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FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

NOV 03 1983

OGC
Project No. 7114
Alaska Power Authority

Jane Drennan, Esquire
Pillsbury, Madison & Sutro
Suite 900
1050 Seventeenth Street, N.W.
Washington, D.C. 20036

Dear Ms. Drennan:

Please provide Staff with the following information by December 5, 1983:

1) Raw data (discharge vs. percent exceedance values) used to plot the flow duration curves in Exhibit E. These curves, for the Cantwell, Gold Creek, Sunshine, and Susitna Station gaging stations, were found in Chapter 2, Exhibit E.

2) Sediment transport and bedload data collected by the USGS in CY 1982.

3) A complete copy of the December 1981 R&M report entitled "Hydrology, Lower Susitna Studies".

4) Copies of the reports entitled, "Alaska Department of Fish and Game Susitna Hydro Studies Final Data Reports and Synopsis". These reports include 1982 and 1983 studies.

5) A copy of the Bradley Lake Instream Flow Assessment being prepared by Jean Baldrige for Woodward-Clyde and the APA.

6) Preliminary results of the habitat preference criteria study now in progress.

7) Results of any new HEC-2 calibration studies, and the data input, to upgrade water surface elevation predictions in the main channel, including new channel cross sections, and water surface elevations.

8) Documentation for the SNTEMP model that has been proposed by AEIDC to simulate downstream water temperature regimes.

9) A complete copy of Table 6.10 from Volume 2 of the Chakachamna Hydroelectric Project Interim Feasibility Assessment Report, March 1983.

10) A report on nitrogen supersaturation due to temperature differences at the Cultus Lake facility in British Columbia.

11) The Fifth Progress Report on the Columbia River.

12) A complete set of the nitrogen supersaturation data and analyses from the Devil Canyon site.

13) Copies of the following references cited in the Exhibit E (listed by Chapter):

Chapter 3

1 Alaska Dept. of Fish and Game. 1978. "Alaska's Wildlife and Habitat." State of Alaska, Juneau.

2 Kemper, et al. 1977. The Potential Impact of the Mackenzie Highway Construction in Northern Wetlands. Unpublished report. Canadian Wildlife Service. Edmonton, Alberta.

3 Newbury and Malaher. 1972. The Destruction of Manitoba's Last Great River. Naturaliste Canadien 1(4): 4-13. Ottawa, Canada.

4 Sellers. 1979. "Waterbird Use of and Management Considerations for Cook Inlet State Game Refuges." Alaska Dept. of Fish and Game.

5 Wolff and Zasada. 1979. Moose Habitat and Forest Succession on the Tanana River Floodplain and Yukon-Tanana Upland. In: Proceedings of the North American Conference and Workshop No. 15. Kenai, Alaska.

6 Woodward-Clyde Consultants. 1979. "Biological Studies of a Proposed Power Plant Site Near Healy, Alaska."

Chapter 10

1 Cook Inlet Region, Inc. and Placer Amex, Inc. 1981. Coal to Methanol Feasibility Study, Beluga Methanol Project. Volume IV, Environmental.

2 Cook Inlet Region, Inc. and Placer Amex Inc. 1981a. Coal to Methanol Project, Final Report. Volume IV.

The following list of information is needed to clarify and supplement APA's responses to the April 12, 1983, letter from the Commission requesting additional information. This information should also be provided by December 5, 1983:

A. Section 3 - Terrestrial, Botanical, and Wildlife Resources

1. Request a listing of all stationary air pollution sources expected during project construction and operation (e.g., diesel generators and incinerators), and indicate as appropriate for each: (a) emission rates for TSP, NOx, SOx, CO, and hydrocarbons; (b) type of fuel; (c) whether permits will be required; (d) results of any air quality calculations or estimated impacts relative to these sources.

2. In APA's response to Exhibit E, Section 3, Request No. 10, which requested meteorological data from the vicinity of the proposed dam sites, portions of Volumes 1-8 of a report prepared by R&M Consultants, Inc. were reproduced representing data from the Susitna Glacier, Denali, Tyrone River, Kosina Creek, Watana, Devil Canyon, Sherman and Eklutna Lake Stations. Request a copy of the remaining unreproduced portions of those reports and any other reports relating to meteorological or air quality data taken by the Applicant for the project area.

B. Section 7 - Recreation Resources

1. With reference to the APA response to Exhibit E, Section 7, Request No. 4, request the notice and map regarding trail locations.

2. Request the report on recreation affected by the transmission line corridors that is mentioned in the APA response to Exhibit E, Section 7, Request No. 6, and the "recreation implementation report" referred to in the response to Request No. 14.

C. Section 8 - Aesthetic Resources

1. Request a list and description of the "exceptional natural features" located along the entire transmission line corridor in a similar manner as presented in Exhibit E, Chapter 8, pages E-8-30 and E-8-31.

2. If not currently being prepared in the final visual resource analysis report, request maps indicating viewpoints, viewsheds, distances, and potential number of viewers for the transmission line corridor stubs (Anchorage-Willow and Fairbanks-Healy). These

maps should be similar in style to those prepared by APA in response to Exhibit E, Section 8, Request Nos. 2 and 7.

3. If available, request all of the "significant view" maps for the transmission line corridor using the same map scale as found on the "significant view" maps provided in APA's response to Exhibit E, Section 8, Request No. 2.

D. Section 10 - Alternatives

1. Request copies of maps showing locations of the following potential hydroelectric sites evaluated by APA: Browne, Keetna, Snow, Johnson, Vee Canyon, MacLaren, Susitna II (Olsen), Susitna III, Butte Creek, Gold Creek, and Tyone. For each potential development, request data or estimates on (a) type and height of dam, (b) reservoir surface area, and (c) total area inundated and disturbed.

Your prompt attention to this request will be appreciated.

Yours very truly,

Donald H. Clarke
Deputy Assistant General Counsel
Hydroelectric Licensing

cc: APA Project Manager

RESPONSES TO FERC LETTER OF NOVEMBER 3, 1983
REQUEST FOR INFORMATION

Comment 1:

Raw data (discharge vs. percent exceedance values) used to plot the flow duration curves in Exhitit E. These curves, for the Cantwell, Gold Creek, Sunshine, and Susitna Station gaging stations, were found in Chapter 2, Exhibit E.

Response:

The raw data used to plot the flow duration curves in Exhibit E has been compiled and is presented as Attachment 1. It includes:

Pre-project daily based discharge vs. percent exceedance values for Denali, Cantwell, Gold Creek, Susitna Station, Chulitna River and Talkeetna River (insufficient data were available to prepare flow duration curves for Sunshine Station); License Application Figures E.2.39, E.2.40, E.2.41 and E.2.42.

Pre- and with-project monthly based discharge vs. percent exceedance values for Watana, Devil Canyon, Gold Creek, Sunshine, and Susitna Station; License Application Figures E.2.159, E.2.206, E.2.207, E.2.160, E.2.208, E.2.161, E.2.209, E.2.162, and E.2.210.

Pre- and with-project weekly based discharge vs. percent exceedance values for Gold Creek; License Application Figures E.2.163 and E.2.211.

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ATH #3544

Comment 2:

Sediment transport and bedload data collected by the USGS in CY 1982.

Response:

The report "Sediment Discharge data for selected sites in the Susitna River Basin, Alaska, 1981-1982" is attached. DA #305

Comment 3:

A complete copy of the December 1981 R&M report entitled "Hydrology, Lower Susitna Studies".

Response:

"Hydrology, Lower Susitna Studies", 1981, was never completed by R&M Consultants. Instead, relevant data collected by R&M Consultants was incorporated into the 1982 "River Morphology" report produced by R&M Consultants for Acres American, Inc. Four (4) copies of this report were transmitted to FERC prior to February 15, 1983 by Acres American as background material for the Susitna Hydroelectric Project License Application. DOC #31

Comment 4:

Copies of the reports entitled, "Alaska Department of Fish and Game Susitna Hydro Studies Final Data Reports and Synopsis". These reports include 1982 and 1983 studies.

Response:

Two copies of the ADF&G Phase II-1982 Basic Data Report have been transmitted to FERC previously, on October 31, 1983.

The 1983 ADF&G Basic Data Report is currently not available, but will be transmitted when available (approximate date June 1, 1984).

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Comment 5:

A copy of the Bradley Lake Instream Flow Assessment being prepared by Jean Baldridge for Woodward-Clyde and the APA.

Response:

A copy of the Bradley Lake Instream Flow Assessment (by Jean Baldridge) is contained in Volume 3, Appendix E of the Bradley Lake Hydroelectric Power Project Feasibility Study. The complete 3 volume set of this feasibility study was transmitted to FERC on 23 November 1983.

Comment 6:

Preliminary results of the habitat preference criteria study now in progress.

Response:

Results obtained in the habitat preference criteria studies now being conducted are briefly discussed in the "Synopsis of the 1982 Aquatic Studies and Analysis of Fish and Habitat Relationships", ADF&G, Phase II, Basic Data Report, 1982. Data regarding habitat preference criteria are contained in Vol. 4 - Aquatic Habitat and Instream Flow Studies, and are summarized in Vol. I, pp. 46-39. These volumes were transmitted to FERC on October 31, 1983.

Comment 7:

Results of any new HEC-2 calibration studies, and the data input, to upgrade water surface elevation predictions in the main channel, including new channel cross sections, and water surface elevations.

Response:

A draft report entitled "Susitna Hydroelectric Project, Lower Susitna River, Water Surface Profiles and Discharge Rating Curves, October 1983, has been prepared and is being reviewed. The report will be finalized after the review comments are received. For your current use, the draft report is attached which contains the following:

1. Main Report: The main report identified the new cross sections surveyed in 1982 and the old cross sections surveyed in 1981

2. Appendices A to I: The appendices contain information on input to and old output of the HEC-2 model.

In addition to the draft report, all channel cross sections used in the study are also attached in a separate volume.

It is anticipated that the draft report will be finalized on or before the end of December 1983. A copy of the final report will be sent to FERC as soon as it becomes available.

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Comment 8:

Documentation for the SNTEMP model that has been proposed by AEIDC to simulate downstream water temperature regimes.

Response:

Documentation for the SNTEMP model is provided in the attached report: Stream Flow and Temperature Modeling in the Susitna Basin, Alaska - Final Report by AEIDC, June 30, 1983. DOC#635

Comment 9:

A complete copy of Table 6.10 from Volume 2 of the Chakachamna Hydroelectric Project Interim Feasibility Assessment Report, March 1983.

Response:

A complete copy of Table 6.10 from the Chakachamna Hydroelectric Project Interim Feasibility Assessment Report is attached.

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Comment 10:

A report on nitrogen supersaturation due to temperature differences at the Cultus Lake facility in British Columbia.

Response:

The report, "Pressure in the Early Life History of Sockeye Salmon" by H.H. Harvey (1963) is attached.

DOC# 386

Comment 11:

The Fifth Progress Report on the Columbia River.

Response:

The 1979 report by the Corps entitled "Fifth Progress Report on Fisheries Engineering Research Program, 1973-1978" is attached.

DOC # 330

Comment 12:

A complete set of the nitrogen supersaturation data and analyses from the Devil Canyon site.

Response:

A complete set of N_2 supersaturation data and analyses from the Devil Canyon Site is available in the 1982 Phase II ADF&G Basic Data Report, Volume 4: Aquatic Habitat and Instream Flow Studies Part I, pp. 30-34; 170-175; 197-202; and the following figures and tables.

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Fig. 4I - 3-54, pg. 171
Fig. 4I - 3-55, pg. 173
Fig. 4I - 3-56, pg. 174
Fig. 4I - 4-3, pg. 200
Appdx. Table 4-D-1, pg. 4-D-2
Appdx. Table 4-D-2, pg. 4-D-3
Appdx. Table 4-D-3, pg. 4-D-4
Appdx. Table 4-D-4, pg. 4-D-11

This volume was transmitted to FERC previously on October 31, 1983.

