse erector that came in to supervise the work. When the rotor came back, I worked with him aligning and balancing the unit, skills that I carried all my years of working with hydro units. Even made use of that knowledge with the two generators at Mayo. Adding weight to balance a generator, you have to know about how much and how many degrees to lead the throw that I was taught by him.

Another was the pump for No. 1 governor which I did not like the vibration and sound of. We could not shut down the unit as we were full loaded, so I borrowed a strobosch which I had used in the Army shops before power plants. It is a variable strobe light that you can match to the speed of what you are examining. On the coupling between the motor and pump I had a look, and although the unit was running you can optically stop the shaft and gradually turn it around. I found that one of the four coupling bolts was gone. So we scheduled a repair after midnight when one unit could handle the load. There was always excitement wherever you wanted to look, and always hope to catch things before they blew up in your face.

Henry

Mayo Surge Tower Break

Email: H. Breaden to H. Dobrowolsky, 1 July 2004, 9:30 PM

Subject Heading: Mayo Surge Tower Break

Hi Helene,
Here is another for your archives.
Cheers,
Henry

Mayo Surge Tower Break by Henry Breaden

When I was in charge at Whitehorse I had a call from our Mayo Supt. Barry Campbell just before quitting time. He reported that he had water coming down the hill from above the plant that was threatening to get into the front door of the plant. I asked him what volume as to whether it was a trickle or how much. He said quite a bit! So I asked again whether it was gallons per hour or cubic feet per second. He chose cubic feet per second so I knew we had trouble. I said, "Well lad, it is pitch black and we cannot see anything, get a loader out of Mayo to keep a channel open to direct the flow into the river below the plant. I will get a few hours sleep and head out real early in the morning." The temperature in Whitehorse was nearing 50 below zero, and I knew that Mayo had to be colder.

I equipped the car with cold weather gear, extra gasoline, food, sleeping bag, a gas burner and some wood and kindling. I was no fool when it came to northern climates. I left Whitehorse at 2:00 AM in minus 50 degrees and could feel the car as I got near Carmacks that it was even colder. Wonderful moonlight, clear and cold. I encountered fog on the river crossings and arrived at Mayo by 7:00 AM. As I could not do anything before daylight I decided to have breakfast at the café in Mayo and then proceed to the plant. The temperature was minus 68 degrees F and the Mayo River valley was solid fog. The tradesman had rough bladed a trail over to the surge tank

When it started to break daylight we headed out on the bladed trail and could see nothing of the plant or anything in the valley. I could hear the water running, and a thought ran through my mind, "I don't really want any part of this, but I guess it is my baby!" The surge tank is a steel vertical cylinder maybe 20 feet across and about 50 feet in height. It was clad on the outside with about 4 inch by 4 inch upright wood. It is a hydraulic shock absorber for the hydro tunnel, and the water is in motion up and down according to change in load.

When we got to the tank I could not see anything because of the fog or anything of the tank because of the wood lagging. The water appeared to be coming from the bottom of the tank, straight across and impinging on a rock wall. Then it shot upwards giving the appearance of possibly an underground fault. I was not happy with that thought until getting a bit wet and with a piece of plywood decided that it was not a fault, but from the tank itself. The next question was, "Why?" We climbed the outside steel ladder without a back guard, and getting to the top could see the ladder on the roof was wood to the vents in the centre of the tank and likely rotten or the nails could pull out. It is not a good feeling 50 feet off the ground and nothing to hang onto. We got a rope around the vent and felt more secure, and were able to get inside to have a look. We found that the interior heaters were burned out and that the tank was frozen to near the bottom. So after getting off of there, the next thing was to talk to Head Office.

It is so strange how things come around, for Dave McGuinness was the chief engineer in Head Office, and he and I had worked together at Vivian Diesel Engines in Vancouver on 6th Avenue. In the winter of 1944 we had both worked for Vivian Diesel, he as a young engineer, and I in the welding

and heat treating. As Vivian had been bought by Hawker Siddley and we were running their KMW engines, Dave had joined them and later came over with NCPC. He was a down to earth engineer, and he and I got along like favourite brothers. Between us we were able to trace down a problem and come up with a common sense solution.

I told Dave what I had found, and he arranged for a welding company from Vancouver to load sheet steel and be ready to work in extreme cold. They loaded their trucks with materials and welding equipment and headed for Mayo. Meanwhile, we had to arrange to shut down the plant and get that water cut off. We had the same trouble with that sliding head gate as before, for if it had rollers like Whitehorse it would go to the bottom. We knew that due to the leakage flow it would stick on us, so this time we pulled a "Sandy!" After shutting down the plant and Mayo and Elsa on diesel, instead of trying to lower it with the hand winch, we peeled off plenty of slack in the cable and tied the gate up with rope. With all men clear, one fellow with a sharp knife cut the rope and it went down like lightning. Even though we did not get a perfect seal, we could take care of the leakage at the bottom end. The tunnel was drained and we could do an inspection to make sure that we had no underground fault.

Head Office had been testing a new gas turbine in Edmonton, and they decided to load it and ship it to Mayo. This was a prototype and would be a great test for it. I was to Whitehorse and back into Mayo again as soon as it was in. None of us had ever seen one of these animals and did not know the first thing about them. No manuals or any information, just make it go! After looking it over and putting heat in the main unit, we decided where the several pieces had to go and got it together. It was placed on the outskirts of Mayo and could feed through the plant substation back into the Elsa line any excess power available. A substation was erected with transformers even though it continued to be cold. I was in good shape as I had good cold weather gear, flight boots, US army windpants from 1943 issue, Pioneer parka, fur hat and mitts.

When the welders were in, the first problem they had was to cut open the side of the surge tower and put in excess heat to thaw that possibly 40 vertical feet of ice. They did not dare to put men in there till it was clear, but any thaw water just went down the vertical shaft into the tunnel. When it was clear they started work and found that there had been a twelve foot split. I can assure you that while they were there they fabricated a back guard on that ladder and a new steel ladder up to the vent with handrails for safety. The plant was down I think for about three weeks and I was back and forth to Whitehorse so that the paper work did not snow me under. Thank goodness for having a good Secretary it was not too bad. After checking everything out and watering up we were back in business with new heaters and a safe access to them. So another tiger had been tamed in the north and we had that much more experience. The welders returned to their more habitable weather and we back to our respective jobs. But I think the best thing of all was that Mayo had a gas turbine sitting in their back yard for standby.

Memorabilia

Email: H. Breaden to H. Dobrowolsky, 3 July 2004, 1:47 PM

Subject Heading: Some old stuff

I have been looking through some old clippings, much of it yellowed from age. I guess I did hit the pages from time to time. I was too busy getting a job done to court any publicity, but the Whitehorse Star caught me from time to time. The one scan was a sheet from our internal magazine, Nicpic, where there was a write-up on my years and a photo taken in the plant office. The only error was shown as 1952 where I took command of the ferry McQuesten at Stewart, and it should have been 1951.

(article is on following page)

HENRY BREADEN



Henry was born at Whitehorse and received his schooling in the north. His first permanent job was with British Yukon Navigation Co. which was the river division of White Pass & Yukon Route in 1942. He was with this fleet until 1951. During the winter Henry was engaged in shop repair work and heavy equipment operation. Some winters he worked coastal towing, and returned north in March to work on ship repair at the Whitehorse shipyard until the crews came up in early May. It was during one of these winters he met the girl who became his wife, and they were married the next fall in Vancouver. Henry and Alice returned north in early 1949, and Alice was able to see the old north before any major changes took place.

During these years he worked upward and obtained his Master's Certification, but by 1951 he could see the handwriting on the wall whereby the river division would be replaced by a modern highway system. In the spring of '52 Henry asked BYN. Co. for a leave of absence, and today he's still on that leave, wondering whether he still has that job. For the Gov't of Yukon he took command of the Motor Vessel "McQueesten" which was being used as a ferry on the highway crossing at Stewart. During the winter he worked in the shop, and the next year was transferred to trouble shooting on Yukon highway equipment and ferries.

In 1953 Mayo highway maintenance was taken over by UKHM. and Henry decided it was time to move further south. He joined DND as mechanic in the RCME shop, and started training in his present profession. Early in 1957 he transferred to the DND

diesel generating station at Whitehorse, and remained till joining NCPC in November 1958.

