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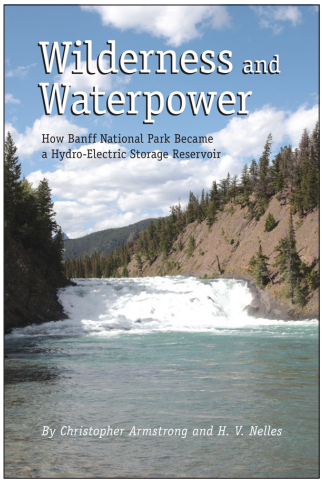

WILDERNESS AND WATERPOWER: HOW BANFF NATIONAL PARK BECAME A HYDROELECTRIC STORAGE RESERVOIR
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CHAPTER 11

Leaving the Bow

During its first forty years, Calgary Power generated its electricity from the Bow River.[1] Step by step, dam by dam, diversion by diversion, the company engineers extracted more and more power from the mountain river until in the 1950s, they began to run out of falling water. Eventually, to keep pace with the growth of southern Alberta, other primary energy sources would have to be found. Starting in the mid-1950s, Calgary Power management began investing heavily in the construction of mine-mouth thermal electric stations to meet a rising baseload. After having, over a half a century, exhausted the hydroelectric possibilities of the Bow and rearranged its unsuitable streamflow to increase its operational efficiency, the company virtually abandoned the river for new power development and adopted a policy long advocated by its critics.

Looking forward from the 1950s, then, the future seems to lead away from our subject: path dependence on a hydroelectric technology leading to conflicts with parks policy. Yes and no. Yes, because over the next thirty or more years the quantity of electricity produced from the Bow as a proportion of total electricity generated would become an insignificant fraction of the total. Thermal dependence would lead the company away from the Bow and relieve the pressure on Banff National Park. But the dams and diversions would stay. No, because the end of our book looks much like the beginning. A private utility company would organize itself around a low-cost method of producing electricity based upon a locally abundant natural resource, coal, which in turn would have profound environmental consequences. The company would no longer come into

direct conflict with Parks policy, but it would – through its mines, emissions, and other disamenities associated with thermal production – strike a broader and entirely different bargain with the environment. And this time, almost all of Alberta would be locked into this dependence. So let us briefly fast forward through this second technological transformation so that we might, in our conclusion, look back through it to help put our primary narrative in perspective.

In the new scheme of things, the hydroelectric dams on the Bow would revert to the secondary role of meeting peak power needs. Yet the shift from hydroelectricity to thermal power could only occur gradually as the company neared the exhaustion of the Bow waterpowers. In 1950, Calgary Power had equipment installed sufficient to produce 82,800 kilowatts (kw) of hydro. In the next year alone, enough additional turbines, fed from the Spray Lakes, were brought online to almost double existing capacity. Water from the new reservoir leaving the Three Sisters control facilities fell 65 feet to produce 3,000 kw of electricity. It then dropped a further 900 feet to produce 49,900 kw at the Spray Plant above Canmore, and another 320 feet to the Rundle station in the bottom of the valley to turn out 17,000 kw. Adding to this total of 69,900 kw, the additional flow could be used downstream on the Bow for the expansion of the Kananaskis Falls plant by 8,900 kw, making an overall total of 78,800 kw: within a single year, these new additions almost equaled already installed capacity. (See Appendix.)

Over the next decade, the company would continue to try and squeeze as much hydraulic energy as possible out of the Bow watershed. To improve the efficiency of the plants at Horseshoe Falls (1911), Kananaskis Falls (1914), and Ghost River (1929), the company constructed additional storage outside the national park system on the Bow's principal tributary, the Kananaskis. This process had begun in 1933 with the building of the dams to raise both the Upper and Lower Kananaskis Lakes; in 1947, the Barrier dam created a head of 155 feet, which could produce 12,900 kw as well as store additional water for the Kananaskis and Horseshoe plants. In 1955, another storage dam was constructed at Pocaterra on the headwaters of the Kananaskis, which permitted the development of 14,900 kw under a head of 207 feet, and at the same time, the small Interlakes

G. A. Gaherty, long-time president of Calgary Power (TransAlta).

station was erected between Upper and Lower Kananaskis Lakes, which could turn out 5,000 kw from a 127-foot head.[2] After the late 1950s, hikers to this region would discover that for a short section, the entire Kananaskis River had been rerouted through the company's metal penstock and the former riverbed – a smooth, sculpted marble canyon – had been turned into a trail.