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Comment 13 - Chapter 3, No. 1:

Provide: Alaska Department of Fish and Game. 1978. "Alaska's Wildlife and Habitat." State of Alaska, Juneau.

Response:

The ADF&G 1978 report entitled "Alaska's Wildlife and Habitat" is out of print. This oversize, two-volume set may be obtained at the Library of Congress in Washington, D.C. The catalogue number is G1531.D4AH 1973. It may also be obtained at the Alaska Resources Library in Anchorage, Alaska.

Comment 13 - Chapter 3, No. 2:

Provide: Kemper, et al. 1977. The Potential Impact of the Mackenzie Highway Construction in Northern Wetlands. Unpublished report. Canadian Wildlife Service. Edmonton, Alberta

Response:

The article, "The Potential Impact of the Mackenzie Highway Construction in Northern Wetlands" is attached.

RESPONSES TO FERC LETTER OF NOVEMBER 3, 1983
REQUEST FOR INFORMATION

Comment 13 - Chapter 3, No. 3:

Provide: Newbury and Malaher. 1972. The Destruction of Manitoba's Last Great River. Naturaliste Canadien 1(4): 4-13. Ottawa, Canada.

Response:

The report "The Destruction of Manitoba's Last Great River" is attached.

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The Destruction of Manitoba's Last Great River

by R. NEWBURY and G. W. MALAHER

. . . water is an integral part of the land, responsible to a large extent for its physical form and the life found in or near it – including man. The land and water are indivisible, and those who would treat a river as so much plumbing to be manipulated, and its water as a commodity to be bought and sold like carloads of wheat, have simply not comprehended this fundamental fact.

Richard C. Bocking

Two great rivers, the Nelson and the Churchill, cut completely through the Precambrian Shield of northern Manitoba bringing water from the interior of Canada to Hudson Bay. Waters flowing to the Nelson begin their journey on the eastern slope of the Rockies, crossing the three Prairie Provinces via the Saskatchewan River. The Saskatchewan enters Lake Winnipeg at Grand Rapids. All rivers that drain into Lake Winnipeg, including many beginning in northwestern Ontario, contribute to the flow of the Nelson. In total, this vast watershed covers some 414,000 square miles.

The headwaters of the Churchill likewise begin far to the west at Beaver Lake near Lac la Biche, northeast of Edmonton. Its waters flow eastward across the northern plains of Alberta and Saskatchewan to Lac Ile-à-la-Crosse, there meeting the Precambrian Shield. From the Manitoba-Saskatchewan border, the river flows northeastward through a magnificent chain of lakes, roughly paralleling the Nelson to the south. The Churchill watershed covers an area of about 115,000 square miles.

Though these rivers lie several hundred miles apart, the height of land separating the Churchill at the Southern Indian Lake area from waters flowing southward to the Nelson is low and very short—so short, in fact, that the idea of diverting the Churchill to increase the volume flow of the Nelson for power purposes is an "engineer's dream." In the late 1960s and the first two years of the present decade, this dream has come closer to reality because of government-approved plans of Manitoba Hydro to build a dam on the Churchill at its outlet from Southern Indian Lake. The dam would create an enormous reservoir stretching some 110 miles southward to the headwaters of a small tributary to the Nelson—the Rat-Burntwood system (see map). The lower 250 miles of the Churchill River valley would be almost completely cut off and receive significant flows only in midsummer when normal high water would overtop the proposed Missi Falls dam. The stopped-up waters of the Churchill would head southward through Notigi and Split Lakes toward the Nelson River some 200 miles to the south. The reservoir would raise lake levels from ten feet or Southern Indian Lake to 60 feet or more in the diversion area, and the diverted water would increase the flows of the Rat-Burntwood system by over 500%.

Whether or not this enormous proposed scheme should become fact is a question that has beleaguered the present government as well as former governments of Manitoba. These governments have doggedly backed Manitoba Hydro's diversion plans, even though there is no doubt that the scheme could create a nightmare for many other human and resource values in the region. The essential question is: Is the power that would be generated really worth more to Manitobans and to Canada than the many values that would be compromised or destroyed? The utilization of an entire river by diversion rather than in steps or stages along its own channel has never been done before in Manitoba or anywhere else in Canada. Even the governments recognized the possible size and immensity of the scheme in 1971:

> *There has never been a thorough appraisal of environment and resource use preceding a diversion project anywhere in North America. The Churchill diversion promises to be the largest single diversion ever undertaken by man on this continent.*[1]

The "need" for development on the scale of the Churchill diversion lies mainly in the minds of power developers who have projected provincial power needs geometrically to the year 1994. The projected geometric increase in "need" ca

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Dr. Newbury is a professor of Civil Engineering and Earth Sciences, University of Manitoba, Winnipeg. He has first hand knowledge of Manitoba's sub-arctic rivers as well as of development schemes for the region.

Mr. Malaher is a former director of the Manitoba Wildlife Branch. He currently retired from government service.

Editor's note: This paper has been published separately as Canadian Nature Federation Special Publication No. 2, January, 1973. Available from the C.N.F. office for $1.00.

Valley of the lower Churchill. If the proposed diversion is approved by the Manitoba government this portion of the Churchill would cease to exist. *R. Newbury*

be visualized by imagining a lily pond in which lily pads are growing and multiplying at such a rate that the number of pads doubles each day. The daily increment of pads would grow geometrically. If we start with two lilies the first day, four the next, and so forth, by the 30th day of growth the pond surface would be totally covered with pads. On the 29th day enough lily pads must grow to cover half the pond in only one day. This is the kind of "need" that the power developers say must be met in the near future.

TABLE I

GENERATING STATIONS AND CAPACITIES IN MANITOBA†

Date	Station	Station Capacity (Mw)	Total Installed (Mw)
1906	Pinawa	28	28
1911	Point du Bois	72	100
1923	Great Falls	132	232
1931	Slave Falls	68	300
1931*	Seven Sisters Falls	150	425
1951*	Pine Falls	86	536
1954	McArthur Falls	56	592
1957**	Selkirk and Brandon	244	836
1961***	Kelsey	224	1028
1965	Grand Rapids	472	1500
1971	Kettle Rapids (partially completed)	300	1800

*Seven Sisters was not completed until 1949. In 1951 the Pinawa Station was abandoned in favour of Seven Sisters.

**This date is approximate as the introduction of these stations was a progressive affair.

***Kelsey was built only to service the town of Thompson and the International Nickel Company mine and as such did not satisfy the normal growth of demand in the Southern system.

†These figures are approximate and do not allow for the commissioning of individual units except where noted.

DEVELOPING HYDRO POWER IN MANITOBA

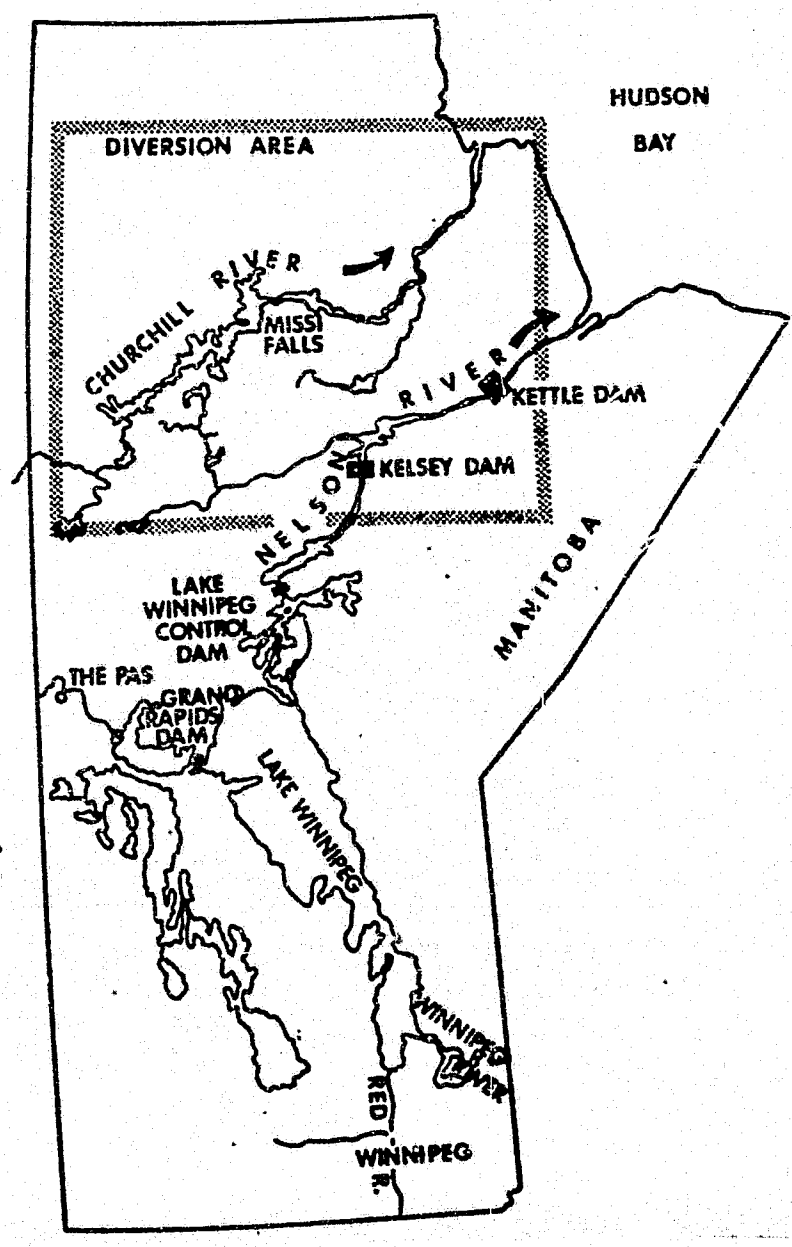
The slow early growth of power demand in Manitoba, starting over 60 years ago, is analagous to the early days of the pond. As indicated by the projected need (load growth) curve for Manitoba, the first hydro-electric plants needed to satisfy the demands were small and widely spaced in years. The initial plants were located on the Winnipeg River starting with the 28 megawatt (Mw) installation at Pinawa. It was not until the late fifties that all of the available drop in the Winnipeg River had been utilized by the additional six dams listed in Table I. By the mid-sixties, however, the increments of power needed to satisfy the demand were in the order of hundreds of Mw, and the installation of new plants took place every few years. The solution to satisfying the geometrically growing demand was to dam the next large river to the north, the Saskatchewan. The Grand Rapids plant above Lake Winnipeg on the Saskatchewan created a vast reservoir by flooding over 600 square miles of uncleared delta land and lakes. The addition of Grand Rapids (472 Mw of capacity) to the system satisfied the demand for only six years. However, the hydro-electric potential in the northern half of the province was vast and untapped.

The large outflow system from Lake Winnipeg, the Nelson River, was well suited for large scale power development. Joint federal-provincial studies indicated that over 5,000 Mw of power would be available by damming the Nelson at eight to ten places (Table II). The feasibility of developing Nelson sites had been proven with an initial plant, the Kelsey Station, located just upriver from Split Lake. The Kelsey plant was constructed primarily to supply the International Nickel Company mine at Thompson, Manitoba. Construction of the first Nelson River plant for the southern system began at Kettle Rapids in 1968 and now nears completion. This plant's capacity of over 1,200 Mw will be transmitted southward by a federally assisted DC transmission line to meet the demand for an additional six years. Exploration for the construction of a second plant on the Lower Nelson at Long Spruce Rapids has now commenced.

As indicated by the projected load growth curve, plants of over 1,000 Mw must be added every five to six years to meet the increasing demand in the 1970s. To improve the efficiency of these future Nelson plants, works to regulate the flow of the Nelson from Lake Winnipeg are now under construction. The Churchill River diversion would dramatically increase the size of the Nelson flows (by about 30%).