During these years Alice travelled with him, and they made their home in a camper travelling the highway in cabooses, cabins and any place they hung their hats.

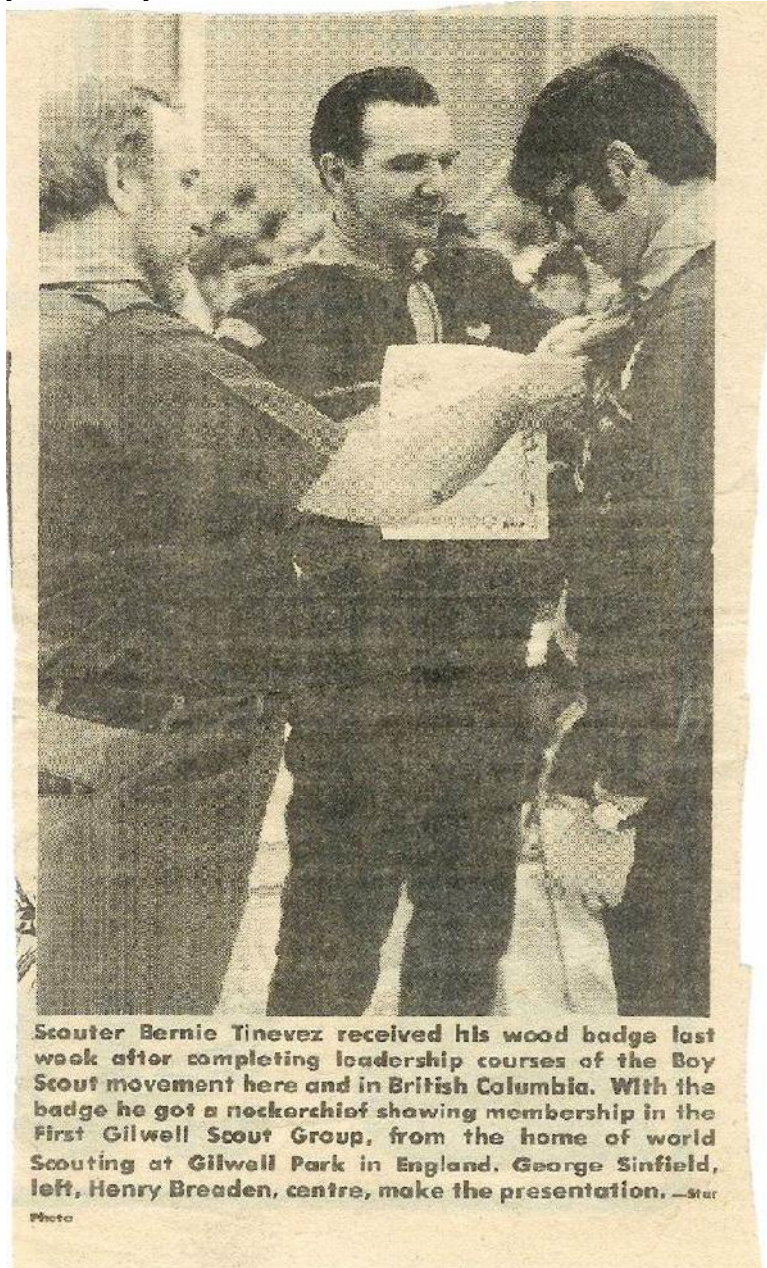
The next few years allowed Henry to enjoy the hobbies of building homes, trailers, boats, campers and other activities associated with the outdoors. The Breaders children learned at an early age to be at home in a boat as much as in their own home.

1964 started several years of moving around, the first being to the Snare Rapids plant. This was a different experience in a different type of country, and they had never before seen so much bare rock. It was at Snare that Henry met Ken Miller who is still at Yellowknife.

In 1964 Henry was sent to Mayo to install and Commission the first standby diesel plant at the Mayo River hydro, and when Dawson was taken over by NCPC he installed the engines and equipment there. Just after New Years 1967 he was transferred in charge of Mayo where they had a busy season, and in October the Breaden family left for Coppermine where Henry installed the units and commissioned the plant. They were back in Mayo just before Christmas, and were there until August 1968 when he was transferred to Whitehorse where expansion was taking place. Henry worked as Assistant to Graham Tench until Graham's retirement, and then was placed in charge of Whitehorse in September 1974.

As all their friends know, The Breadens are ardent fishermen, enjoy hiking and any activities associated with the outdoors.

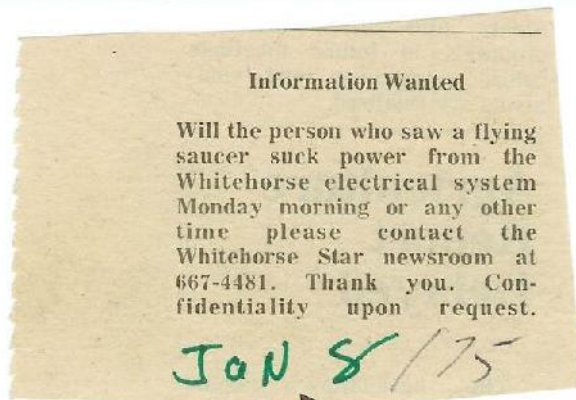
The other scan was my days with Scouting in Whitehorse. A friend talked me into working as Assistant Cubmaster in the First Whitehorse Pack. He said it was only 1-½ Hours a week, so it would not take that much time! Was I ever to learn differently. Shortly after, the Cubmaster was transferred and I had that job. Not having any formal training, on vacation that summer I took the Gilwell training in Camp Byng at Gibson, obtaining my Wood Badge, and came back with many ideas. Then our District Cubmaster, Dave Gairns was transferred to Yellowknife, and I had that job along with my own Pack. The only complaint I heard from Alice was that she near needed an appointment to see me as I was out most nights. When I was transferred to Mayo I was kind of relieved as it gave me a bit of time for myself and family. Then when I was transferred back to Whitehorse, the Scouting movement were after me to come back in. But I just had too much on my plate with the expansion to even consider it. Scouting was really enjoyable, but you can only handle so much.



Scouter Bernie Tinevez received his wood badge last week after completing leadership courses of the Boy Scout movement here and in British Columbia. With the badge he got a neckerchief showing membership in the First Gilwell Scout Group, from the home of world Scouting at Gilwell Park in England. George Sinfield, left, Henry Breaden, centre, make the presentation. —Star

Photo

The third scan you would hardly believe that the Whitehorse Star was chasing Flying Saucers, Jan. 8, 1975. On line I have seen a UFO site with many sightings in Yukon but never any myself. The only thing I saw about 7:45 one morning while rounding the base of the dam on the way to the office, was a Russian satellite burning up in the atmosphere which exploded around Faro. I thought it was an early morning flight coming into the airport, but soon realised the angle was wrong for an approach. Then I thought it could be an aircraft on fire as it came over the spillway. It went over just east of the plant as five pieces, and there I was with my mouth hanging open! It seems that I am the only one that saw it in Whitehorse and phoned it into the Whitehorse Star. Apparently someone saw it explode near Faro. I got out of the car to look and it was weird! Not a sound, but these glowing objects which appeared quite close. I guess they were still well up in the atmosphere, but I just happened to be in the right place at the right time and still quite dark.



Whitehorse Star, 8 January 1975

The Anvil and Aishihik Lines

Email: H. Breden to H. Dobrowolsky, 4 July 2004, 11:44 AM

Subject Heading: The Anvil and Aishihik Lines – Henry

Dear Helene,

Please find attached some short stories on the Anvil and Aishihik Lines. Thankfully most of the trouble took place while we were at work. But at home I lived with a monitor in my bedroom where I could see what was happening if the system was in trouble. If the bell rang and the red light came on, I was up and away after it had scared the devil out of Alice.

Cheers,
Henry

The New Anvil Line: 138 KV for 226 miles

by Henry Breaden

In the early summer of 1969 I was chatting with Bob Choate of Yukon Electrical before we picked up the new Anvil line. He made the remark that, "It would be like a long elastic band" which proved to be true in the long run. Normal planning would be 1000 volts for every mile, but the Anvil line was 138 thousand volts for a line of 226 miles. The original planning was to run direct to Anvil which would be about 125 miles, but was later revised to follow the highway to Carmacks and then to Anvil to service the communities en-route. To stop over voltages because of the line length on no load and initial loading, reactors were placed at Whitehorse and Anvil which were direct connected to the line. It was fine that way for the first years before Anvil Mines started to increase loading, and then the voltage started to sag which created problems.