Meanwhile, with the demand for power increasing steadily, the Ghost plant on the Bow was expanded by 22,900 kw in 1954, bringing its total capacity to 50,900 kw. The same year, the provincial government manoeuvred Calgary Power into building a fifty-foot high dam at Bearspaw, just outside the western limits of Calgary, to alleviate the winter floods apparently caused by the increased winter streamflow.[3] Though the company was reluctant to do this, it was able to recoup some of the cost by installing a 16,900 kw generating station there. Upstream, the Cascade plant in Banff National Park, built to meet an emergency wartime power shortage, was expanded in 1957 to add 17,900 kw of new capacity. Finally, further gains from the Spray Lakes project were achieved in 1960 that more than doubled the output of the Spray powerhouse with an additional 52,900 kw, while a second unit was added at the Rundle station lower down to bring its potential from 17,000 kw to 49,900 kw.[4] Overall, by 1960, the company had added hydroelectric capacity of 163,400 kw to the 161,600 kw that had existed on the Bow in 1951 when the Spray plants had first come online.[5]

Naturally, each of these sizable construction projects had lead times of many months before the turbines came into service. As early as 1955, president G. A. Gaherty reported to shareholders that the company must begin building thermal generating stations if future load growth were to be met.[6] This represented a fundamental strategic shift for the company,

one that an old hydroelectric champion such as Gaherty must have found difficult to swallow. Initially, the company hoped to use Alberta's abundant supplies of natural gas to produce steam, a plan that it began testing in 1955 with a 25,000 kw gas turbine located in the Joarcam gas field. Eventually, however, the experiment determined that this supply of gas was inadequate to produce sustained baseload power.[7]

Calgary Power began, therefore, to focus instead upon a large thermal development at a site forty miles west of Edmonton. At first glance, this location seemed a curious choice since the company's principal markets were in southern Alberta and it did not supply wholesale power to the provincial capital, which had its own municipal generating system.[8] What attracted Calgary Power to the Lake Wabamun area, which was outside of its market area, was a huge deposit of sub-bituminous coal. This fuel could be strip-mined, ground to powder, and used to fire large boilers that would draw water directly from the lake and return it there for cooling. Moreover, this plant would not require elaborate pollution-control equipment on its exhaust stacks because the coal had an unusually low sulphur content averaging just 0.3 per cent.[9] At this site, the company believed, thermal electricity could be produced at the lowest possible cost. In 1956, Calgary Power therefore purchased the shares of the Alberta Southern Coal Company, which owned the Wabamun site, securing control of fifty million tons of coal reserves.[10]

What made the scheme economical was the fact that as early as 1930, Calgary Power had constructed a 138 kilovolt (kv) transmission line over the 190 miles from its new Ghost plant on the Bow to Edmonton. This tie line permitted exchanges of current with the municipal system in the provincial capital as required, and that link was twinned in 1951.[11] Starting in 1956, the company upgraded this transmission system – including the key links between Ghost, Wabamun, Edmonton, and Calgary – to carry 230 kv, which made it possible for the company to switch power efficiently from all its stations throughout the southern part of the province.[12]

Obviously, some time would be required to open up the strip mine at Lake Wabamun and begin producing sizable amounts of coal, so Gaherty and his engineers devised a scheme that would provide the greatest

flexibility in expanding Calgary Power's capacity. In 1955, Calgary Power decided to build a 69,000 kw thermal station at Lake Wabamun but to use gas while making it convertible to coal later, "[a]gainst the day when the use of natural gas as a 'premium' fuel, both locally and for export, may make its cost prohibitive for power plant use." This plant came into production in 1956, followed two years later by a second unit of the same type and size.[13] One Wabamun generator was converted to run on coal in 1963, but the second was not changed over until twenty years later.