Now, in the 1970s, according to Manitoba Hydro, the supply of hydro-electric power has reached the lily pond's 29th day of growth, where entire rivers must be developed in a single project to meet the projected demands. The Churchill is the last great river capable of sustaining such growth for even a few years in Manitoba.

If the remaining potential of the Nelson River is applied



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to the power demand and projected into the future at a conservative 7% growth rate, it can be seen that the Nelson alone will carry the new demand to the year 1990. Based on the addition of Churchill River flows as an approximation, the diversion will increase the capacity of the Nelson River plants by 1,500 Mw, while an additional 400 Mw will become available along the diversion route (Table II). The total effect of the Churchill River diversion will be to add 1,900 Mw to the system, but this allows the load demand to be carried only into the year 1994. With the tremendous annual increments of power that will be needed in the 1990s, the total effect of the entire diversion project will be to delay the need to develop alternative sources of power for only four to six years. In spite of a scarcity of undammed rivers which will occur by 1990, power planners and politicians advocate the diversion of the Churchill immediately, that is, before the Nelson is developed. They bolster their arguments by actively promoting greater consumption of electricity both in the province and for export. Although the 1972-1990 period could be used to assess the true value of the last great river, Manitoba will reach its 30th day of development in the lily pond analogy by 1974 if the move to dam the Churchill cannot be stopped.

Of course, saving for the future always costs today's consumer. Manitoba Hydro's estimate of the extra cost of preserving the Churchill for 18 years is a 5% to 10% increase in power costs. They argue that saving the option on the Churchill is not the cheapest way to produce power, their only interest. Unfortunately, cheapest power is also the cheapest treatment of native communities and of Manitoba's livable environment. It is also the cheapest heritage of natural resources that can be passed on to future generations. Is a few percent of efficiency worth it?

THE DIVERSION

A description of the Churchill River after its diversion must be based on smaller projects elsewhere since diversion projects of the extent proposed do not exist. Essentially, in the diverted form, the lower 250 miles of the river valley will have only a small flow from local drainage occupying the large unfilled channel. The only appreciable flows will occur in early summer and last only a few weeks when the Southern Indian Lake reservoir is overtopped at the proposed Missi Falls Dam. Whether the smaller flows are maintained during the winter in the large channel without remedial work or extra releases is unknown. In effect, the abandoned channel aspect will be maintained by short bursts of peak flows forever, and no new natural regime will be allowed to establish. The whole ecology of the Lower Churchill will be drastically changed to some form unique to an artificial regime.

In the Southern Indian Lake-Notigi Lake reservoir, over 300 square miles of shoreline areas will be flooded as existing lake levels are raised up to ten feet at the upper end and 60 feet at the lower end of the reservoir. The bedrock surface in the area is overlain with lacustrine clay and unconsol-

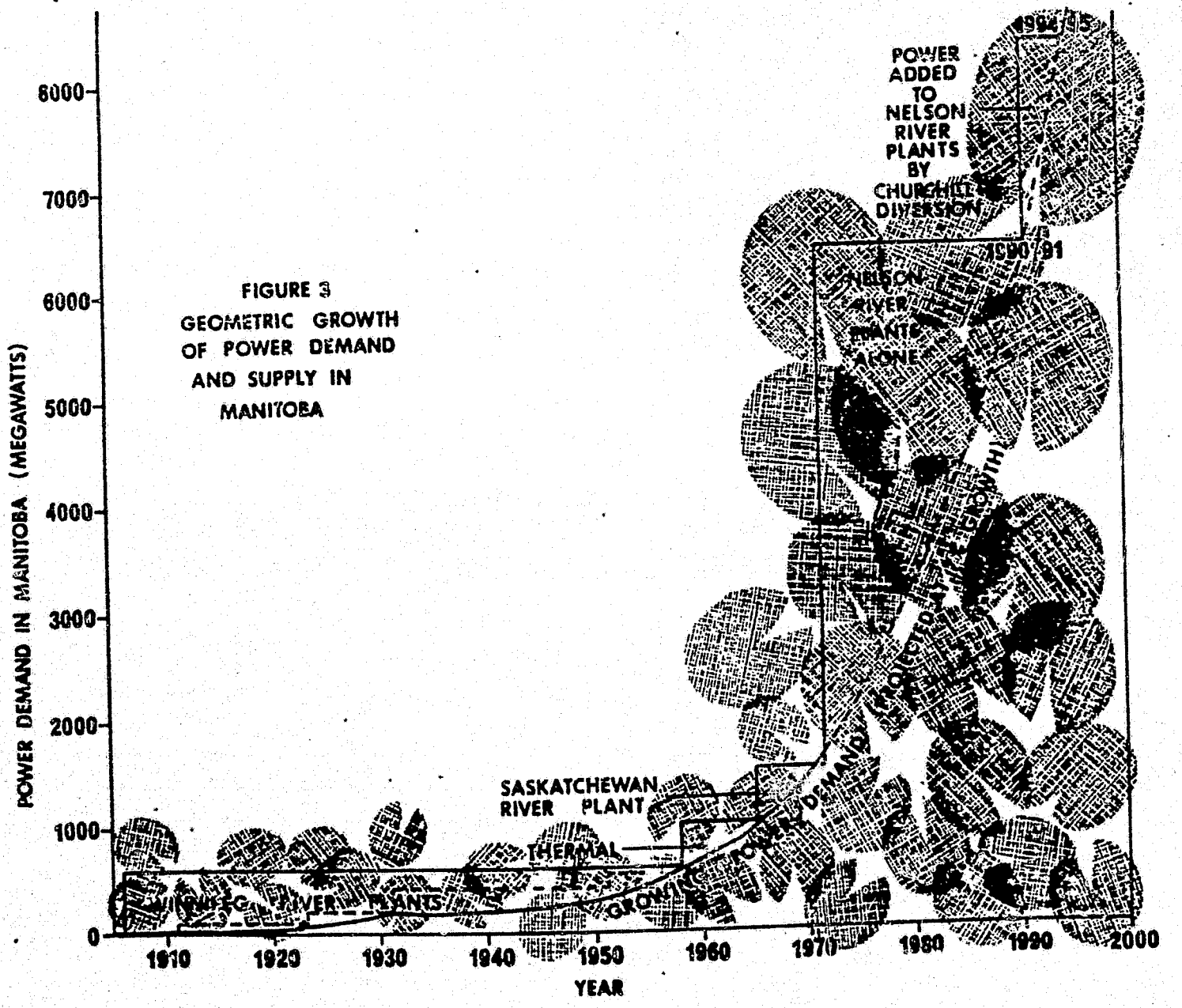

FIGURE 3
GEOMETRIC GROWTH OF POWER DEMAND AND SUPPLY IN MANITOBA

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South Indian Lake settlement, one of the many communities along the diversion route that would be displaced. The diversion would also cause uncalculated damage to wildlife and other natural resources in the region. *G. McCullough*

The livelihood of hundreds of Indian families will be destroyed if the Manitoba government approves plans to divert the Churchill River. *H. H. Lloyd*

Embayment in Kettle Reservoir on the Nelson River, northern Manitoba, showing typical impact on forested land behind a hydro dam. *S. Simpson*

idated glacio-fluvial deposits in which permafrost is widespread. The effect of impoundment over unconsolidated frozen materials elsewhere, even to a limited extent, has been to cause continuous bank instability, high water turbidity and off-shore sedimentation, a high frequency of floating debris and shores lined with dead vegetation. As observed in portions of Reindeer Lake impounded only four feet in 1941, Sipiwesk Lake impounded in 1961, Cedar Lake impounded in 1964, or the Kettle Reservoir impounded in 1970, the time required for the re-establishment of lake shores in permafrost areas is unknown, but is definitely more than 30 years.

The small tributary channels of the Rat-Burntwood system that will receive the flows of the Churchill will also undergo an unspecified period of instability. The flows in the 200 miles of channel connecting the Churchill and Nelson will be increased by over 500% causing large lake level fluctuations, unstable shorelines, and continuous reaches of channel erosion followed by downstream deposition in the slower-flowing expansions and lakes. The location and frequency of sediment and floating debris will depend on the sequence of development of additional reservoir sites along these diversion routes.

These projected effects of flooding have been confirmed by even the most recent Manitoba Hydro study where shoreline clearing and debris booming of travelled routes in the proposed reservoir is recommended for safety and appearance, and where the deliberate creation of cleared boat refuge areas in other parts of the reservoir is recommended. The last study, released only a few months ago was commissioned by the chairman of Manitoba Hydro and directed by P. D. McTaggart-Cowan, the executive director of the Science Council of Canada. The terms of reference are typical of the limited studies undertaken to date in that it is assumed that: the project must proceed immediately; the study must be short-term; and the recommendations are to deal only with the mitigation of environmental effects. This study noted however:

> *We sincerely hope that this will be the last time in the history of Manitoba that major engineering endeavours are undertaken without a proper environmental impact study having been completed so that it is one of the essential inputs to the political decision.*[2]

It will, of course, be the last time—for the Churchill River is the last great river in Manitoba on which major engineering endeavours have not yet been undertaken.

MOVING TO IMPLEMENT THE PLAN

Although studied as far back as 1919, serious consideration of the Churchill diversion by Manitoba Hydro first resulted from a study by the firm of Gibb, Underwood & McLellan in 1964. In 1966, the Conservative government of Manitoba allowed Manitoba Hydro to enter into an agreement with the Federal Government to proceed with the development of the Nelson, including a high level diversion of the Churchill and construction of a 560 mile DC power line to southern Manitoba. Public announcements made with enthusiasm by Premier Roblin were taken at face value by a public unfamiliar with northern geography, its people, or the values of other resources in the region. The Manitoba Wildlife Federation (12,000 members) pressed for biological and environmental studies to be carried out coincident with Hydro investigations and planning. A preliminary study by the University of Manitoba recommended in-depth sociological, biological and environmental studies. But, funds for the recommended studies were refused, and the report is being kept secret and has still not been made public.

On December 20, 1968, an open letter expressing deep concern regarding the proposed high level diversion was

TABLE II
FUTURE GROWTH OF THE MANITOBA HYDRO SYSTEM

Without Diversion of the Churchill River		Assuming Diversion of the Churchill River
Capacity (Mw)	Station	Capacity (Mw)
800	Kettle Rapids	1200
168	Jenpeg*	168
420	Bladder Rapids*	420
320	Kelsey*	320
700	Gull Rapids**	900
600	Long Spruce	800
1300	Limestone Rapids**	1800
600	Gillam Island	800
0	Burntwood River	400 (approx)
Full utilization by the year 1990.		Full utilization by the year 1994. Four years gained by diversion at 7% growth.

*The figures are dependent on Lake Winnipeg Regulation. Present installed capacity at Kelsey—224 Mw.