In that first two years, here was a bunch of Bush Bunnies including myself into something that was new to them. Our Supt. at Faro, Gordon Walmsley, was originally from YCGC Dawson in charge of electrical. They had copper lines running at 33 thousand volts, and our lineman, Vern Parkin was from Gordon's crew in Dawson. So this was a complete different ballgame. For a line truck we only had a ¾ ton four wheel drive service truck without a boom, and all climbing had to be done with spurs.

Our first line outage adventure took place early in February 1970 during a period that our Supt. Graham Tench was on vacation in Hawaii. He was the only one that had any prior experience on transmission lines in Snare-Yellowknife. During the time he was away I took over his job. We got Trans North Turbo with a helicopter to fly us, and the lineman and myself climbed aboard with another of our crew as a spotter. Weather was not so good and it was hard on the eyes watching that line continuously, but it was OK to Carmacks. On the second lap to Anvil we found the break on a long span across a valley at the upper end of Little Salmon Lake. We continued to Faro to get Walmsley and equipment to make a repair and the pilot put us down as close as possible. We found that the line had parted right in the middle of the span. One end was dropped as it was dead-ended at both structures, and we had some line with us. All we had was clamps which were found useless, for upon pulling the line up they just tore up the aluminum strands and parted. That had to be given up as a bad job, and as it was getting dark flew Walmsley back to Faro. The pilot had to get a special dispensation to fly at night back to Whitehorse as night flying with a helicopter was not allowed at that time. A beautiful night of bright moon and the trip back was uneventful. We loaded a reel of wire on the service truck along with proper splicing sleeves, and after a short rest, Vern headed out to hit the break at daylight. The crew from Faro met him and the new line was run up and tensioned.

At that time we did not have clearances to be signed or radio for communication which would scare the devil out of me today. We ran the breaker in the plant out to the test position and red tagged the breaker control. No communication meant that the lineman had to drive up to Faro and phone the plant that all men were clear, and the operator was authorized to close in on the line. In the next year we obtained proper clearance forms, and I established that at the time the clearance was completed that the line foreman would establish a password to be used upon surrender of the clearance. Only he and the operators on the switchboard knew it, and without that password, nothing was to be closed even though the clearance number was surrendered by radio or telephone. We did not get radio communication for about another four years

The next time the line got us was Christmas Eve 1971 in snow and high winds. This time Graham was at the plant and us Bush Bunnies had learned a few tricks. While Graham and one of the young men took to the air, the crew to hit the road was assembled and equipped with whatever they would need. When Graham found the break I had made arrangements for the line crew to run their amber flashing light on the highway. It was easily seen, and the helicopter was able to drop down on the highway and Graham

advise Vern the location of the break. As soon as Graham was back on the ground I with a half ton pickup headed out with a small snow machine on the back of the pickup. It was a small skidoo and I think it was more trouble than it was worth. Of all places, it was the same location that the line had parted ten months before. What we found was that in the high wind off Little Salmon Lake, it had gone up that same sharp draw and had moved the entire line to the north at least forty feet. There was a steep hillside with a tree at that point that the line had contacted, grounded and burned through. The line was replaced and Vern took care of that tree with a chainsaw ending that high wind business. Coming back out I had Minard Witt, a tradesman with me on the snow machine, and when we hit the highway I cut across the ditch to the pickup. All of a sudden we were up to our neck in fluffy snow. We had to dig that thing out and get it loaded and lashed on the pickup. Now we were headed for home and Christmas, I will admit a bit late?

I started driving towards Carmacks and as it was around 4:00 in the morning I started getting sleepy near Carmacks. I asked Minard if he was in good shape which he assured and we changed over. The highway was typical wind blown polished ice which made driving a hazard but we were doing OK. Rounding a curve at 64 mile, we encountered as we judged about 18 wolves who were having as much trouble as ourselves on the glare ice. All of them got clear except one that we hit. Minard did the unforgivable thing of hitting the brakes and we went out of control. First sliding down the highway sideways and then going back end first. I could see that we were headed for the edge and no way of knowing how far down as it was pitch dark. It turned out to be a 25 foot 45 degree slope and no vehicles were equipped with seat belts. I expected a rollover and had a death grip on the back of the seat, my right arm on the roof over the door and both feet braced on the floor. As we slid down the embankment all I could see was whirling snow in the headlights till Minard's knee hit the headlight switch and everything went black. When we hit the bottom of the slope, the truck rolled on its side and came to a stand still. I was still anchored in that upper corner and asked Minard if he was OK? He said he was fine, and my next concern was for fire. Meanwhile we had a radar light that had slid across the floor, contacted something to flip the switch and we had light in the cab. I rolled down the upper window, stuck my head through and checked the engine hood but all seemed to be fine. Surprisingly, the only damage was the left mirror bracket which had bent. The Anvil Mine ore haul had been cut off for Christmas and there was not a thing on the road. But the first concern was that if there was a dead wolf on the road and a vehicle hit it, we could have someone else in on top of us. So we climbed the embankment and started up the highway, but the wolves were howling all around us. Minard said to me, "You know we are crazy?" to which I replied, "How so?" He said, "Here we have wolves all around us and all we have for a weapon is a flashlight!" At that moment I swung the light up the highway and the wolf's eyes reflected in the light. We walked slowly up to the wolf, and Minard kicked him to make sure he was dead. Minard said, "You put us in the rhubarb and I am going to have you stuffed! We pulled the dead wolf down to the truck, for the rest of the pack would have eaten him. Now they really put up a fuss of howling. We tried a jack-all to try to right the truck which did no good as the box started to bend, and the snow machine had lost all the gasoline from the tank in the roll. So we had to wait for Vern returning from Faro.

Our first concern was those howling wolves which was now to the north of us, and we decided it would be a good idea to build a fire. There was fire killed wood which we cut into three foot lengths, and with the aid of a can of oil we got a fire going. Meanwhile our friends kept up a steady song, and when we threw on additional wood and the sparks would fly they started all over again. Vern did not come along till near 7:00 AM with the service truck, and with his electric winch we righted the pickup. But on attempting to pull the pickup back up the bank it powered out. I could see that the next ¼ mile south was a slope that I thought I could coax the pickup through and proceeded. Back and forth to create a rut and a gain each try. Finally when I had made it near the top I floorboarded it and made for the highway. Near made it except for the windrow, but Vern could now get me out. We arrived back home at about 8:00 AM for our Christmas to begin. Dropped Minard with his wolf off and back home to kids that wanted to open the Christmas tree. Meanwhile, our Chief Operator, Peter Garside had for the occasion written a poem

based on, T'was the night before Christmas outlining our experiences.

Long after I had taken over Whitehorse and we had Aishihik on line, one problem we had was with forest fires. There was a fire along side of the Aishihik line to Takhini, and a water bomber was being used to dump on it. While making a pass across the line, water was dumped across all three conductors. Needless to say, the breaker at Takhini and Aishihik opened, which caused our system to start on the way down, and the Anvil line had to be dropped to save Whitehorse. That was the night I ended up in the control room in a tuxedo. I was not happy with the design of the reactor placing at Aishihik, for it was on the low voltage side of the transformer. The main breaker had to be closed between the line and the low voltage bus before the line could be picked up. Attempts had been made to close at Takhini, but the line went out on over voltage. When I came into the control room I immediately looked at the printout and instructed the operator to close that breaker. When he said, "But, But" , I had no time for niceties but said, "No buts just close it," and when it was closed," now close at Takhini." My next order was to have Aishihik start up and synchronize to the bus and get Anvil back on. Whenever we had problems like that, I always drew a schematic on the blackboard so that the operator knew what he had done to get things back together. I always felt that my strength was in the knowledge of my crew, and hopefully when I was not there that they would handle any situation on their own.