Four factors worked together to leave Calgary Power well positioned to meet future demand: the company's rapid expansion of capacity outlined above; a slight slowing of load growth as a result of the recession in Canada, which began in the late 1950s; the sizable additions to the Spray hydro plants in 1960; and a marked reduction in line losses owing to the higher voltage tie lines to the Ghost plant. As Gaherty told the shareholders in 1959, "A few years ago your Company's system was supplied entirely by hydro, but already half of its energy requirements are met from thermal plants." And he went on to point out the advantages of the new set-up: as fuel charges declined with rising coal production, generating costs would be among the lowest in North America; at the same time, the additions to the Spray plants to meet peak needs were an extremely economical way to produce more power, costing only $83 per additional kilowatt since the capital charges for those dams and reservoirs had already been covered. Furthermore, hydraulic plants could be switched on and off as demand fluctuated without the time lag required to raise steam at the thermal stations. The following year, Gaherty reported that Calgary Power was selling 139,000 kw to meet the power requirements of the city of Calgary, accounting for 18.6 per cent of its revenues, and had just signed a new contract to supply the city's entire power requirements until 1973, which might then total 300,000 kw.[14] In 1961, G. H. Thompson, who had taken over as president from Gaherty, was able to report that projections of higher power demand now justified the opening of a third coal-fired unit at Wabamun, this one capable of producing 147,000 kw, or more than twice as much as each of the earlier plants there.[15]

Four decades after the Horseshoe plant opened, Calgary Power was finally able to end its reliance upon hydroelectricity from the Bow watershed for its baseload requirements. Nonetheless, hydraulic energy still had an important place in the company's plans. In his penultimate report to shareholders, Gaherty had observed that there were still several sites along the Bow, such as Russell, which could be developed to meet peaking requirements but that "other considerations" made it desirable to look elsewhere for future hydro developments. In fact, the government of Alberta was already pressing the company to consider a large dam project on the Brazeau River, ninety miles southwest of Edmonton, not initially for power purposes but to reduce sharp seasonal fluctuations in the flow of the North Saskatchewan at Edmonton to alleviate pollution problems and supply water for industry.[16] Eventually, the province agreed to finance a dam on the Brazeau capable of storing one million acre-feet of water at a cost of $14.5 million; the company would only be required to purchase the dam once it had installed generating equipment there to meet its peak needs. As load growth surged upward in the early 1960s, construction got under way on the Big Bend plant on the Brazeau; the plant was ready to turn out 165,000 kw by 1965, followed by an expansion of another 190,000 kw in 1967.[17]

At the same time, Calgary Power began investigations, in co-operation with the government, on the future hydroelectric potential of the Athabasca River in northern Alberta, with the possibility of using Lesser Slave Lake to store water for a plant on the Lesser Slave River. Longer-range assessments also started into the use of oil from the Alberta tar sands for thermal units and even into the construction of a nuclear plant.

All in all, the company seemed to be in an enviable situation in the early 1960s. Thompson pointed out to the shareholders that the low price of the coal from the new Whitewood mine at Wabamun would keep the cost of the baseload under control. He observed that although the eleven hydro plants on the Bow were comparatively small, and two of them more than a half century old, now that they had been converted to remote control they could be switched on and off as required, so they could "be operated and maintained almost indefinitely at a low cost."[18]

One danger to which the company had to be alert was public agitation against a single private power producer serving most of southwestern Alberta. Management always argued that fulminations against its "monopoly" were misguided since many of its wholesale contracts with municipalities and industrial users were the result of competition and could be terminated after notice. Barriers to entry by rivals were always weakened by the availability of abundant natural gas supplies at the lowest rates anywhere in Canada. In 1964, the city bureaucrats of Calgary, Edmonton and Red Deer began discussing a municipally owned thermal station on the Ardley coalfield near Red Deer. Calgary Power was convinced that there was not enough coal to fuel the station but comforted itself with the thought that cost estimates for the new plant would demonstrate how economical was its wholesale power supply contract with the City of Calgary, which accounted for about 20 per cent of total revenues. Eventually, interest in the Ardley plan evaporated, and by the autumn of 1966, a contract had been signed with the city for up to 550,000 kv of power, with rates good until 1980, after which either party could terminate with ten years' notice. At the same time, Red Deer also signed a ten-year contract, which generated 2 per cent of company revenues, and Edmonton decided to build a gas-fired plant for its own municipal system. In 1970, the City of Lethbridge also signed a twelve-year contract for bulk power and, four years later, sold its municipal station to the company. Meanwhile, industrial load was growing by 10 per cent per annum, so Calgary Power continued to investigate nuclear generation as a future possibility.[19]