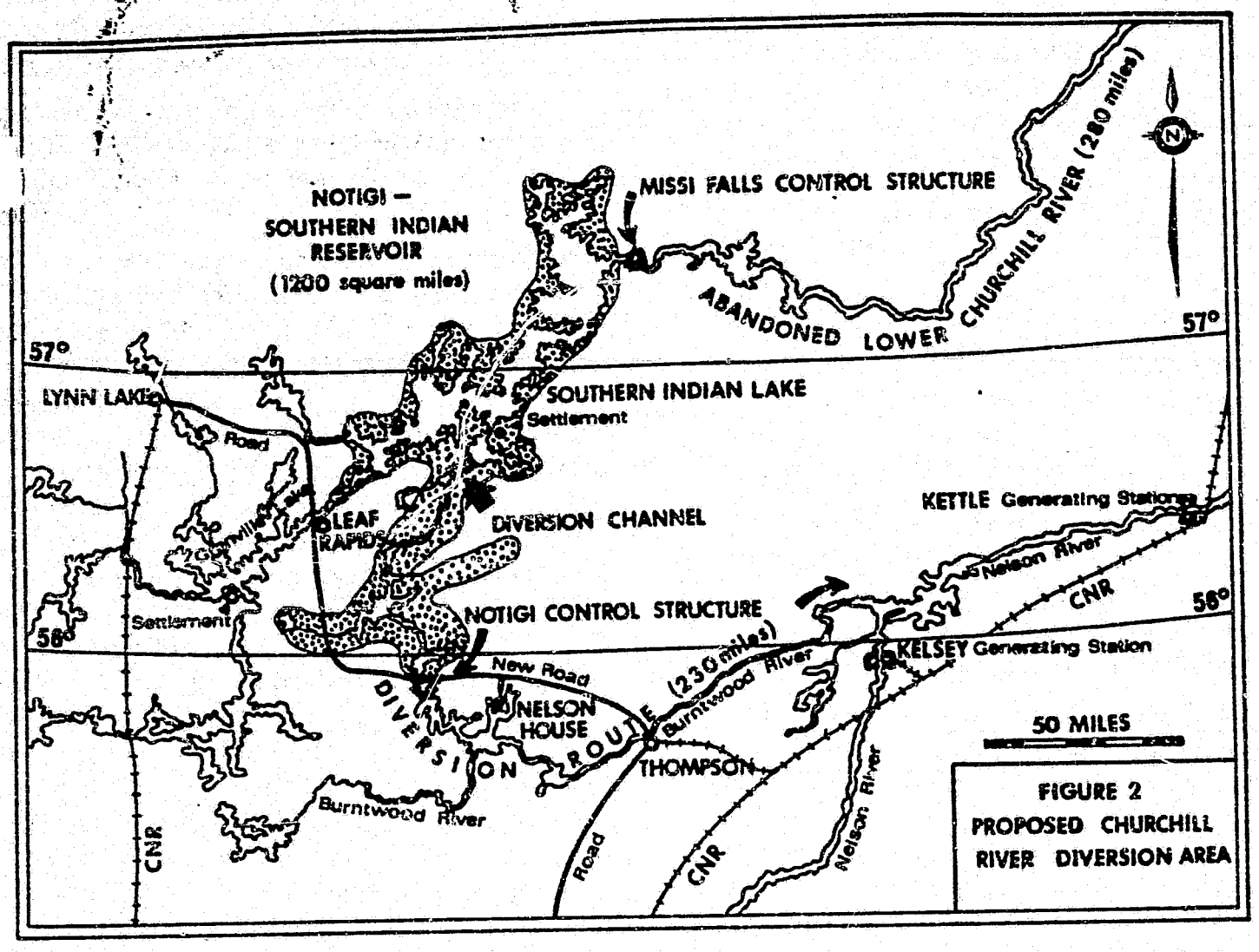
**These locations may involve two plants each.

Note: The approximate capacities shown are based on available river flows only and may vary depending on their role in supplying power to the province or for export.

presented to the Hon. Harry Enns, then Minister of Mines and Natural Resources, by a group of University of Manitoba professors. Publication of the letter first made the public aware of the probable annihilation of the South Indian Lake settlement, and of widespread extreme environmental damage.

A Southern Indian Lake Action Committee was formed by private citizens to further inform the public by holding a series of public meetings. In the meantime, Manitoba Hydro applied for a license to proceed, and public hearings under the *Water Powers Act* (Man.) were announced. At the stormy sessions which followed in January 1969, Manitoba Hydro representatives stated that Hydro's sole responsibility was to provide adequate power at the lowest possible cost. Opponents of the plan objected vigorously to this unilateral approach, blaming the government more than Hydro. The main objections centered on the disruption of the South Indian Lake community, lack of any in-depth resource studies, and refusal of the government to make public such reports as they had. The hearings were adjourned without a recommendation, and in February lawyers representing the South Indian Lake and Granville Lake communities sought and obtained an injunction to prevent Hydro from proceeding unless the hearings were properly concluded.

To circumvent the injunction, the government introduced Bill 15 in the ensuing legislative session. If passed, this Bill



would have become an Act superseding and having preference over any other Act or hearings. Opposition parties (including the present NDP government) fought the Bill vigorously on the basis that lack of information and government refusal to release reports and other vital information prevented any intelligent vote in the legislature. The Bill did not pass second reading since the House was dissolved in the spring of 1969 and an election called, partly on this issue. In a surprise vote the Conservatives lost, and the New Democratic Party assumed the reins of government.

Premier Schreyer had stated prior to the election that, if elected, he would not allow the high level diversion and would seek other alternatives. The NDP government called in David Cass-Beggs, former chairman of the Saskatchewan Power Corporation, to review Hydro's plans. In his report to the legislature, Cass-Beggs confirmed that alternatives to high level diversion could be found.

On September 23, 1970, Premier Schreyer announced alternative plans to develop Lake Winnipeg immediately for the dual purpose of flood control and regulation of the Nelson River for power purposes. He proposed that the diversion at Southern Indian Lake should indeed proceed, but must not raise the level of the lake more than some ten feet.

The announcement appeared to give government sanction to the Cass-Beggs recommendations. (These recommendations are contained in his foreword to a Manitoba Hydro Task Force Report on *Expansion of Generating Capacity in Manitoba*, dated September 23rd). At the same time, federal-provincial agreement to study the effects of hydro-electric development on all resources and settlements was being [illegible]. However, a small paragraph in the Hydro Task Force Report's introduction shows that the authors of the report had their minds already made up!

> *A more detailed study of the effect of the controlled regime on resource values is at present being undertaken under joint Federal-Provincial auspices, but while it will provide important information for the detailed planning and operation of the control project, there is no possibility of it leading to any basic revision of the concept.*[3]

The agreement covering the "detailed study" was not signed until a year later, in September 1971, following repeated re-drafting because of objections raised by the chairman of Manitoba Hydro. The lost time was critical, particularly since findings would represent the only detailed study of effects on natural resources in the Churchill-Nelson and Lake Winnipeg project areas. Two million dollars have been committed and more will be, but "there is no possibility of it leading to any basic revision of the concept"!

Lack of basic data and the failure to undertake in-depth quantitative resource studies, in spite of pressure to do so is a serious indictment of both governments concerned. Even the one detailed study, which deals with the effects on resources only, will not be completed in time to influence the course of events in any significant way.

A current analysis of federal participation in the Churchill-Nelson study further confirms the peripheral nature of the research by noting:

> *. . . . the governments asked if there was an opportunity for and sufficient time to achieve meaningful results, or is this (study) essentially a whitewash to cover decisions already taken.*[1]

0011 8

Although the Churchill is the last major river, plans to divert local systems to the diversion area are being entertained. To the north lies a smaller river, the Seal. Its two branches drain most of Manitoba lying north of Southern Indian Lake. The preface to the Manitoba Hydro Task Force Report of September 23, 1970 states:

> *It has also been pointed out that ultimately a diversion from the Seal River (100 miles further north) might be used to compensate for reductions in the available flows from the Churchill.*[3]

Should this be the next step in power development, even more country will be flooded than in the initial diversion of the Churchill. There would then be one continuous chain of impoundments stretching northward from Notigi, 300 miles to the Northwest Territories.

At the time of writing, the present chairman of Manitoba Hydro, David Cass-Beggs, has moved on to head British Columbia Hydro. However, assurances by Premier Schreyer of Manitoba have been given that problems associated with northern hydro development have been solved by the former chairman, and plans to divert the Churchill River will proceed as rapidly as possible.

In a final move of arrogance, on December 8, 1972, the Minister responsible for granting a license to Manitoba Hydro for the diversion, the Hon. Sydney Green, announced that no license would be required, no hearings into the issue would be held, and no compensation to native communities would be necessary as it had been decided in Cabinet to simply grant permission to Manitoba Hydro to proceed immediately by an Order in Council. The legality of this move is now in question.

A RIVER OF HISTORY AND BEAUTY

The Churchill River, in its course through the Precambrian Shield, is today in its natural state except for a power dam and a minor in-channel reservoir at Island Falls, Saskatchewan. From the Saskatchewan border, the river surges eastward and northward through Manitoba for 250 miles to Missi Falls at the outlet of Southern Indian Lake. Its character is that of a magnificent chain of lakes broken only by short stretches of river where rapids and falls occur. That it was known and well-used before the onset of Canadian history is apparent from the large numbers of archeological sites discovered since the flooding and diversion were first discussed. Approximately 180 sites of up to 35 acres in extent have been found within the area, and most of them will be inundated. Age of some of the sites is tentatively dated at 6000-7000 years. In modern times the Churchill has lain remote, known only to scattered native communities along the lake shores and to canoeists who have retraced the early fur trade routes of western Canada.

Duke Watson, an internationally-known wilderness traveller, in a letter to Premier Schreyer in June, 1970, described the Manitoba portion of the Churchill in these words:

> *The Churchill River holds a very special significance for me in that I have traversed it by canoe in its entirety across Manitoba. I have camped at many sites along its course; I have sailed on Southern Indian Lake and the other big lakes of the Churchill system; and I have visited the community of South Indian Lake, in itself an inspiration. I should add that wilderness travel throughout North America has been a recreational pursuit of mine for many years. Out of the numerous trips, however, the lower Churchill, consisting of the sections which would either be flooded or diverted of most of the volume, ranks as my most outstanding recreational and esthetic experience. There is simply nothing like it elsewhere!*

In another letter to Premier Schreyer dated September, 1971, two canoeists wrote:

> *We have spent months with villagers in Alaska, remote mountain regions of the U.S., and canoeing and hunting in Canada. Of all our trips, we enjoyed the Churchill River better than any other. Never have we enjoyed such great freedom as enjoying this great water route. The fishing, wildlife and pure natural beauty are unsurpassable.*

Sigurd F. Olson, internationally-known author and outdoorsman and leader of the Voyageurs' group from Ottawa (that has included Prime Minister Trudeau and the late Blair Fraser), has traversed the fur trade routes of Canada. In a letter to G.W. Malaher, he has written:

> *I have travelled the Churchill River in 1955 from Ile-à-la-Crosse near its headwaters in Saskatchewan some 500 miles to Cumberland House and the Pas on the Saskatchewan River, then later in 1961 from Lake Pukatawagan through Granville and South Indian, then down the Rat to its confluence with the Burntwood ending at the mining town of Thompson . . .*
>
> *The area that will be flooded on the Churchill is one of the most beautiful regions of Canada. It is usable, accessible, its waters warm compared to the frigid rivers and lakes of the far north. Fishing is excellent and there is much wildlife.*
>
> *If the South Indian project is abandoned, future generations will bless the vision of the decision makers of today.*

The Churchill will soon become accessible directly by road from the south, and it will be possible for many more people to enjoy its wilderness beauty and wildlife. The Ruttan Lake mine, now under construction, lies a few miles south of Southern Indian Lake, while the new townsite for the mine is located on the Churchill River where it enters Southern Indian Lake at Leaf Rapids. A new highway connecting Leaf Rapids with the southern road system nears completion, providing the first land link from the south with the Churchill River. The large mining developments at Flin Flon, Thompson, Lynn Lake and Ruttan Lake lie nearby to the south and west.

In addition to providing a stable local economy based on fish, fur, and game animals, the Churchill provides a habitat for a significant portion of the northern Manitoba waterfowl population. The lower 250 miles of the channel that is trimmed of large vegetation by ice and high flows each winter provides a major nesting and rearing area. At the end of the river the Churchill estuary on Hudson Bay also plays a role in providing a fresh water habitat for populations of white whales, capelin and seals.

Many of the original settlers at South Indian Lake moved up from the Indian Reserve at Nelson House. They were the most aggressive hunters who moved far out to the best hunting grounds. At first it was only a winter settlement but in time became their home. The main source of livelihood was trapping, and until some years ago their trapping grounds were open to invasion by any itinerant trapper from the outside who chose to compete with them. This precarious existence was changed by the advent of two major management programs. A system of Registered Traplines was instituted by the government, which gave security of tenure to each trapper on his own area, not subject to trespass by others.