Our Chief Operator, Peter Garside and I worked as a team. When the system was in trouble, I usually handled the phone to Yukon Electrical and the diesel plant console, and Peter the main switchboard. We chatted back and forth as the system was being put back together again. In later years he handled the bench board while I took the phone and the diesel control. From the office I could hear the plant and knew immediately when we were in trouble, and it taking no more than ten seconds down into the control room. Yes, we had many wild times in that business, but it was a challenge to be met. I have many stories of blackouts of the plants or ice sealing off our intake to the hydro plant at least twice, some hair raising, but to smile at when you think back.

Peter Garside Poem

Email: H. Breaden to H. Dobrowsky, 9 July 2004, 12:05 PM

Subject Heading: T'was the day Before Christmas

Hi Helene,
This is the poem by Peter Garside that I mentioned.

Henry

At Northern Canada Power, Whitehorse

December 24th 1971

(characters)

'T'WAS THE DAY BEFORE CHRISTMAS

about 15:00 Hrs.

Supt. "Graham" Trench, Asst. Supt. "Henry" Breaden, Lineman, "Vern" Parkin, Tradesman "Minard" Witt

'T'WAS THE DAY BEFORE CHRISTMAS,
AND ALL DOWN THE LINE;
THE GENERATORS WERE TURNING,
AND EVERYTHING WAS FINE.

THE CREW WERE ALL READY
FOR A GOOD CHRISTMAS CHEER,
WHEN ALL OF A SUDDEN
THEY WERE HIT IN THE EAR!

THE LINE MUST BE DOWN
FROM THE WIND AND THE SNOW,
PETER KNEW IN A MOMENT
ANVIL LINE HAD TO GO!

SO THE LINE 'T'WAS DOWN,
AND A PATROL IT MUST BE,
A HELICOPTER WAS HIRED,
SO GRAHAM MUST SEE.

SO UP TO THE TREETOPS
THE 'COPTER THEY FLEW,
ONE PASSENGER WAS SICK,
AND GRAHAM TURNED BLUE.

A PHONE CALL WAS MADE
TO THE LINEMAN ON LEAVE,
TO SEE HE WOULD COME,
HE APPEARED SOMEWHAT PEAVED.

THE BREAK THEY LOCATED
WHICH A TREE HAD BROUGHT DOWN,
WITH EQUIPMENT ALL READY
THE BOYS, THEY LEFT TOWN.

ON AN ICY STEEP HILLSIDE
THE FELLOWS HAD "FUN"
TILL AT TWO IN THE MORNING
THE JOB IT WAS DONE.

VERN PHONED INTO WHITEHORSE
TO TELL THEM ALL CLEAR,
WISH THEM A MERRY CHRISTMAS;
AND A HAPPY NEW YEAR.

TWO OF THE BOYS, WITT AND BREADEN
WHILE ON THEIR WAY BACK,
AND ROUNDING A CURVE,
RAN INTO A WOLF PACK.

WITT HIT THE RHUBARB
BREADEN WITH HIM DID TOO!
SPENT THE NEXT TWO HOURS
DEBATING WHAT TO DO!

HELP, THEY KNEW WOULD COME,
BUT THE BOYS WERE IN A RUSH,
TO BUILD A FIRE, THEY MUST
FROM THE TIMBER IN THE BUSH.

NO RIFLE DID THEY HAVE
SO THE BOYS WERE CHEWING THE FAT,
AND THE WOLF PACK KEPT A HOWLING,
WHILE AROUND THE FIRE THEY SAT.

WHEN VERN CAME ALONG
HE DID PULL WITH HIS WINCH,
SO IT WAS WITT AND BREADEN
WERE OUT IN A PINCH.

AT EIGHT IN THE MORNING,
WITH THE CREW ALL IN TOWN,
BREAKFAST THEY HAD
AND THEN BEDDED DOWN.

BUT I HEARD THEM EXCLAIM
AS THEY WENT OUT OF SIGHT,
"HAPPY CHRISTMAS TO ALL,
AND TO ALL A GOOD NIGHT!"

Original by Peter Garside, Systems Operator, Whitehorse.

Whitehorse Rapids Cofferdam

Email: H. Breaden to H. Dobrowolsky, 9 July 2004, 12:09 PM

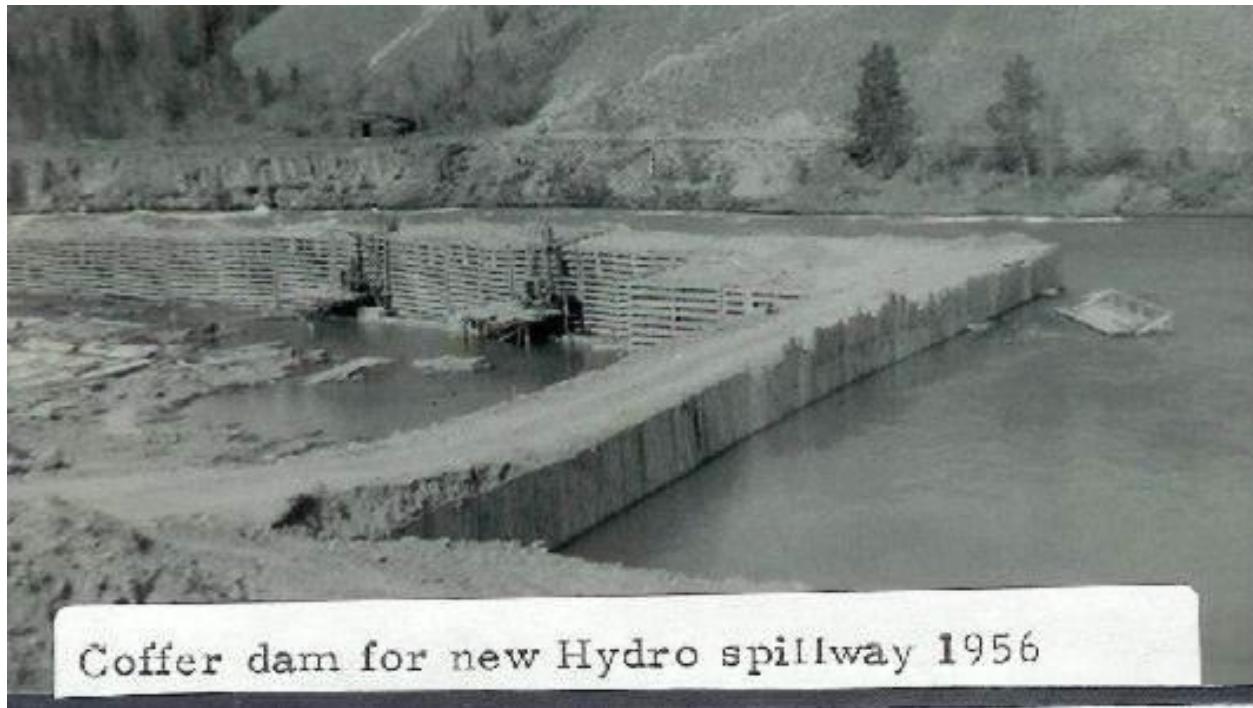
Subject Heading: Fw: Start of Hydro

Hello Helene,
You may find this interesting?
Henry

Sent: July 9, 2004 11:34 AM

Subject: Start of Hydro

Hi Sherron,
Don't imagine that there are many of these around on the start of the spillway at Whitehorse Rapids.
Henry