Management remained convinced that for the near term, reliance upon thermal generation for the baseload, reserving the hydro plants for peak demand, was the proper business strategy. In 1968, a fourth and final unit was constructed at Wabamun capable of producing 286,000 kw, nearly twice as large as its immediate predecessor. As early as 1960, Calgary Power had begun considering another huge strip mine on the south side of Lake Wabamun to fuel a number of additional stations, and by 1965, a drilling program had revealed reserves of a hundred million tons of coal at Highvale in addition to the seventy million–ton reserve at the existing Whitewood mine to the north. In 1972–73, rights to an additional

Wabamun Power Plant (TransAlta).

eighty-eight million tons of reserves were acquired near Highvale. The first generating unit at a new mine-generating site called Sundance, with a capacity of 286,000 kw, came into operation at the end of 1970, followed by another one of similar size in 1973.[20]

Though the Bow seemed unable to yield any more power, the company remained interested in developing as much additional hydroelectric capacity as possible to meet peak requirements. In the late 1960s, discussions began with Alberta about a dam at Bighorn on the headwaters of the North Saskatchewan about eighty miles upstream from Rocky Mountain House, "the largest known storage possibility in the province on the eastern slopes of the Rocky Mountains." The provincial government was eager to support the project because, like the Brazeau scheme, it would further increase the winter flow of the river to alleviate flooding and to use for industrial purposes. While the company claimed that the capital cost of generating power at Bighorn would be greater than expanding its thermal plants nearer Edmonton, it was willing to make a deal since "hydro power

does offer certain inherent advantages over thermal power, such as operating flexibility and stable long term operating costs." Eventually, agreement was arrived at for Calgary Power to construct a three-hundred-foot-high dam, fourteen hundred feet long, that would permit storage of 1.165 million acre-feet of water in the 13,700-acre Lake Abraham, the largest man-made body of water in Alberta, and to install equipment that could produce up to 120,000 kw. Calgary Power drove a fairly hard bargain with the province, extracting a subsidy to compensate for the higher costs of developing hydro-power as compared to thermal electricity.[21]

The completion of Bighorn left Calgary Power with a potential capacity of up to 800,000 kw of hydroelectricity,[22] but it effectively brought an end to any sizable future hydraulic schemes in the southern part of Alberta. Investigations had revealed that another 1.5 million kw might be developed at Fort Fitzgerald on the Slave River in the far north of the province, but the high cost of the project and the need to transmit current 460 miles to link up with the company's high voltage grid at Edmonton rendered the plan uneconomical in the current circumstances. When the second of the two large stations at Sundance was added to the four units at Wabamun in 1973, Calgary Power, with 1,141,000 kw available from its coal-fired plants, now had much more thermal than hydraulic capacity available. Future growth would rest upon adding to its steam plants.[23]

The relationship of Calgary Power to the Government of Alberta within a broader Canadian context remained anomalous. Some other provinces – in the interests of accelerating economic growth, developing resources to the fullest extent, and equalizing economic opportunity – had nationalized their electric utilities in the postwar era. Neighbouring British Columbia was among the last of the provinces to go this route. As we have seen, Alberta, under Social Credit management, had decisively rejected that option after the war. As long as the private companies kept ahead of demand and maintained relatively low prices, the province, both ideologically and fiscally, preferred a lightly regulated private sector to a quantum increase in the role and size of the public sector. Still, there were issues to be resolved. At the end of the 1960s, the company began to concern itself with its long-term relations with government. In 1968, Alberta

municipalities pressured the province to bring municipally owned systems under a revised Power Commission Act that would grant them exclusive franchises in their service areas. Calgary Power successfully opposed such a change, arguing that it would make it possible for a local government to expropriate private power producers if permitted to annex new territory.[24]

The company then turned its attention to trying to simplify and regularize its relations with the province. For the first thirty years of its existence, Calgary Power had dealt exclusively with the federal Department of the Interior for land leases and water rights, whether on provincial land or Indian reserves, or inside the national park system. In 1929, however, a federal-provincial agreement transferred all remaining lands and natural resources to Alberta, which was confirmed by concurrent legislation the following year. When Calgary Power applied to begin construction of the dams at the Kananaskis Lakes in 1931, it procured its first water storage licence from the province. Yet Ottawa remained intimately involved in the company's affairs: the overlap of land ownership, water rights, national park territory, and Indian reserves continued. For instance, the 1942 Cascade project required a licence from the federal Department of Mines and Resources and the passage of the Natural Resources Transfer (Amendment) Act of 1941, as well as Alberta's approval to divert the upper Ghost River into Lake Minnewanka to store more water. While the original federal licences to use water at Horseshoe and Kananaskis were for terms of twenty-one years, renewable for additional twenty-one-year periods, this Cascade licence, like several other provincial ones, ran for a term of fifty years.[25] A new federal-provincial agreement in September 1945, later confirmed by concurrent legislation in both Ottawa and Edmonton, transferred all the rights and obligations of the federal government to Alberta but still left a situation of Byzantine complexity that seemed to favour nobody except a few lawyers.[26]