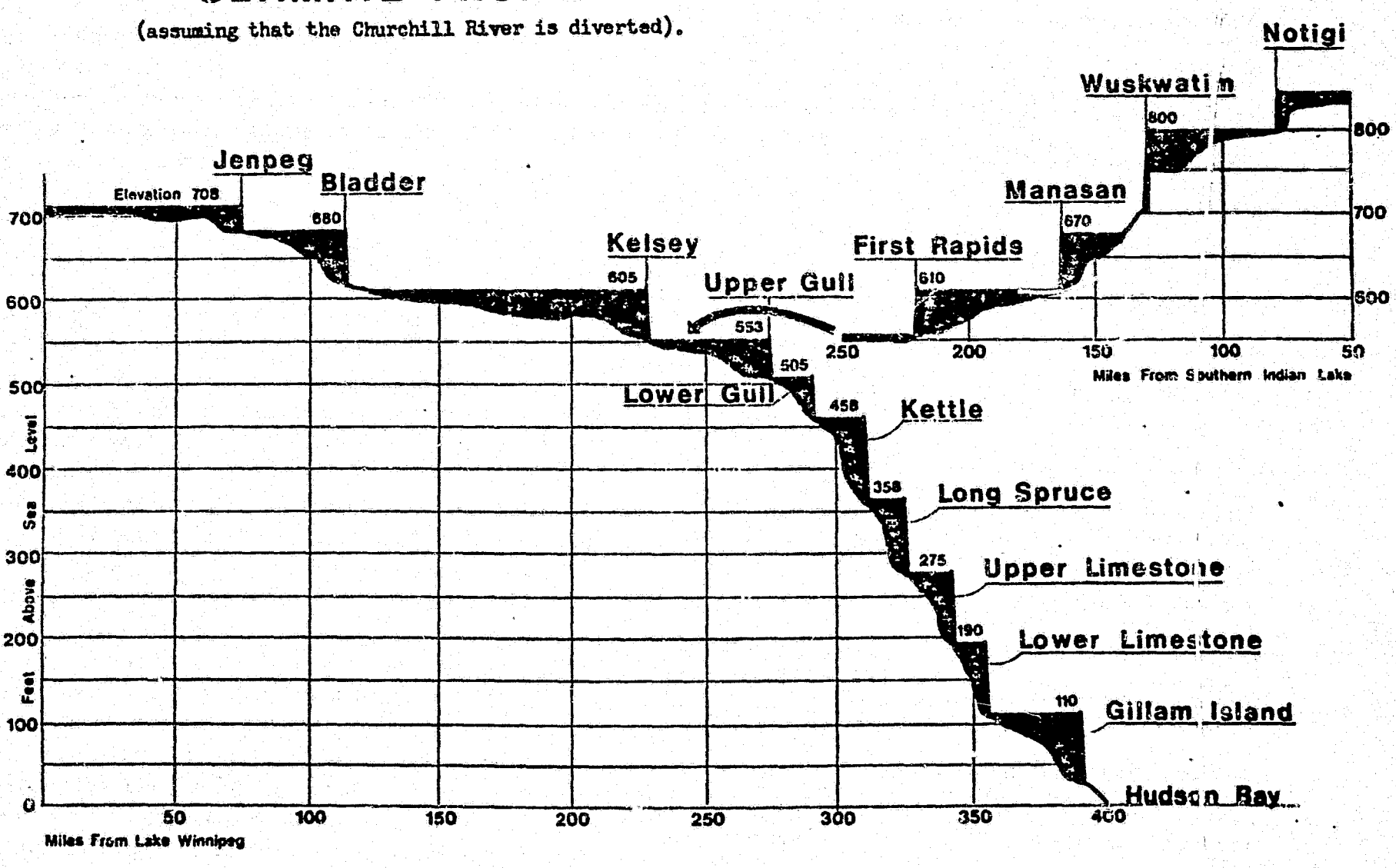
The lake was opened to commercial fishing in 1942, and so a second source of income was provided. At first there were conflicts of interest. There was danger of introducing a new and additional population of commercial fishermen because the men at South Indian had no experience in commercial fishing. This was resolved by permitting a few experienced men to move in on a short term basis to train the local people and help maintain an economic operation while so doing. Licenses were then restricted to local residents.

Further complications arose through the insistence of commercial fish marketing interests that fish production must be undertaken in time to catch the early winter market, thus keeping men from their traplines during the important trapping months of November and December when fur pelts were at their prime. This too was finally resolved so that trapping and fishing earning opportunities did not conflict and were spread over the longest possible period of the year. The people responded splendidly to this integration of earning opportunity, and so today we find a settlement where Indians, Whites and those of mixed blood work together in harmony and under relatively prosperous conditions without social assistance. They have carved their own security by developing all the talents of use in their chosen environment. Offers to compensate these people, to move them to new locations in the general area or train them in new skills to be used elsewhere, have naturally been rejected. Compensation can be destructive of their pride and self-respect, and many are certainly too old to learn new skills in a new environment. Yet, Manitoba Hydro and the Government of Manitoba refuse to make public their studies, if any, of this potential social problem.

That residents do not want the hydro project, spurn the idea of "compensation," and have pride in the existing com

NELSON AND BURNTWOOD RIVER ULTIMATE PROFILE

(assuming that the Churchill River is diverted).



munity is evidenced by statements of two oldtimers quoted in the *Winnipeg Free Press* and the *Winnipeg Tribune*.

> *. . . . the manager of the Hudson Bay store went on a fishing trip and forgot to lock the door. In fact it was wide open. Yet during the three days he was gone not one person walked into that store. You can leave a boat and motor anywhere and be certain no one will touch it.*
>
> *A year ago, the R.C.M.P. built a jail at South Indian Lake. So far it has yet to have a single inmate and no one wants the distinction of being the first person in the community to be locked up.*[4]
>
> *The reason I am writing this letter is that I hope you will print it so that the people down south will realize what is about to take place at South Indian Lake; and why we, the residents, are one hundred percent against it.*[5]

Though the residents of South Indian Lake were provided with legal assistance during the diversion controversy by the Conservative Government, they were refused the same assistance when the present plan was presented by the New Democratic Government. Thus, people are confused and do not know where they stand. They have raised a small fund within the community to retain their former legal assistance and continue their fight.

It has now been learned that after a Canadian firm of consultants had refused to accept the work, a consultant from Wisconsin has been hired to plan a new townsite—higher up the bank. The community at South Indian does not yet know of this.

CONCLUSION

This destruction of the Churchill River and Rat-Burntwood system would take place only for the sake of providing cheaper hydro-electric power for a few additional years. This power will not be needed until close to the turn of the century. Yet Manitoba Hydro is anxious to proceed with the diversion almost immediately. To "justify" the rapid expansion of power developments, Manitoba Hydro continues to light its offices in Winnipeg for 24 hours each day and has conducted an intense publicity campaign advocating that people use more electric power. Such advertising for self-gratifying growth should be made illegal.

Physically, the proposed diversion project would begin a cycle of long term erosion and deposition along 250 miles of local river channels—the Rat-Burntwood system, and would destroy the natural landscape and habitat of 250 miles of large scale river channel—the Lower Churchill River, and 370 square miles of shoreline environment spread out over thousands of miles of mainland and islands—the Southern Indian Lake-Notigi Lake area.

Culturally, the diversion would remove the traditional independent livelihood of the South Indian Lake community and other downstream fisheries and would substitute untried one-way compensation.

Tragically, the diversion would permanently destroy Manitoba's last great river before its values for recreation, habitation, wildlife, or wilderness are gauged, realized, or understood. All this for the sake of a power scheme that could be delayed for at least 20 years and perhaps forever.□

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The quotation on page 4 is from *Canada's Water: For Sale?*, copyright 1972 by Richard C. Bocking. Reprinted by permission of the publisher, James Lewis & Samuel, Toronto.

[1]McDougall, I. A., 1971. *The Churchill Diversion: Development of a Legal Framework for the Management of Canadian Water Resources*. Environment Canada.

[2]Report to the Chairman of Manitoba Hydro on *The Clearing Program for Southern Indian Lake and the Diversion Channel from South Bay to Notigi*. P. D. McTaggart-Cowan (Chairman), F. F. Slaney, E. D. Gillespie (August 1972).

[3]*Manitoba Hydro Task Force Report on Future Generating Capacity in Manitoba* (September 1970).

[4]McKenzie, Murray, 1971. Interviewed by Gene Telpner, *Winnipeg Tribune*, August 6.

[5]Charlie Dysart, 1972. 40-year resident of South Indian Lake in Letter to the Editor, *Winnipeg Free Press*, August 22.

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Report of the Joint Federal-Provincial Task Force. 1971. *A Preliminary Study of the Environmental Impacts of the James Bay Development Project*. Environment Canada, Ottawa.

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Sprague, J. B. 1972. *Aquatic Resources in the Canadian North: Knowledge, Dangers and Research Needs*. Canadian Arctic Resources Committee, Ottawa.

Waterfield, Donald. 1970. *Continental Waterboy*. Clarke, Irwin and Company Ltd., Toronto.

Comment 13 - Chapter 3, No. 4:

Provide: Sellers. 1979. "Waterbird Use of and Management Considerations for Cook Inlet State Game Refuges." Alaska Dept. of Fish and Game.

Response:

The 1979 report by R. Sellers of ADF&G entitled "Waterbird Use of and Management Considerations for Cook Inlet State Game Refuges" is attached.

Comment 13 - Chapter 3, No. 5:

Provide: Wolff and Zasada. 1979. Moose Habitat and Forest Succession on the Tanana River Floodplain and Yukon-Tanana Upland. In: Proceedings of the North American Conference and Workshop No. 15. Kenai, Alaska.

Response:

The 1979 report by Wolff and Zasada entitled "Moose Habitat and Forest Succession on the Tanana River Floodplain and Yukon-Tanana Upland" is attached.

Doc# 715

Comment 13 - Chapter 3, No. 6:

Provide: Woodward-Clyde Consultants. 1979. "Biological Studies of a Proposed Power Plant Site Near Healy, Alaska."

Response:

The 1979 report by Woodward-Clyde Consultants entitled "Biological Studies of a Proposed Power Plant Site Near Healy, Alaska" is attached.

Comment 13 - Chapter 10, Nos. 1 and 2:

1. Provide: Cook Inlet Region, Inc. and Placer Amex, Inc. 1981. Coal to Methanol Feasibility Study, Beluga Methanol Project. Volume IV, Environmental.

2. Provide: Cook Inlet Region, Inc. and Placer Amex, Inc. 1981a. Coal to Methanol Project, Final Report. Volume IV.

Response:

The report, Coal to Methanol Feasibility Study, Beluga Methanol Project is no longer available.

A copy of Coal to Methanol Project, Final Report, Volume IV, is attached.

B/6/1
R2

Comment - A, Section 3, No. 1:

Request a listing of all stationary air pollution sources expected during project construction and operation (e.g., diesel generators and incinerators), and indicate as appropriate for each: (a) emission rates for TSP, NO_x, SO_x, CO, and hydrocarbons; (b) type of fuel; (c) whether permits will be required; (d) results of any air quality calculations or estimated impacts relative to these sources.

Response:

The following air pollutant emission estimates and air quality analyses depict point source emissions during construction and operation of the Susitna Hydroelectric Project. Fugitive dust emission estimates were presented in an earlier document (Comment 3B-8, submitted to FERC on July 11, 1983).

Comment a) and b): Request a listing of all stationary air pollution sources expected during construction and operation, and indicate the emission rates for TSP, NOx, SOx, CO, and hydrocarbons; indicate type of fuel.

Emission estimates were made for the diesel electric generator, refuse incinerator, concrete batch plant, aggregate screening plant, and oil heater emissions from the Watana and Devil Canyon camps and townsites. The estimated emission rates for particulates, sulfur oxides (SO_x), nitrogen oxides (NC_x), carbon monoxide (CO), and hydrocarbons from each of these sources are listed in Table 1.