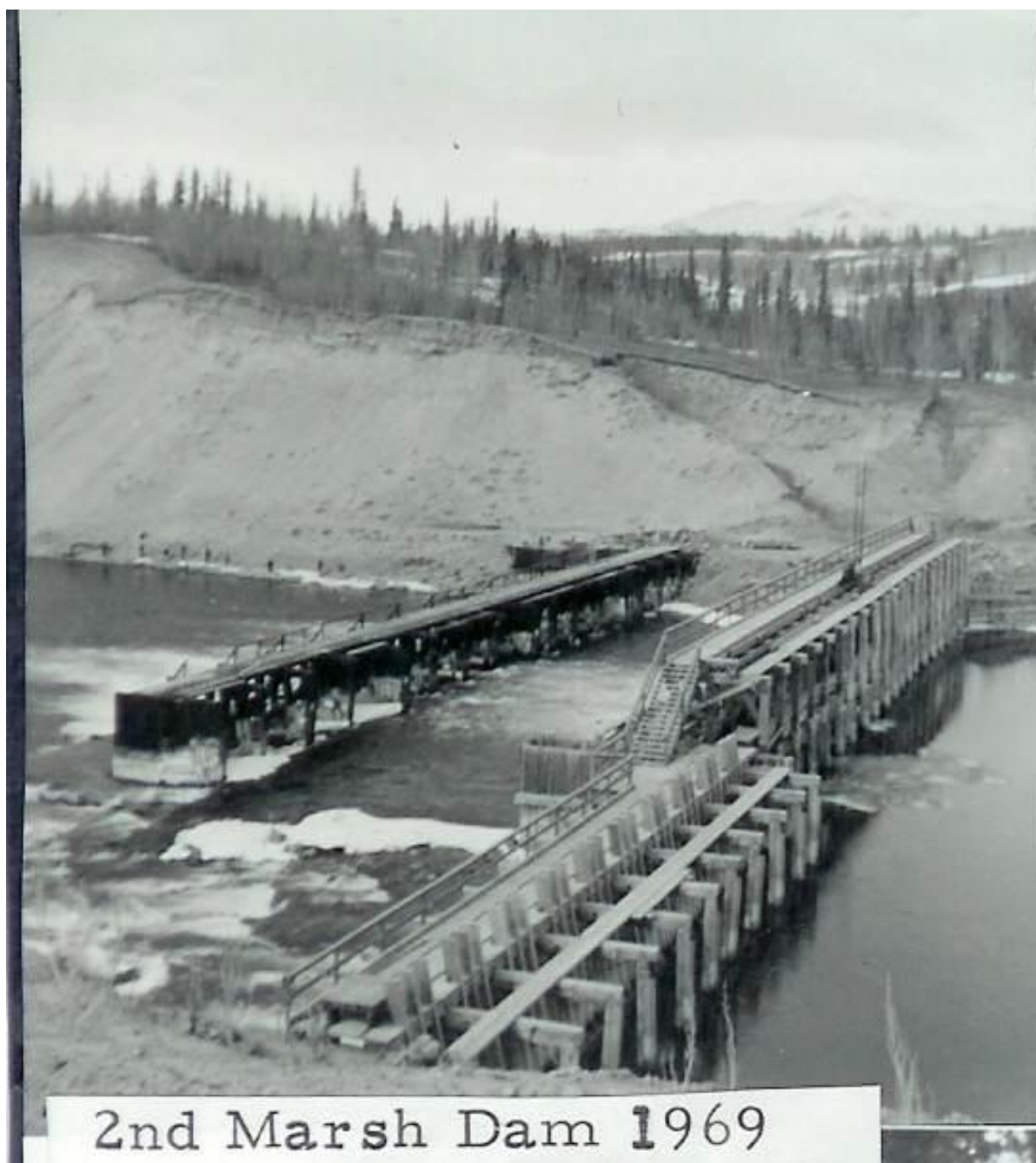
Marsh Lake Dams

Email: H. Breaden to H. Dobrowolsky, 9 July 2004, 1:42 PM

Subject Heading: Two Old Marsh Lake Dams

Hello Helene,
Here is a photo of the two old wooden dams. You can see the half remainder of the old White Pass Dam and the one built by DPW. The section that we lost would be just beyond the stairway up to the higher second section. You can see the hoist on the higher section used to lift the gates. It was a real monstrosity,

and when long hair came into being I had a labourer get his hair caught in the revolving shaft. It was good that Vern Parkin was very quick to stop the hoist. I had to let the man go as he refused to cut his hair and I did not want to see him scalped. This should give you a good idea what was there before the steel dam was built in 1975.