Inflation brought the pressure for change to a head. By 1970, Calgary Power was becoming concerned that the rising cost of new generating capacity might render it very difficult to earn a decent rate of return on its investment. Power rates fixed around the time of World War II had been reduced significantly owing to large plants using low-cost coal, but

management now concluded that an across-the-board rate increase was required in order to raise additional capital from outside investors instead of continuing to rely upon retained earnings.[27] In 1969, an advisory committee recommended to the Alberta government that the company should be treated in the same way as all other utilities, and negotiations were entered into that would make the terms of its various agreements and licences with Ottawa and Edmonton more or less uniform. In September 1972, Calgary Power signed an agreement with the Alberta Department of the Environment that would make it subject only to the provincial Water Power Regulations in order to facilitate future rate hearings.[28]

The company hastened to apply to the Alberta Public Utilities Board for a large rate increase. Within two years, Calgary Power had been granted a rise of 20.5 per cent over its 1972 rates, and the company immediately requested an additional 17.6 per cent rise, which was allowed on an interim basis pending further hearings. The decision to rely upon coal-fired thermal stations seemed to be confirmed by the rapid rise in oil and natural gas prices sparked by OPEC during the 1970s. With millions of tons of reserves in its strip mines around Lake Wabamun, Calgary Power management authorized the construction of four new generating stations at Sundance, each with an unprecedented capacity of more than 350,000 kw; the new stations came into service between 1976 and 1980. (See Appendix.)

The scale of these operations created new pressures on the company. In 1923, management had attempted to convince Parks Branch bureaucrats that the unsightly mudflats and decaying vegetation that would surround Lake Minnewanka when its level was drawn down to produce power would "resemble a bold seacoast at low tide."[29] During the next quarter century, Calgary Power wrangled with the Parks Branch lobby and wilderness preservationists over plans to transform the Spray Lakes into a power reservoir. The company eventually got its way with both Lake Minnewanka and the Spray Lakes development by arguing that the growing demand for hydroelectricity in southern Alberta must be met. But the development of half a dozen huge new thermal stations around Lake Wabamun, along with the growing sensitivity of public opinion concerning the environmental

impact of economic activity, had begun to change the situation. A. W. Howard's 1970 report to shareholders described for the first time a plan to minimize air pollution from the plants at Sundance by constructing five-hundred-foot exhaust stacks to disperse nitrogen oxides higher into the atmosphere. Beginning the following year, for the first time, the company's annual report contained a section headed "The Environment," in which the president admitted that such large thermal stations could not be operated without "some prejudicial effects."[30] Tighter regulation by the Alberta Health Department soon required the company to take other steps to control the environmental impact of thermal generation. Electrostatic fly ash precipitators installed on the stacks were designed to capture nearly all the solid particulates in the exhaust gases.[31] Calgary Power sought to recoup part of the cost of these devices by creating a subsidiary called Western Fly Ash, which marketed some of the ash to manufacturers of concrete blocks and the like. By 1970, the company was mining about two million tons of coal for the Wabamun plant alone, with huge draglines stripping topsoil off hundreds of acres, and, recognizing that damage to the environment was likely to arouse criticism, it began restoring 250 acres at the Whitewood mine. By 1980, the Highvale mine was producing an additional 6.5 million tons of coal, and the topsoil had been replaced on over fourteen hundred acres at the two mines; the reclaimed land was seeded with alfalfa with yields comparable to other areas of the province.[32]