Diesel Electric Generator - The diesel generator at the Watana site will provide interim electrical power for the camps at both Watana and Devil Canyon. The generator will be operated for the first three

TABLE 1

ESTIMATED EMISSION RATES (TONS PER YEAR)[a/]

	Diesel[b/] Generator	Refuse Incinerator	Concrete Batch Plant	Aggregate Plant	Residential Oil Heaters Watana	Devil Canyon
Particulates	163	36	44	Negligible[c/]	8	3
Sulfur Dioxide	300	7	0	0	108	43
Nitrogen Oxides	2,230	8	0	0	55	22
Carbon Monoxide	1,220	90	0	0	15	6
Hydrocarbons	204	4	0	0	3	1

a/ Emission rates calculated from AP-42 (EPA 1977).

b/ Diesel generator emissions based on representative manufacturers' data for peak output of 16 MW.

c/ Very much less than EPA standards.

years of project construction, then line power will be available. The generator will be designed for a peak load of 16 MW and an average annual load of 10.3 MW. The generator will use an average of 723 gallons per hour of No. 2 diesel fuel. Estimated emissions from the generator are shown in Table 1.

Refuse Incinerator - Refuse from the Watana and Devil Canyon camps and permanent townsites will probably be incinerated. As a worst case estimate, the combined populations at the Watana and Devil Canyon sites will produce an estimated 14 tons per day of refuse, based on a conservative refuse generation rate of 5 lbs/person per day (Tchobanoglous, 1977). Estimated emissions from the refuse incinerator are shown in Table 1. It was assumed that the incinerator will be equipped with a water spray scrubber for particle removal.

Batch Concrete Plant - One or more batch concrete mixing plants will be used. The estimated peak capacity of the plants is 1,000 tons per hour, producing concrete with a density of 4,000 pounds per cubic yard. As shown in Table 1, particulates are the only significant pollutant emitted from the plant, at an estimated emission rate of 44 tons per year.

Aggregate Screening Plant - River gravel from the Susitna River will be used as processed gravel fill in the dam and as aggregate for concrete. The gravel will be dredged and stockpiled along the river before washing and screening prior to use. Particulate emissions from the washing and screening process should be negligible because of the high moisture in the gravel (EPA 1977).

Camp and Townsite Emissions - The major emissions from the camps and permanent townsites are expected to come from residential oil heaters. The fuel type used will be No. 2 distillate, with a 0.25% sulphur content. The population at the Watana site will use an estimate 6,080,000 gallons per year (gpy), while the population at the Devil

Canyon site will use 2,430,000 gpy. Estimated oil heater emissions from the two sites are shown in Table 1.

Comment c): Indicate whether air quality permits will be required.

Prevention of Significant Deterioration (PSD) Permit - Construction of the diesel electric generator will require a PSD review by the Alaska Department of Environmental Conservation (ADEC), as part of the ADEC Permit to Operate. A PSD review is required for any "major" source that emits at least 250 tpy of any pollutant regulated under the Clean Air Act. As shown in Table 1, the diesel generator will emit an estimated 2,240 tpy of NO_x, so it is a "major source" and is therefore regulated under the PSD process.

Full PSD analyses are required for each pollutant emitted from a "major" source at a rate higher than the significance level established for that pollutant. The significance levels for 15 pollutants are listed in 18 AAC 50.300. For the diesel generator, the estimated emission rates of particulates, SO_x, NO_x, CO, and hydrocarbons exceed the applicable significance levels shown below:

	Estimated Diesel Generator Emissions, tpy	ADEC Significance level, tpy
Particulates	163	25
Sulfur Dioxide	300	40
Nitrogen Oxides	2,240	40
Carbon Monoxide	1,220	100
Hydrocarbons	203	40

As outlined in 18 AAC 50.300, air quality and Best Available Control Technology (BACT) analyses must be conducted for each of the above

pollutants emitted from the diesel generator. The BACT analysis consists of the following:

a. A detailed demonstration that the maximum allowable emissions from the generator will not cause the ambient concentrations of TSP, SO_x, NO_x, CO, or hydrocarbons to exceed either the ambient air quality standards (18 AAC 50.020a) or the allowable PSD Class II increments for SO_2, and TSP (18 AAC 50.020b). A simplified screening model analysis is sometimes suitable for isolated sources such as the diesel generator (EPA 1980). Where applicable, the maximum expected 24-hour pollutant concentrations can be estimated using suitable "worst case" assumptions: low wind speed (typically 2.5 meters per second) and poor atmospheric dispersion (F-class stabiity). If the modeled "worst case" concentrations are well below the applicable 24-hour standards, then the PSD applicant may not be required to conduct additional, more sophisticated, air quality modeling.

b. BACT analyses will be required for TSP, SO_2, NO_x, CO, and hydrocarbons emitted from the generator. Each analysis must demonstrate that the proposed air pollution control strategies are effective and use readily available equipment and materials. It is doubtful that the flue gas treatment would be required for an internal combustion diesel generator. However, it is possible that BACT for TSP and SO_2 would require use of low ash and low sulfur fuel oil.

c. It is unlikely that a full year of meteorological and air quality monitoring will be required. Meteorological data are not required if the worst-case air quality screening analysis described in part (a) above is used. Monitoring of existing pollutant concentrations is not required if the applicant can

demonstrate that either the existing ambient concentrations are below published threshold values, or that the estimated increases in pollutant concentrations resulting from the proposed emission will be less than those same threshold values (EPA 1980b).

ADEC Permit to Operate - Industrial processes and fuel burning equipment constructed in Alaska require an ADEC Permit to Operate. The refuse incinerator, concrete batch plants, and aggregate screen will require this permit, as described in 18 AAC 50.300. The permit applications for these processes will require brief engineering reports, describing the facility layouts, process flowrates, and estimated pollutant emission rates.

Emission Standards - The diesel electric generator (rated at 16 MW peak capacity) would be subject to the proposed federal NSPS standard for NO_x emissions from internal combustion engines (Federal Register, 1979).

Emissions from the diesel generator, concrete batch plant, and the aggregate screen will be limited according to the emisson standards established by the ADEC in 18 AAC 50.050. Emissions from the refuse incinerator will be limited according to 18 AAC 50.040. Operation of residential wood stoves will be limited by the practices described by 18 AAC 50.085.

Comment d): Indicate results of any air quality calculations or estimated impacts relative to these sources.

The EPA-approved screening procedure was used to estimate the worst case air quality impacts near the diesel generator, refuse incinerator, concrete batch plant, and the Watana and Devil Canyon townsites (EPA 1980b). To estimate the maximum 24-hour average pollutant

concentrations downwind of the Watana sources, the wind was assumed to blow up the valley along the Tsusena Creek at a constant 2.5 mps wind speed with a F-class atmospheric stability. The EPA screening approach recommends the use of the 2.5 mps wind speed and F-class stability as the "worse case" conditions. As shown in Table 2, the measured wind speeds at the Watana site are generally greater than 2.5 mps, so the use of that wind speed as the "worst case" condition should provide conservatively high pollutant concentrations. The EPA approved COMPLEX model was used to estimate pollutant concentrations along the complex terrain. Under the assumed conditions, the maximum pollutant concentrations occurred at a point roughly 3 km north of the Watana Townsite. Similarly, the maximum air quality impacts near the Devil Canyon townsite were modeled by assuming that the wind blew up the valley along Portage Creek, at 2.5 mps with F-class stability.

The estimated worst case 24-hour average ambient pollutant increments caused by the point source emissions are shown in Table 3. The estimated maximum increments for TSP and SO_2 are well below the allowable PSD Class II increments and ambient air quality standard concentrations for those pollutants. Based on the low calculated 24-hour concentrations for all the pollutants, the 3-hour, 8-hour, and annual average concentrations of NO_x, CO and hydrocarbons will probably also be well below the applicable Alaska ambient standards for those averaging times.

The low calculated pollutant concentrations also indicate that ambient air quality monitoring will not be required as input to the PSD review for the diesel generators. Ambient monitoring is not required if the maximum impacts of the PSD source are below significance levels for the appropriate pollutants (EPA 1980b). The calculated impacts from the diesel generator are near or below the significant monitoring concentrations, as shown below:

	Calculated Impact from Diesel Generator (micrograms/m^3)	EPA Significant Monitoring Concentration (micrograms/m^3)
TSP	7.4	10
SO_2	14	13
Carbon Monoxide	100	575

Because the calculated maximum impacts are near or below the monitoring significance levels, it is unlikely that a full year of ambient monitoring would be required for the PSD review.

TABLE 2

RECORDED MONTHLY WIND SPEEDS AT WATANA WEATHER STATION

Month	Monthly Average Wind Speed, mps
October 1981	3.2
November	3.8
December	3.6
January 1982	4.0
February	No data available
March	3.5
April	3.2
May	2.4
June	2.7
July	2.4
August	2.0
September	2.4

Source: R&M Consultants, 1982.

TABLE 3

ESTIMATED MAXIMUM 24-HOUR QUALITY IMPACTS
(All Values In micrograms/m^3)

	Particulates	SO_2	NO_x	CO	Hydrocarbons
Diesel Generator	7.4	14	190	100	17
Refuse Incinerator	1.4	0.26	0.30	3.5	0.16
Concrete Plant	2.3	0	0	0	0
Watana Townsite	2.3	33	17	4.6	0.93
Devil Canyon Townsite	0.057	0.80	0.41	0.11	0.23
PSD 24-hr Class II Increment	37	91	No PSD Increment	No PSD Increment	No PSD Increment
Ambient 24-hr Standard	150	365	No 24-hr Standard	No 24-hr Standard	No 24-hr Standard

Note: Values do not include background concentrations. 24-hr impacts calculated using EPA approved screening analysis (EPA 1980).

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REFERENCES

EPA. 1977. Compilation of Air Pollutant Emission Factors, AP-42. Office of Air and Waste Management. 3rd Edition, August 1977.

EPA. 1980. Guideline on Air Quality Models. Office of Air Quality Planning and Standards. EPA 450/2-78-027, Revised October 1980.

EPA. 1980b. Ambient Monitoring Guidelines for Prevention of Significant Deterioration. EPA 450/4-80-012. November 1980.

Federal Register. 1979. Proposed Standards of Performance for New Stationary Sources; Industrial Internal Combustion Engines. July 23, 1979.

R&M Consultants. 1982. Processed Climatological Data. Volume 5. 0650 - Watana Station, October 1981 - September 1982. Alaska Power Authority, Susitna Hydroelectric Project. R&M Consultants, Anchorage, Alaska. December 1982.

Tchobanoglous, G. and H. Theisen, R. Eliason. 1977. Solid Wastes. McGraw Hill, 1977.

0118

Comment - A, Section 3, No. 2:

In APA's response to Exhibit E, Section 3, Request No. 10, which requested meteorological data from the vicinity of the proposed dam sites, portions of Volumes 1-8 of a report prepared by R&M Consultants, Inc. were reproduced representing data from the Susitna Glacier, Denali, Tyone River, Kosina Creek, Watana, Devil Canyon, Sherman and Eklutna Lake Stations. Request a copy of the remaining unreproduced portions of those reports and any other reports relating to meteorological or air quality data taken by the Applicant for the project area.