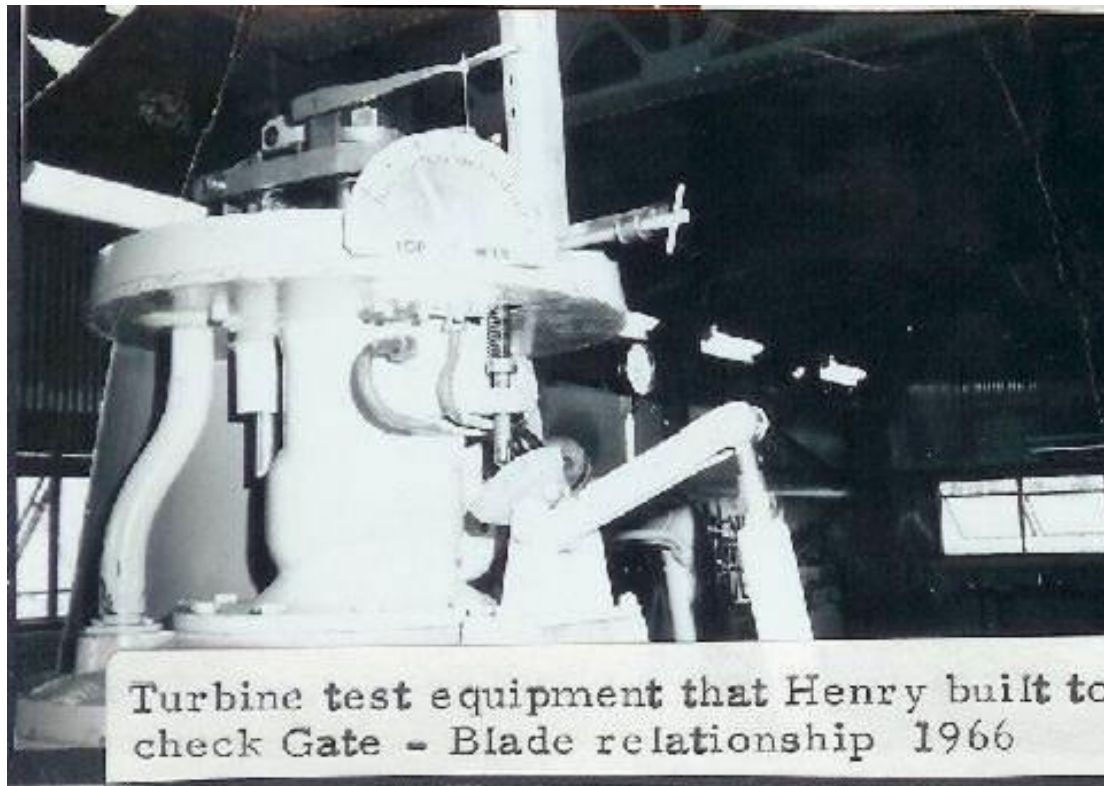
Whitehorse Testing

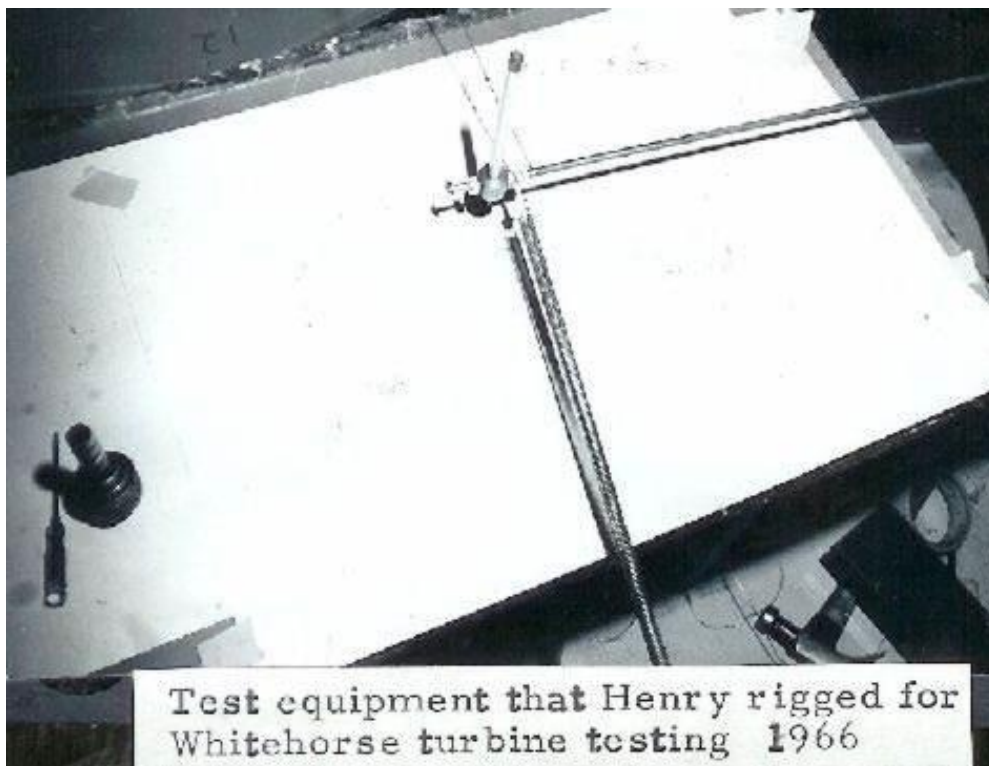
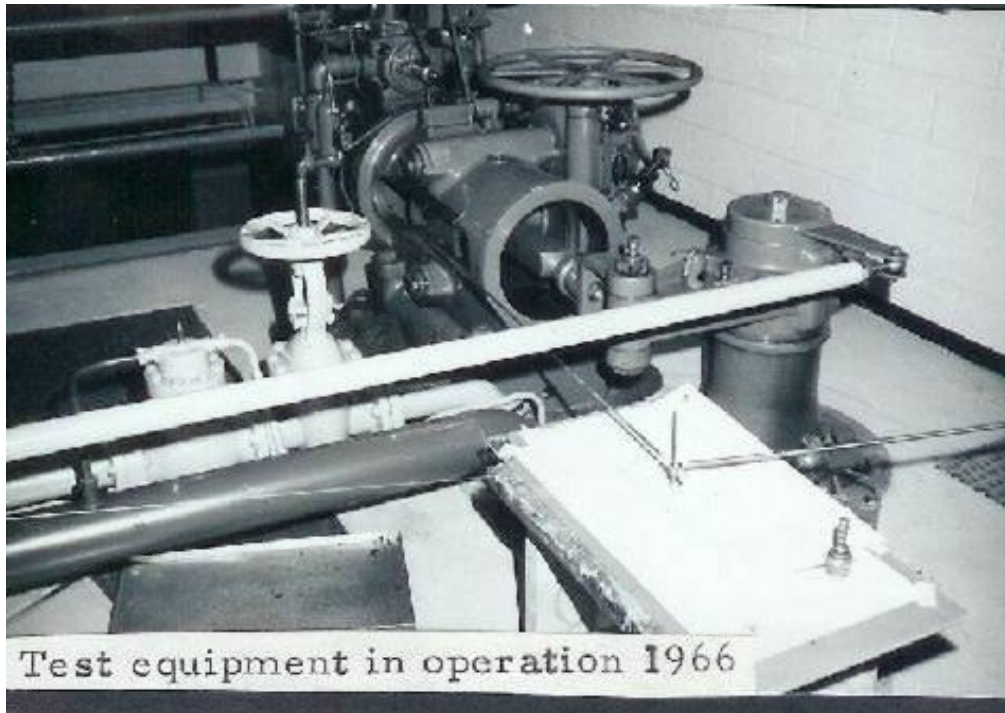
Email: H. Breaden to H. Dobrowolsky, 9 July 2004, 3:05 PM

Subject Heading: Whitehorse Testing

Hello Helene,

As is said, a picture is worth a thousand words. I mentioned the instability of the KMW hydros and testing of them that resulted in them being better than they were. But they were far from perfect, for a unit should be entirely stable. I got into my old album and am coming up with some of the old photos of that equipment. Looking at it now, I find it quite primitive but I guess it got the message across. About 1959 I was quite concerned with the amount of vibration in the units and the throw of the shafts. I devised another test set-up to record the throw of the shafts and recorded on an adding machine roll that I drove with a small slow turning motor. It got the message across that resulted in Head Office that was in Ottawa then to send in a Westinghouse erector to balance the units. Were it now, we would use electronics to do that recording so much easier, but in those early days it was unheard of. I always had it in mind that the KMW blade control should not be direct connected to the governor. If the control was fed through a computer, the control would be separate and not result in a cat fight between the governor and the blades.

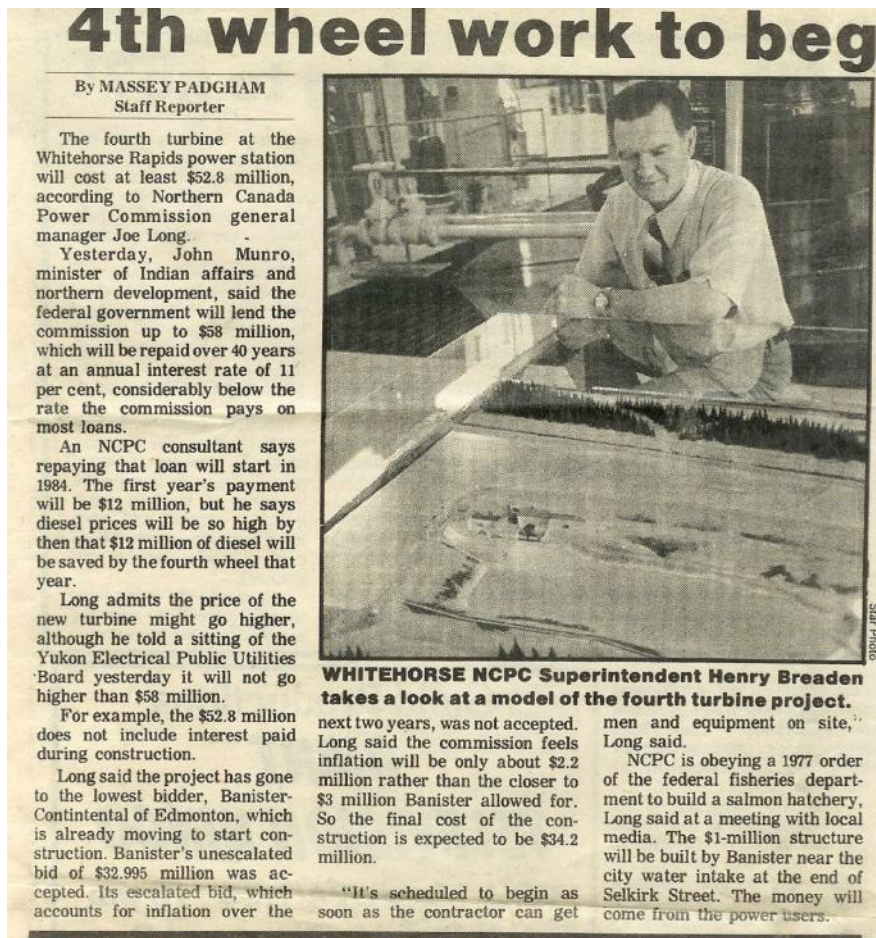




Fourth Wheel

Email: H. Breaden to H. Dobrowolsky, 10 August 2004, 3:28 PM

Subject Heading: New 4th Wheel



Whitehorse Star, 17 March 1982

Hi Helene,

In the *Whitehorse Star* of March 17, 1982 was a photo of me taken in the plant viewing the proposed New 4th Wheel project. Bill Fox was the engineer in Head Office overseeing the project and I was the one on site to keep track of it. Of course I was quite interested in the original drawings to make sure that there were not any bugs that would torment us in operation of the new plant. The original dam had two large spill gates and a control gate that gave us fine adjustment of water flow. The new 4th wheel would use the control gate as their intake, and any adjustment of flow was done with the two large ones.

As the work progressed I was on site often following the construction. When the turbine was ready to roll and the generator to be dried out before being connected to the grid, it gave us a chance to get used to the new equipment and all of the built-in protection. Dry out is completed with a short circuit bar between output conductors which heated the windings. From time to time resistance readings were taken as the

insulation on the windings dried out. When the readings were satisfactory the conductors were connected to the unit breaker and ready to synchronize to the system. Once on line the unit was gradually loaded in stages for several hours at a given load before going up to the next stage.