As power production increased from the power plants around the shores of Lake Wabamun, protests began to be heard from cottage owners and fishing enthusiasts that the discharge of millions of gallons of heated water was promoting the growth of aquatic weeds. The company started harvesting weeds in 1972, while arguing that more time and research on nutrient supply and penetration by sunlight was required to solve the problem. The following year, however, the Alberta Energy Resources Conservation Board shifted the onus to Calgary Power for showing that the heat added to the lake was not having an adverse effect; the board ordered the immediate construction of a twelve-hundred-acre cooling pond fed by water brought from the North Saskatchewan River by an eight-mile pipeline at a cost of $23 million, to be completed by 1975. Meanwhile,

the company promised to spend $80 million over the next three years on ecological research on the lake, including a study with the Department of Agriculture on whether warm water irrigation would enhance crop yields. In an effort to fend off critics, management argued that its hydroelectric plants already contributed

> … significantly towards abatement of pollution on the North Saskatchewan and Bow Rivers. Water stored in our reservoirs from the spring and summer runoff is released during the period of low natural flow in winter. In addition to providing water for communities, industry and others, the dilution of industrial and municipal wastes by this additional water is an important factor in preventing serious pollution problems to downstream users in winter months.

Eventually, the ecological studies of Lake Wabamun failed to produce conclusive evidence that discharge water from the company's plants needed to be cooled, and the Energy Resources Conservation Board was persuaded not to order expensive remedial measures; instead, the board allowed the company to deal with the problem through weed harvesting, pending a final board decision in 1979.[33]

With inflation becoming a serious concern for such a capital-intensive industry, Calgary Power convinced the Public Utilities Board in 1975 to fix its power rates for a two-year test period at a level to provide a return on common shares of $3.40 for the first year and $3.75 for the second. This rise gave a boost to investor confidence, which permitted the sale of 1.3 million new common shares in a sales campaign entitled "Opportunity for Albertans." At another round of hearings before the Public Utilities Board, the company sought to demonstrate that the capital cost of Sundance units #1 and #2 had been $184 per kw, while units #3 and #4, which were expected to come onstream over the next two years, would require $288 per kw, an increase of 57 per cent. The company therefore asked for further increases in rates to raise its per share earnings to $4.18 in 1977 and $4.57 in 1978.[34]

With world petroleum prices continuing to rise during the 1970s, Calgary Power became even more firmly committed to increasing its coal-fired generating capacity;[35] the company completed the Sundance development with a sixth unit, opened in 1980, bringing that station's potential output up to 1,987,000 kw. Exploratory work meanwhile revealed another sizable deposit of low-sulphur, non-bituminous coal only five miles away at Keephills. In addition, the company purchased additional coal reserves near Lake Wabamun from both PanCanadian Petroleum and Fording Coal, adding over 65 million tons to its supplies, and in the early 1980s, Calgary Power acquired over 90 per cent of Dome Petroleum's coal holdings near the existing Highvale mine, increasing its reserves to more than one billion tons. With economical fuel supplies assured, Calgary Power began the construction of the first of two 377,000 kw units at Keephills, one of which opened in 1983, the second the following year.[36]

In 1980, seeking to consolidate its position in Alberta's electricity supply industry, Calgary Power split its common shares on a three-for-one basis and purchased a 40 per cent interest in Canadian Utilities Limited, which controlled a group of utilities that supplied most of the northern and eastern regions of the province with whom interconnections had already been established at several points. To reflect its expansion, the company changed its name to TransAlta Utilities Corporation in 1981; at the same time, it created a subsidiary called TransAlta Resources to hold this equity interest since these earnings were not directly regulated by the province. The following year, however, in an effort to block a complete takeover, Canadian Utilities acquired a 21 per cent interest in TransAlta Utilities. A few weeks later, the two companies signed an agreement concerning the future divestiture of their interlocking ownership positions in each other: for the next three years, neither TransAlta nor Canadian Utilities would attempt to gain voting control of each other or of ATCO (which controlled Canadian Utilities). This standstill arrangement led to a decision by TransAlta in November 1984 to negotiate the sale of its interest in Canadian Utilities and unlock their equity interests in one another.[37]

While these corporate manoeuvres were under way, demand for electricity in Alberta was predicted to continue to grow rapidly. In response,