Response:

Attached are complete copies of the following reports in which meteorological data for the project area is presented:

R&M Consultants. 1982. Susitna Hydroelectric Project, Processed Climatic Data. October 1981 thru September 1982. Vol. 1, 0610 - Susitna Glacier Station. 43

R&M Consultants. 1982. Susitna Hydroelectric Project. Processed Climatic Data. October 1981 thru September 1982. Vol. 2, 0620 - Denali Station. 44

R&M Consultants. 1982. Susitna Hydroelectric Project. Processed Climatic Data. October 1981 thru May 1982. Vol. 3, 0630 - Tyone River Station. 45

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R&M Consultants. 1982. Susitna Hydroelectric Project. Processed Climatic Data. October 1981 thru September 1982. Vol. 4, 0640 - Kosina Creek Station. 50

R&M Consultants. 1982. Susitna Hydroelectric Project. Processed Climatic Data. October 1981 thru September 1982. Vol. 5, 0650 - Watana Station. 46

R&M Consultants. 1982. Susitna Hydroelectric Project. Processed Climatic Data. October 1981 thru September 1982. Vol. 6, 0660 - Devil Canyon Station. 47

R&M Consultants. 1982. Susitna Hydroelectric Project. Processed Climatic Data. May 1982 thru September 1982. Vol. 7, 0665 - Sherman Station. 48

Volume 8 (0700 - Eklutna Lake Station) was transmitted to FERC with the 11 July, 1983 filing. 49

R&M Consultants. 1982. Susitna Hydroelectric Project. Processed Climatic Data. July 20 thru September 30, 1981. Vol. 1, Susitna Glacier Station. 198

R&M Consultants. 1982. Susitna Hydroelectric Project. Processed Climatic Data. July 18 thru September 30, 1981. Vol. 2, Denali Station. 200

R&M Consultants. 1982. Susitna Hydroelectric Project. Processed Climatic Data. August 27, 1980 thru September 30, 1981. Vol. 3, Tyone River Station. 202

R&M Consultants. 1982. Susitna Hydroelectric Project. Processed Climatic Data. August 25, 1980 thru September 30, 1981. Vol. 4, Kosina Creek Station. 204

R&M Consultants. 1982. Susitna Hydroelectric Project. Processed Climatic Data. April 8, 1980 thru September 30, 1981. Vol. 5, Watana Station. 206

R&M Consultants. 1982. Susitna Hydroelectric Project. Processed Climatic Data. July 17, 1980 thru September 30, 1981. Vol. 6, Devil Canyon Station. 208

The 1981 sampling period had only 6 stations in operation - Stations 7 and 8 had not been set up at that time.

RESPONSES TO FERC LETTER OF NOVEMBER 3, 1983
REQUEST FOR INFORMATION

Comment - B, Section 7, No. 1:

With reference to the APA response to Exhibit E, Section 7, Request No. 4, request the notice and map regarding trail locations.

Response:

Attached is the notice for proposed easements and topographic maps denoting trail locations, in support of the 11 July 1983 submittal of supplemental responses to FERC (Exhibit E, Section 7, No. 4).

AA-16637-EE (75.4)
AA-13358 (2652)
(963)

SEP 26 1983

Memorandum

To: Assistant Deputy State Director for Conveyance Management (960)

From: Chief, Branch of Easement Identification (963)

Subject: Final Easements for Cook Inlet Region, Inc. (Talkeetna Mountains Deficiency Area)

Following are the final easement and major waterway recommendations for lands selected by Cook Inlet Region, Incorporated, in the Talkeetna Mountains Deficiency area. Of those recommendations, my decision is as follows for the lands described below:

Seward Meridian, Alaska (Unsurveyed)

T. 31 N., R. 1 W.
Secs. 1 to 12, inclusive, all.

T. 32 N., R. 1 W.
Secs. 5 to 10, inclusive, all;
Secs. 13 to 24, inclusive, all;
Secs. 29 and 30, all.

T. 29 N., R. 1 E.
Sec. 13, all;
Secs. 23 to 29, inclusive, all;
Secs. 33 to 36, inclusive, all.

T. 31 N., R. 1 E.
Secs. 6 to 12, inclusive, all.

T. 32 N., R. 1 E.
Secs. 3 and 4, all;
Secs. 7, 8, and 9, all;
Secs. 18 and 19, all;
Secs. 30 and 34, all.

T. 33 N., R. 1 E.
Secs. 25 and 26, all;
Secs. 34 and 35, all.

T. 29 N., R. 2 E.
Secs. 1 to 4, inclusive, all;
Secs. 8 to 33, inclusive, all;
Sec. 36, all.

T. 30 N., R. 2 E.
Secs. 1 and 2, all;
Secs. 11 to 14, inclusive, all;
Secs. 23 to 26, inclusive, all;
Secs. 34, 35, and 36, all.

T. 31 N., R. 2 E.
Secs. 1 to 4, inclusive, all;
Secs. 7 to 11, inclusive, all;
Secs. 14 and 15, all;
Secs. 22 to 26, inclusive, all;
Secs. 35 and 36, all.

T. 32 N., R. 2 E.
Sec. 22, all;
Sec. 27, all.

T. 33 N., R. 2 E.
Sec. 30, all.

T. 29 N., R. 3 E.
Secs. 5 to 8, inclusive, all.

T. 30 N., R. 3 E.
Secs. 1 to 22, inclusive, all;
Secs. 28 to 32, inclusive, all.

T. 31 N., R. 3 E.
Secs. 13 to 17, inclusive, all;
Secs. 25 to 36, inclusive, all.

T. 30 N., R. 4 E.
Secs. 1 to 9, inclusive, all.

T. 31 N., R. 4 E.
Sec. 1, all;
Sec. 9, all;
Secs. 11 to 14, inclusive, all;
Secs. 22 to 36, inclusive, all.

T. 32 N. R. 4 E.
Sec. 34, all.

T. 30 N., R. 5 E.
Secs. 5 and 6, all.

T. 31 N., R. 5 E.
Secs. 1 to 24, inclusive, all;
Secs. 26 to 34, inclusive, all.

T. 32 N., R. 5 E.
Sec. 25, all;
Secs. 34 to 36, inclusive, all.

T. 31 N., R. 6 E.
Secs. 1 to 8, inclusive, all;
Secs. 17 and 18, all.

T. 32 N., R. 6 E.
Secs. 25 to 29, inclusive, all;
Secs. 31 to 36, inclusive, all.

T. 31 N., R. 7 E.
Secs. 2 to 6, inclusive, all;
Sec. 11, all;
Sec. 12, all lands south of Susitna River.

T. 32 N., R. 7 E.
Secs. 30 and 31, all;
Sec. 32, all lands south of the Susitna River.

MAJOR WATERWAYS:

Stephan Lake and Fog Lake #4 (Secs. 13 and 14, T. 31 N., R. 5 E., Sec. 18, T. 31 N., R. 6 E., Seward Meridian) have been determined to be major waterways. In addition, the Susitna River has been determined to be a major waterway. Stephan Lake has an extensive history of significant use for access purposes. As the site of several private lodges and as the major floatplane staging area for several townships, it serves as the point of origin and terminus for access to large areas of land which will remain in public ownership.

While all of the Fog Lakes have been used for access purposes, Fog Lake #4 appears to have seen the most use for accessing those lands outside the selection area which will remain public. The demand for access to public lands south and east of Fog Lake #4 will continue to place a premium on this lake as a focus for this access.

The Susitna River provides a major avenue of access to and through the public lands in the region surrounding the subject selected lands. The obstacle to traversing the entire length of the river presented by Devil's Canyon, does not negate the use historically found on the river upstream from the canyon. Current information reflects a consistent, long term use of the river above Devil's Canyon for both recreational river floating and for general access purposes. These uses generally originate upstream on public lands at points such as the Denali Highway crossing and the Tyone and MacClaren Rivers. Travel downriver ends just above Devil's Canyon requiring access off of the river.

ALLOWABLE USES:

All easements are subject to applicable Federal, State, or Municipal corporation regulation. The following is a listing of uses allowed for each type of easement identified. Any uses which are not specifically listed are prohibited.

25 Foot Trail - The uses allowed on a twenty-five (25) foot wide trail easement are: travel by foot, dogsled, animals,

snowmobiles, two- and three-wheel vehicles, and small all-terrain vehicles (ATV's) (less than 3,000 lbs. Gross Vehicle Weight (GVW)).

50 Foot Trail - The uses allowed on a fifty (50) foot wide trail easement are: travel by foot, dogsled, animals, snowmobiles, two- and three-wheel vehicles, small and large all-terrain vehicles, track vehicles, and four-wheel drive vehicles.

One Acre Site - The uses allowed for a one (1) acre site easement are: vehicle parking (e.g., aircraft, boats, ATV's, snowmobiles, cars, trucks), temporary camping, and loading or unloading. Temporary camping, loading, or unloading shall be limited to 24 hours.

EASEMENTS TO BE RESERVED:

a. (EIN 18 D1, D9, L) An easement fifty (50) feet in width for an existing and proposed access trail from the Chulitna siding on the Alaska Railroad in SE¼, Sec. 2, T. 32 N., R. 2 W., Seward Meridian, easterly through selected lands in T. 32 N., Rs. 1 E. and 1 W., Seward Meridian, to public lands. The proposed segment of this trail has been rerouted, where necessary, around and adjacent to the boundary of U.S. Survey No. 4987 and U.S. Survey No. 5382, connecting with the existing trail. The uses allowed are those listed above for a fifty (50) foot wide trail easement.

Discussion:
This is an existing trail which has been used for many years to provide access from the Chulitna siding on the Alaska Railroad to public lands east of Portage Creek and north of the Susitna River. It provides access for the transportation of supplies and equipment to mining claims and patented entries on the public lands in this area. Primary use is by track vehicles, with some use by four-wheel drive vehicles during drier periods.

b. (EIN 22d D9) A site easement upland of the ordinary high watermark in the NW¼, Sec. 18, T. 31 N., R. 6 E., Seward Meridian, on the northeast shore of Fog Lake #4. The site is one (1) acre in size with an additional twenty-five (25) foot wide easement on the bed of the lake along the entire waterfront of the site. The uses allowed are those listed above for a one (1) acre site.

Discussion:
Fog Lake #4 has been determined to be a major waterway. This site will facilitate a change in mode of transportation and in conjunction with trail EIN 22e D9, will provide access to public lands located south and east of the lake. These lands have been isolated due to topography and the selection pattern. There are no other nearby alternate access routes to these lands.

c. (EIN 22e D9) An easement twenty-five (25) feet in width for a proposed access trail from site EIN 22d D9 on the northeast shore of Fog Lake #4 in the NW¼, Sec. 18, T. 31 N., R. 6 E., Seward Meridian, southerly to public land. The uses allowed are those listed above for a twenty-five (25) foot wide trail easement.

Discussion:
This trail provides access from a major waterway to public land. This land has been isolated due to the combined effect of the surrounding topography and the selection pattern. There are no other nearby alternate access routes into these lands.

d. (EIN 26 D9, L) An easement fifty (50) feet in width for an existing access trail from the west shore of Stephan Lake adjacent to the southeast corner of U.S. Survey 5213 in Sec. 16, T. 30 N., R. 3 E., Seward Meridian, thence westerly along the southern boundary of said survey and on to public land. The uses allowed are those listed above for a fifty (50) foot wide trail easement.

Discussion:
This is an existing trail which begins at site EIN 26a C4 on Stephan Lake. In order to avoid conflict with the private landowner, the trail has been moved south, adjacent to the boundary of the private land. This trail has been used in the past for the transportation of materials and supplies into the Stephan Lake area. The trail will provide access from a major waterway to isolated public land.

e. (EIN 26a C4) A site easement upland of the ordinary high watermark on the west shore of Stephan Lake adjacent to U.S. Survey 5213 in Sec. 16, T. 30 N., R. 3 E., Seward Meridian. The site is one acre in size with an additional twenty-five (25) foot wide easement on the bed of the lake along the entire waterfront of the site. The uses allowed are those listed above for a one (1) acre site.

Discussion:
This site will serve as the trailhead for trail EIN 26 D9, L. The site will facilitate public use of public waters and change in mode of transportation.

f. (EIN 27a D9) A site easement upland of the ordinary high watermark on the southeastern shore of Stephan Lake, adjacent to U.S. Survey No. 5202 in Sec. 16, T. 30 N., R. 3 E., Seward Meridian. The site is one (1) acre in size with an additional twenty-five (25) foot wide easement on the bed of the lake along the entire waterfront of the site. The uses allowed are those listed above for a one (1) acre site.