I have explained that turbines have a peculiarity at about 78 per cent gate opening where the governor is pushing to open the gates up to 78%. About that point the governor had to hold back while going to 100% gate opening. As we gradually increased load over a period of time, here is where our first problem showed up. I had a call from my Chief Operator, Peter Garside that at about 78% the gates went to 100% and he could not bring it down. In effect we had a run-away turbine like having a tiger by the tail. I went down into the control room and had them start all the diesels as we were going to have to pull a "Swiftie!" The only way to shut down No. 4 was to shut the headgate and have enough capacity to assume that load from No. 4. It worked better than we expected, and Whitehorse was not aware of how close they had come to a mix-up! Our governors in the lower plant were operating on 300 pounds per square inch pressure. But No. 4 operated on 200 PSI. In effect, there was not enough pressure in the operating rams to overcome the turbine. Now it was back to the drawing board.

Phone calls to Head Office and they in turn to Dominion Turbine who had manufactured the turbine. Many weird and wonderful ideas came forth, but none to my satisfaction. In my mind was two things: either increase pressure to 300 pounds if the system would stand it. Or larger diameter rams to replace the smaller ones to give a greater surface area and power for the rams to work at 200 PSI if the oil pump could supply sufficient volume. Of course Dominion Turbine wanted us to accept the turbine so that they could be paid, and everything would be taken care of. They were not aware that Bill Fox and I had an agreement that neither one of us would accept until all deficiencies were taken care of. When I retired, they were still fooling around with this problem, and it would be interesting to hear how they made out.

The next thing to arise was that a wicket gate link had broken, and they could not shut down the turbine. A replacement link had been installed while at "Speed, No Load" and it broke also. At least they were off line and the headgate could be dropped to shut the unit down. With the crew I was down in the scroll case and we did what normally was done, to encircle the wicket gates with a cable and tighten with a come along. I checked the link on the headcover and found that the pin was misplaced in the operating ring. How this ever happened I don't know, but here we go again. Dominion still was trying to get me to accept the turbine so that they could be paid, but my answer was always the same.

They decided to send in an engineer from Dominion, and meanwhile I had Ed Jacobs have a look at it. He suggested welding in the original hole, milling it off and redrill in place. So by the time that the engineer arrived in Whitehorse, I had everything arranged with Jacobs to supply what was needed and to do the work. This was where I could not help but smile and even a chuckle! I arranged for the engineer to be picked up at the airport, a hotel room and anything that he would need. I was as normal on site with a hard hat on when he came into the plant. They must have told him at Dominion that the Supt. at Whitehorse was a tough SOB and be careful with him! So I introduced the engineer to Ed Jacobs and advised him of everything that he would need. I think the engineer was from Switzerland, and he said, "And who might you be?" I replied that I was Breaden, to which he responded, "But you are such a nice man!" I could not help but smile as I shook his hand and said, "I am not a bad fellow really, just a perfectionist." Ed did a wonderful job, everyone was happy and the turbine went back on line again. With a new plant you have growing pains and they have to be eliminated one by one. This one was eliminated without too much fuss, and the engineer found that we were not such a bad bunch of fellows to work with.

THE NCPC IN THE YUKON

E. W. (Ted) Humphrys

[written spring 1987 for NCPC house publication "Northern Light"]

Note: all items in square brackets were handwritten on the typescript.

The Commission's activities in the Yukon originated with the Mayo River Hydro plant in November 1952. This development was a first cousin of the Commission's initial power project, the Snare Rapids development in the N.W.T. This project was sparked by Ventures Ltd., a mining development company who had also become interested in the United Keno Hill mine at Elsa, about 28 miles north of Mayo. This mine had operated for several years with old style and somewhat inadequate diesels as the power source. In keeping with the objective of improving and expanding the United Keno Hill Mine operation, Ventures Ltd. initiated a search for an appropriate source of hydro power within economic proximity of the mine site. An experienced engineer, W. G. Stewart [deceased 1954 or '55] was commissioned in the fall of 1948 by Ventures Ltd. to carry out a hydro reconnaissance survey of the Mayo area in the Yukon. Bill Stewart quickly identified attractive hydro potential on the Mayo River a few miles north and upstream of Mayo Landing townsite.

Encouraged by the Federal government's participation in the Snare River project, and by the fact that the Northwest Territories Power Commission had been established to "facilitate the construction and operation of power plants for mining and other interests to encourage the development of mining properties", the Ventures-UKHM officials suggested that the Federal government develop a source of hydro power in the Yukon, primarily to supply their mine site at Elsa. The government acquiesced and directed that this initial Yukon power project be undertaken by the Northwest Territories Power Commission. To that end, the NWT Power Commission Act was promptly amended in March, 1949 to extend the Commission's "domain" to include the Yukon Territory, but the corporate name was not changed until the Act was further amended in 1956.

Montreal Engineering Company carried out a full-scale feasibility study and engineering investigation of the hydro potential of the Mayo River, with a capacity objective of 2500-3000 kw. Topographic surveys, water measurements and geological studies were carried out in the summer of 1949. The study selected the site of the existing Mayo hydro plant on the Mayo River as the optimum scheme for a 2500 kw development, with Mayo Lake to be developed as a storage reservoir by constructing dam at the lake's outlet. The main dam upstream of a bend in the river would raise the river level thus the necessity to raise the highway bridge between Mayo and Elsa. Construction of the plant and transmission lines to Elsa and Mayo townsite was carried out in the summer of 1951 and 1952 and the plant became operation in early November, 1952.

The Commission's own Joe Long, was transferred to Mayo in the role of inspecting engineer and was seconded to Montreal Engineering's staff in Montreal over the winter of 1951/52 to work on design of the 69 kV transmission line to Elsa. As many readers will know, Joe was assigned to the Commission head office staff following completion of the Mayo project and held various senior positions before becoming General Manager in 1978; Joe retired in June, 1982 and died in September, 1983 after an eight month battle with cancer.

The late Jesse Barwise was transferred from Snare Rapids to be the first superintendent of the Mayo development. Lorne Vance, now on Commission head office staff, was a Mayo operator/lineman in the early years of the Mayo plant.

The original Mayo project included a short transmission line into the Mayo Landing townsite so hydro could be supplied on a wholesale basis to the Mayo Light and Power Company. The Commission purchased this distribution company in 1956. During the 1950's, the main transmission line was extended from Elsa to the Keno City area to supply a short-lived milling operation, along with wholesale supply to a private company who had developed a small distribution system serving the Keno City community. In 1957 a second unit was added to the Mayo plant increasing the installed capacity to 5150 kW.

The Mayo plant was the Commission's only activity in the Yukon until 1955 when studies began in earnest for development of a major central generating station to serve the Whitehorse area. In 1952, the Commission had asked the Federal Department of Mines and Resources to assess the possibility of a hydro development in the Whitehorse area. However, this study was not pursued because of studies of Yukon Hydro Resources by Northwest Power Industries Ltd., a wholly owned subsidiary of Ventures Ltd.

Extensive engineering investigations were undertaken of potential hydro schemes, envisions river diversions and possible inundation of the Yukon River valley. However, by 1955, the Northwest Power Industries proposals had crystallised to the extent that the Whitehorse townsite was not endangered and it was evident that actual development work was by no means imminent. At the time the Department of National Defence was actively considering adding a 1000 kW diesel unit to their Whitehorse diesel station, primarily to meet power demand of the RCAF Whitehorse station, and of the new Whitehorse hospital that was then in the planning stage. In mid-1955, the Commission embarked on planning studies for a 5000 kW central generating station which was then deemed to be adequate to supplant expensive diesel generation. While hydro was the preferred choice, it was not at all certain that an economically feasible site could be located; the development would have to deliver power to Whitehorse at a cost significantly below diesel generation and at the same time have adequate reserve capacity on a year-round basis – hence water storage through the winter months would be an important factor. The study included the possibility of establishing a coal-fired thermal station that would burn coal from the mine at Carmacks.

Due to the lack of reliable data as to the reserves of the Carmack coal field, this concept was abandoned since some promising hydro sites had been identified. One of the was in the Primrose Lake area west of Whitehorse where a drilling program to check dam foundation conditions was undertaken. It was probably fortuitous that the Primrose drilling results were negative, there being no prospect of favourable dam foundation geology, making construction of the requisite dam excessively costly. This, together with the cost of a transmission line to Whitehorse, ruled out what had appeared to be an attractive prospect. Serious attention was then directed to the Whitehorse Rapids area, despite the fact that it offered a good deal more capacity than was then required or likely to be marketable in the foreseeable future. However, the favourable conditions at the head of the rapids resulted in a project cost estimate for a single unit, 5000 kW station, considerably less than any of the other prospects. Another plus for the rapids site was that the new Whitehorse hospital was still in "planning" and there existed the opportunity to supply hydro power to heat the hospital complex.