TransAlta began planning for a large new thermal generating station near Hanna on the Sheerness coalfield, about one hundred miles northeast of Calgary, to be jointly owned with Alberta Power Limited (as Canadian Utilities Limited had been renamed). Although load growth was slowed by the economic recession of the late 1980s, the two units at Sheerness, each capable of turning out 366,000 kw, were brought into production in 1986 and 1990, with TransAlta's half interest in the project giving it a total thermal generating capacity of 3,676 kw. (See Appendix.) In 1983, the company built its first 500 kv transmission line from Keephills (at Lake Wabamun) to Edmonton and, two years later, added another 500 kv line from Calgary through the Crowsnest Pass to link up with the British Columbia power grid. Since BC Hydro was already connected to other very large systems in the Pacific Northwest, all of which produced their baseload from hydroelectric plants, this tie permitted TransAlta to use its coal-fired plants for more efficient load management and to bank energy credits by taking off-peak hydroelectricity from outside Alberta.[38]

With power supplies now almost totally generated by three producers (TransAlta, Alberta Power, and Edmonton Power), the Alberta government decided to try and eliminate rate disparities between various types of customers in different parts of the province.[39] On September 1, 1982, the Alberta Electric Energy Marketing Agency (EEMA) began to purchase all current at prices approved by the Public Utilities Board. The costs of the three generating systems were then averaged and an EEMA price established for the utilities companies to resell power to their customers over the coming year.[40] Since TransAlta was the lowest-cost producer, it repurchased its power from EEMA at a premium, which had to be passed on to its customers, leading to rate increases that were phased in over a five-year period.[41] By 1990, TransAlta was generating over 70 per cent of Alberta's electricity, 93 per cent of which came from coal-fired plants. The three huge strip mines at Whitewood, Highvale, and the Montgomery mine at Sheerness (co-owned with Alberta Power) were producing 15.7 million tons of coal – equal to 23 per cent of total Canadian production.[42]

Although hydroelectricity accounted for a mere 7 per cent of TransAlta's power production in 1990, the company still had every reason

to value its hydraulic plants. Even the small stations on the Bow River could be turned on with little delay to meet peak power needs, and a symbol of their complete integration into the wider system was the shift of the control of hydro generation from its historical location at the Kananaskis dam at Seebe to a broader Systems Control Centre in Calgary in 1985. Furthermore, in that same year, rather than being the focus of criticism for its impact on the environment, as had often been the case in earlier decades, the company could advertise that it had received the Bighorn Award, Alberta's highest commendation for wildlife conservation, as a result of eight years of co-operation with the Stony Plain Fish and Game Association.[43]

Yet the environmental issues raised by hydroelectric generation still had the potential to arouse controversy. On this occasion, the anxiety arose downstream rather than upstream. In 1984, the Alberta Water Resources Commission convened a series of public hearings on its South Saskatchewan River Basin Planning Program dealing with water use priorities in the entire watershed south of Red Deer. A whole range of interested parties testified at sessions held across southern Alberta concerning the use of water for purposes such as irrigation, industry, power production, and recreation. TransAlta officials seized the opportunity to point out that there were plenty of potential conflicts and to defend its water utilization policies. The need for water storage to generate electricity during the winter often clashed with summer irrigation requirements, since farmers downstream were likely to demand more releases in a dry year even though lower precipitation in the mountains might cut down the flow of the Bow at the same time. Hydroelectricity probably supplied one-third of Calgary's winter power needs as a source of speedy, flexible supplies to meet peak fluctuations. Yet the Bearspaw dam, just to the west of the city, also had to be managed to even out large seasonal fluctuations in the river's flow to dilute pollution, provide water supply, and control flooding, while providing enough volume to satisfy the irrigators along the lower Bow.[44]

In a written brief to the Alberta Water Resources Commission, TransAlta contended that any changes required to the company's pattern

of reservoir management on the Bow that could affect generating capacity would result in higher power rates. The most efficient possible use should be made of scarce water supplies, but power consumers ought not to have to finance benefits enjoyed by irrigators. The company also downplayed the recreational potential of its reservoirs on the upper river for fishing and boating, noting that shifting water levels on the shorelines were an impediment to such activities.[45] The dams may have lost much of their importance as primary energy producers, but they rose in importance as recreational resources. The surges in flow downstream from the dam when the turbines were suddenly turned on attracted whitewater kayakers, and the mountain reservoirs had become magnets for campers and canoeists.

That the conflict between users of the reservoirs remained a lively and contentious issue was clear from the testimony of Jim Blake, mayor of the Ghost Lake Summer Village, which sprang into existence at the Ghost dam each year. Blake reported that TransAlta virtually drained the lake each winter and spring down to a level of 3,884 feet above sea level (asl), only starting to refill it in the first week of July. The summer residents, who since 1952 had joined the eight or nine permanent families to make up a seasonal population of 189, needed the lake filled to the brim at 3,906 feet asl for safe boating and swimming. In 1983, the company had promised that the water would stay at 3,906 from July 1 on, but when Blake went to look, he discovered that the level had been lowered between four and six feet, leaving a wide band of mud and rock exposed around the shoreline. The next year, TransAlta had not even started to raise the lake level until August 1, and then only to 3,904 feet asl. With a serious frost putting an end to most recreational uses in the second week of September, Blake noted, "this makes a very short summer." He demanded that the refilling of Ghost Lake be started earlier and be held at the promised maximum throughout the swimming and boating season.[46]

Other witnesses expressed fears about schemes to build more dams along the Bow. For the previous two decades, there had been rumours that the government intended to build a new barrier east of Calgary. The likeliest site was downstream from the point at which the Highwood River joined the Bow near Dalemead: this would create a huge reservoir that

would back up the water as far as the eastern suburbs of the city. This dam, which would be constructed mainly for irrigation purposes, might also permit an interbasin transfer as part of a larger scheme to redistribute water supplies across southern Alberta. At the Water Resources Commission hearings in November 1984, Neil Jennings of the Bow River Protection Society expressed fears that the plan was "almost inescapable," though "that possibility frightens us, it angers us, and it saddens us beyond words."[47] Should it be built, the dam would sound the "death knell" for the world-famous fishery on the Bow below Calgary, creating instead "an enormous sewage lagoon."[48]

From TransAlta's point of view, the Bow plants existed primarily to be turned on and off to meet peaks in demand. Other uses – recreation, sanitation, irrigation – might be accommodated from time to time, but conflicts between optimization of operations within the TransAlta distribution system received the highest priority. However, as the Bow River's contribution to the grid declined to virtual insignificance, it became harder and harder to defend such a position.

By the late twentieth century, ninety years after entrepreneurs like Max Aitken had begun to eye the hydroelectric potential of the Bow, the flow of the river below Banff was almost entirely the product of engineering. The dam operators for TransAlta Utilities, the water and sewage managers of the City of Calgary and other cities, the fish biologists, and the irrigation co-operatives determined how many cubic metres of water passed any given point. Some things had not changed all that much: in 1955 (before the dramatic expansion of the three stations fed by the Spray Lakes), Calgary Power generated 1.728 billion kwh of hydroelectric current, while by 1994 (with those additions in the late 1950s plus the two large hydraulic developments in the North Saskatchewan watershed at Big Bend and Brazeau in the 1960s), TransAlta produced 1.574 billion kwh of hydro to meet peak power needs.[49] The only variables not subject to human control seemed to be the level and timing of precipitation in Alberta, the size of the snowpack in the mountains along the upper Bow, and the warmth of the weather during the spring runoff, although some people had already suggested trying cloud-seeding to increase available water supplies.[50]

The engineered river had become such an accepted fact of life that the town manager of Cochrane, just west of Calgary, told the Alberta Water Resources Commission during the 1984 hearings that his main concern was that TransAlta's Ghost dam might cease to be used to generate electricity. Should this occur, the seasonal fluctuations that had kept the Bow ice-free in winter would end, and a steady flow "would undoubtedly result in much of the river freezing solid during extended cold spells. Our raw water intake for the municipal water supply has been constructed on the basis of daily fluctuations." A rise in the river level would harm recreational uses and reduce economic benefits to the town by reducing visitor traffic to the area.[51] Humans had adjusted their behaviour to this "second nature" of the engineered Bow, especially its recreation potential and its altered flow behaviour.

Meanwhile, upriver near Banff each spring and early summer, boaters and fishers would continue to raise their eyes to the mountains encircling Lake Minnewanka, trying to ignore the broad mudflats littered with stumps that the drawdown of the power reservoir for TransAlta's Cascade plant still required. In winter, Calgarians could sleep more soundly in the knowledge that the engineers at the Bearspaw dam were attempting to manage the ice buildup along the Bow so as to prevent any disastrous floods. Down below the city, the fishers would return each spring to cast for wild trout, which now bred naturally among the plants that grew there thanks to the nutrient loads flowing out of Calgary's sewage plants. Over the past ninety-odd years, a new kind of "natural" waterway had evolved out of the wilderness river that had first attracted the hydraulic engineers soon after the turn of the century.