The original Whitehorse Rapids plant became a two unit, 15,000 h.p. (11,200 kW) plant with a spare penstock from the intake structure to the powerhouse in case future load growth should ever warrant installation of a third unit.

To comply with Department of Fisheries' request, a fish ladder facility including a barrier dam downstream of the main dam was included in the plant production. The cost of this facility was met by a direct Federal government grant rather than being charged to the Commission's capital cost of the hydro project. Construction was started in the fall of 1956 and the plant was placed in service in the fall of 1958, supply the DND establishments and the new hospital boiler load and, through the Yukon Electrical Company, the remainder of the Whitehorse area. The DND system was transferred to the Yukon

Electrical Company a few years later.

The early 1960's were relatively uneventful for the Commission in the Yukon, until 1965/66 when plans were developed to assume responsibility for supply and distribution of power and the operation of the water supply system in Dawson. Also at this time, studies were initiated for power supply to the Van Gorda Creek area and to the associated Faro townsite.

In 1966, when Yukon Consolidated Gold announced a firm shutdown date for their mining operation, the Commission took over their subsidiary company, the Dawson Electric Light and Power Company. A new diesel plant containing three, 250 kW generating sets were constructed in Dawson townsite in 1966. A new electrical distribution system was built in 1966/67 and the water distribution system was renovated in 1967. A 500 kW diesel set was added in 1969/70 because of highly unexpected load growth; further diesel additions have since been added to provide a total installed capacity of some 2500 kW, the peak demand having reached the level of approximately 1500 kW.

During 1966 it was determined that the most economical scheme to supply the Anvil mine and Faro townsite would be to install an 8200 kW third hydro unit in the Whitehorse Rapids plant and construct a 225 mile, 130 kV transmission line from Whitehorse to the mine and the new Faro townsite. In addition, to provide peaking and standby capacity, a 9000 kW diesel installation was constructed adjacent to the Whitehorse Rapids hydro station, and a 5000 kW stand-by diesel unit was installed in a small powerhouse structure at Faro. Construction of these three major undertakings commenced in the spring of 1968.

A diesel unit comprising 1-5200 kW, 16 cylinder diesel unit and 1-3800, 12 cylinder unit, was completed in the fall of 1968; the larger machine and its sister unit at Faro were the largest capacity, stationary diesel generating sets in Canada at the time. The number three hydro addition and the transmission line to Faro and the mine were completed in the summer of 1969 and power was supplied to the Anvil mine and the Faro townsite in August. A transmission line extension from Faro to Ross River was constructed a few years later in order to supplant diesel generation in that community. Because of continued load growth before additional hydro supply could be planned and built, the diesel installation at the Whitehorse Rapids diesel station was augmented in the early 1970's by installations totalling some 14,700 kW, which increased the combined hydro and diesel installed capacity at Whitehorse Rapids to approximately 45,000 kW.

In the early 1970's, plans were developed to construct the 30,000 kW, two unit underground Aishihik power station. This project, along with transmission lines to connect with the Whitehorse-Anvil line and an extension to Haines Junction, so that hydro supply could supplant diesel generation at the community, was carried out in 1973-75. The station was formally commissioned in September, 1975.

In 1975/76, the old Marsh Lake storage dam was replaced with a new structure which allowed for improved control of the Marsh Lake storage reservoir thereby enhancing the energy production capability of the Whitehorse Rapids hydro plant.

Another NCPC event of 1975 was the appointment of a long-time Yukon resident, the former Commissioner of the Yukon, Mr. James Smith as the first full-time chairman of the commission. Mr. Smith served with distinction for eleven years until his retirement in March 1986.

In 1975, plans were developed for a 20 MW fourth hydro unit to be installed at Whitehorse Rapids to displace the increasing volume of diesel generated energy during the high flow months when water was unavoidably being spilled and could not be utilized since the existing hydro units were operating at full capacity. Unfortunately the proposed development was found to be uneconomical at the time. However, with the onset of significant increases in diesel fuel costs, in-depth studies of the proposed fourth unit

were re-activated in 1979. These updated studies indicated that the proposed scheme would now be economically viable and increasingly so as oil costs continued to escalate. Thus, it was decided in 1980 to proceed with the 20 mw fourth unit. Construction of this project commenced in the spring of 1982 and was essentially completed by December 1983. The new plant was officially commissioned in a dedication ceremony in 1985.

The Commission sponsored several hydro oriented studies in the Yukon in the latter part of the 1970s and early 1980s with a view to establishing an inventory of the hydro potential of Yukon to supply power requirements of varying magnitude. The possibility of supplying hydropower to pumping stations along the proposed, but now dormant, Alaska Highway Gas Pipeline was one of the major projected applications.

The devolution [as of April 1, 1987] of the Commission's Yukon interests to territorial ownership and authority will mark the completion of 38 years of progressive and successful power utility development, operation and related activity in the Yukon. All those conscientious and dedicated people who were in any way associated with the Commission's Yukon history and daily operations can hopefully derive some satisfaction from the knowledge that the Territory is inheriting a valuable legacy as a result of their efforts in creating the Northern Canada Power Commission's Yukon arm.

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Addenda: Apart from the NCPC hydro activity in the Yukon as described in this article, there were two preceding hydro developments:

(i) a hydro plant on the Klondike River upstream of Dawson, built in the early 19?0s by one of the predecessors of Yukon Consolidated Gold Co. to supply economic power to dredges operating in the Dawson area, and to thaw permafrost areas preparatory to dredging.

(ii) A small hydro plant on McIntyre Creek near Whitehorse built in the late 1940s or early 1950s (?) by what was then called Yukon Electric Co. owned by the late John Phelps and a partner. ?? plant supplemented diesel generation in Whitehorse for distribution to retail consumers in Whitehorse. As far as I know, the plant is still in operation (but maybe not?); the diesel plant was abandoned when hydro supply from the Whitehorse Rapids plant became available.

The hydro plant near Dawson was abandoned upon the cessation of dredging in the area in 1966 or 1967. An Engineering study in 1965 found that it would not be economically feasible to maintain the plant to supply the City of Dawson due to the decrepit condition of the plant and the impracticability and cost of maintaining water supply to the plant in winter months when the river flow became minimal and the canals transporting the water to the plant froze over. The considerable reduction in generating capacity in winter months was of little concern to the mining company since the dredging operations were shut down for the winter.

Chairs of the NCPC/ NTPC/ YDC

- compiled by E.W. (Ted) Humphrys, 2004
 - YEC information compiled by H. Dobrowolsky, 2004
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Corporate Entity	Chair	Term	Occupation
NWT Power Commission (1948-1956)	J. M. Wardle	1948-1952	Officer of Water Resources Branch, Dept. of Indian Affairs and Northern Resources
	Gen. Hugh Young (ret.)	1952-53	Deputy Ministers of the federal Department of Indian Affairs and Northern Development
	R. G. Robertson	1953-1963	
Northern Canada Power Commission (1956-198)	Ernest A. Côté	1963-67	
	John Macdonald	1968-1970	
	Basil Robinson	1970-75	
	James Smith	1975-1986	Ex-Commissioner Yukon
	Jack W. Beaver	1986-1989	Officer in DIAND (Dept. of Indian Affairs and Northern Development)
NWT Power Corporation (1988 on)	James Robertson	1988-1990	NWT businessman
	Pierre Alvarez	1990-1992	Officer of NWT gov't.
	Gordon Stewart	1992-2002	Yellowknife businessman
	Richard Nerysoo	2002-present	NWT resident
Yukon Development Corporation (1987 on)	David Joe	1987-1989	Yukon lawyer
	Fred Berger	1989-1993	Dawson City resident
	Barry Ernewein	1993-1996	Yukon lawyer
	Ray Wells	1997- 2001	Northwestel executive
	Lorne Austring	2001-2002	Whitehorse lawyer
	David Morrison	2003 - 2004	consultant
	Willard Phelps	2004 -	Yukon lawyer