Discussion:
The site is used extensively as a boat and floatplane landing area. It is noted that there is patented land in the area. The site is not in conflict with the patented land. This site along

with trail EIN 28 D9 was relocated approximately one (1) mile northeast of the proposed location as recommended by the State of Alaska. The present location will serve as the trailhead for the relocated trail EIN 28 D9 which provides access to public land southeast of Stephen Lake.

g. (EIN 28 D9) An easement twenty-five (25) feet in width for an existing access trail from site EIN 27a D9 in Sec. 16, T. 30 N., R. 3 E., Seward Meridian, southeasterly to public land. The uses allowed are those listed above for a twenty-five (25) foot wide trail easement.

Discussion:
This trail, in conjunction with site EIN 27a D9, provides access from Stephan Lake southeasterly to public land isolated by the selection pattern and topography. This trail easement was originally in a proposed location but has been moved approximately one (1) mile northeast to the present alignment on an existing trail as recommended by the State of Alaska.

h. (EIN 38 D1, D9) An easement twenty-five (25) feet in width for an existing and proposed access trail from the SW¼, Sec. 31, T. 29 N., R. 3 E., Seward Meridian, northwesterly, thence southwesterly generally paralleling the right bank of the Talkeetna River to public land in Sec. 2, T. 28 N., R. 1 E., Seward Meridian. The uses allowed are those listed above for a twenty-five (25) foot wide trail easement.

Discussion:
This trail provides access to and between public lands isolated by the selection pattern and the surrounding rugged topography. This easement has been realigned to facilitate unrestricted access to public lands.

i. (EIN 40 D1) An easement twenty-five (25) feet in width for a proposed access trail from trail EIN 38 D1, D9 in Sec. 16, T. 29 N., R. 2 E., Seward Meridian, northwesterly, generally paralleling the right bank of Cache Creek, to public land. The uses allowed are those listed above for a twenty-five (25) foot wide trail easement.

Discussion:
This trail easement is necessary to provide access to public lands northwest of the Talkeetna River. These lands have been isolated by topographical features and the selection pattern.

j. (EIN 46 C5, D1) An easement twenty-five (25) feet in width for an existing access trail from site EIN 14 C5, D9, in the NE¼, Sec. 23, T. 31 N., R. 3 E., Seward Meridian, southerly to the northern end of Stephan Lake. The uses allowed are those listed above for a twenty-five (25) foot trail easement.

Discussion:
This trail, together with site EIN 14 C5, D9 provides the primary access from the Susitna River for parties floating the river down-stream from public lands. Because of Devil's Canyon, river floaters are forced to haul their equipment overland to Stephan Lake for pick-up by floatplanes.

k. (EIN 46a C4) A site easement upland of the ordinary high watermark in Sec. 2, T. 30 N., R. 3 E., Seward Meridian, at the northern end of Stephan Lake. The site is one (1) acre in size with an additional twenty-five (25) foot wide easement on the bed of the lake along the entire water front of the site. The uses allowed are those listed above for a one (1) acre site.

Discussion:
This site will serve as the trailhead for trail EIN 46 C5, D1. This site will facilitate public use of public water and change in mode of transportation. It is part of a trail system providing access from the Susitna River to Stephan Lake.

l. (EIN 48 L) An easement fifty (50) feet in width for an existing access trail from Gold Creek on the Alaska Railroad in the SW¼, Sec. 20, T. 31 N., R. 2 W., Seward Meridian, easterly, generally paralleling the south side of the Susitna River at a distance of approximately 1½ to 2 miles, to a point south of Devil's Canyon and then extending southeasterly to public land. The uses allowed are those listed above for a fifty (50) foot wide trail easement.

Discussion:
This is an old cat trail which was used by the Bureau of Reclamation to get from the Railroad wayside at Gold Creek to the Susitna River at Devil's Canyon. It is presently used as an access route and supply route from the Alaska Railroad at Gold Creek to several mining claims in the Chunilna Creek area. The trail is needed for access to public lands which have been isolated due to the rugged topography of the area and the selection pattern.

m. (EIN 71 C5, D9) A one (1) acre site easement upland of the ordinary high watermark on the right bank of the Susitna River in the SE¼, Sec. 20, T. 31 N., R. 4 E., Seward Meridian. The uses allowed are those listed above for a one (1) acre site.

Discussion:
This site, in conjunction with trail EIN 72 C5, D9, provides access to public lands on the north side of the Susitna River which would otherwise be isolated by distance, topography and the selection pattern. The nearest point upstream from this easement at which a landing may be made on the north side of the river is approximately twenty (20) miles.

n. (EIN 72 C5, D9) An easement twenty-five (25) feet in width for a proposed access trail from site EIN 71 C5, D9 on the right

bank of the Susitna River in the SE¼, Sec. 20, T. 31 N., R. 4 E., Seward Meridian, northerly to public lands. The uses allowed are those listed above for a twenty-five (25) foot wide trail easement.

Discussion:
Topography and the selection pattern along the Susitna River create the circumstance where access to public lands north of the river is restricted for a span of approximately sixty (60) miles. This trail, in conjunction with site EIN 71 C5, D9, constitutes one of the few places on this part of the river where a landing can be made and access gained to the public lands north of the river.

The following easements were considered but were not recommended.

a. (EIN 16e D9) A site easement for a bush airstrip located in Secs. 13 and 14, T. 32 N., R. 1 W., Seward Meridian, adjacent to trail EIN 18 D1, D9, L.

Discussion:
The relocation of trail EIN 18 D1, D9, L to its true alignment leaves this airstrip isolated within selected lands. Since it no longer provides access to public lands it cannot be recommended.

b. (EIN 22f C5, D1) An easement twenty-five (25) feet in width for a proposed access trail from site EIN 22d D9 on the east shore of Fog Lake #4 in Sec. 18, T. 31 N., R. 6 E., Seward Meridian, northerly to public land.

Discussion:
This trail is not needed as alternate access from the north is provided by trail EIN 22e D9.

c. (EIN 25a D9) A site easement upland of the ordinary high watermark on the east shore of Stephan Lake in the SW¼, Sec. 2, T. 30 N., R. 3 E., Seward Meridian. The site is one (1) acre in size with an additional twenty-five (25) foot wide easement on the ed of the lake along the entire waterfront of the site.

Discussion:
This site easement was the trailhead for trail EIN 45 L. This trail has been deleted, therefore site EIN 25a D9 is not necessary and has been deleted.

d. (EIN 34c D9, L) A site easement two hundred fifty (250) feet in width and three thousand (3,000) feet in length for a bush airstrip located in the NW¼, Sec. 23, T. 29 N., R. 2 E., Seward Meridian.

Discussion:
This easement was deleted because the airstrip does not meet minimum requirements set forth by FAA.

e. (EIN 39 D1) An easement twenty-five (25) feet in width for a proposed access trail from site EIN 34c D9, L in the NW¼, Sec. 23, T. 29 N., R. 2 E., Seward Meridian, westerly and southwesterly, generally paralleling the right bank of the Talkeetna River to public land.

Discussion:
This Easement Identification Number was deleted and the easement combined with trail EIN 38 D1, D9 to simplify the easement identification and numbering process.

f. (EIN 45 L) An easement twenty-five (25) feet in width for an existing access trail from site EIN 25a D9 on the east shore of Stephan Lake in the SW¼, Sec. 2, T. 30 N., R. 3 E., Seward Meridian, easterly to public land.

Discussion:
This trail easement has been deleted as it duplicates access provided by trail EIN 28 D9. Both EIN 28 D9 and EIN 45 L provide access to the same block of public land. EIN 28 D9 was retained instead of EIN 45 L as it impacts less Native land and is located on an existing trail that is presently being used according to the State of Alaska.

/S/ MARTIN L. KARSTETTER

cc:

Retained Lands Unit - Easements
Division of Land and Water Management
Alaska Department of Natural Resources
Pouch 7-005
Anchorage, Alaska 99510

AM-FM (270)

Navigability (962)

963:RLloyd:sqt:09/26/83-F
SQT#28*a

Comment - B, Section 7, No. 2:

Request the report on recreation affected by the transmission line corridors that is mentioned in the APA response to Exhibit E, Section 7, Request No. 6, and the "recreation implementation report" referred to in the response to Request No. 14.

Response:

No recreation report exists for the transmission corridors referred to above. The study referenced in response to Exhibit E, Section 7, No. 6 is of transmission line alternatives, including the License Application Route for the north and south stub areas. This study is incomplete and will not be completed

Recreation facilities or sites potentially affected by the License Application route in the north and south stubs are very few. These sites can be referenced on the visual resource maps submitted in response to the Supplemental Comment C, Section 8, No. 2 regarding aesthetic resources.

0011 8

Comment - C, Section 8, No. 1:

Request a list and description of the "exceptional natural features" located along the entire tramsission line corridor in a similar manner as presented in Exhibit E, Chapter 8, pages E-8-30 and E-8-31.

Response:

There are no areas within the proposed transmission line route that are currently identified as exceptional natural features. Scenic viewsheds within proximity of the proposed route include the Hurricane Gulch area and the Chinilna Creek drainage. Though the Hurricane Gulch area can be viewed from Parks Highway, the visibility of the transmission line structure from the highway is unlikely due to the potential screening effect of the natural landscape vegetation and terrain.

A number of lakes are also within proximity of the transmission line, but these are not considered to offer unique or exceptional scenic viewing experiences.

Comment - C, Section 8, No. 2:

If not currently being prepared in the final visual resource analysis report, request maps indicating viewpoints, viewsheds, distances, and potential number of viewers for the transmission line corridor stubs (Anchorage-Willow and Fairbanks-Healy). These maps should be similar in style to those prepared by APA in response to Exhibit E, Section 8, Request Nos. 2 and 7.

Response:

Attached are three visual resource maps, two for the northern corridor route and one for the southern corridor route. The route chosen for the Susitna License Applicaton is highlited in yellow. Accompanying the maps is commentary for each of the segments comprising the License Application route. The commentary notes viewpoints, viewsheds, potential viewers, and viewing distances. The segment numbers indicated in the commentary text are marked on the maps.

SOUTHERN TRANSMISSION LINE ROUTE - ANCHORAGE TO WILLOW

Segment 1. Susitna River Lowlands Physiographic Subunit

Potential Viewpoint:
a) Parks Highway crossings north of Willow
b) Willow Creek Recreation Area
c) Iditarod Trail Crossing (primary), in addition to 6 other trail crossings identified on maps

d) Little Susitna State
Recreation River Crossing

The primary viewpoints, locations from which the landscopes will be viewed most frequently, are the Parks Highway crossings north of Willow and the Willow Creek Recreation Area.

Observer Position: a) transportation
b) recreation sites

Viewsheds: the primary viewsheds will be at the Parks Highway crossing north of Willow, and recreational area users

Potential Viewers: a) vehicle travelers, approximately 2000/day
b) recreationists engaged in outdoor activities at all areas, especially Little Susitna River, Iditarod Trail, and Willow Creek Recreation Area

Distance: usually with 1/4 to 1/2 mile

Segment 5. Susitna River Lowlands near Pt. McKenzie

Viewpoints: Minimal
Viewsheds: Topography is flat, visual quality is low
Potential Viewers: generally low levels of viewers
Distance: viewers will have to be within 1/2 mile.

Segment 8. Parallels Existing Chugach Electric Transmission

Viewpoints: Minimal due to long viewing distance and dense vegetation cover

Viewsheds: topography is flat and vegetation is dominated by closed mixed forest, open dwarf tree scrub, and sphagnum bog. Visual quality is minimal

Potential Viewers: minimal, due to great viewing distances and dense vegetation

Distance: viewers will have to be within 1/2 mile

Segment 18. Knik Bottomland with Anchorage Physiographic Subunit.

Potential Viewpoints: a) an approximate 2.8 mile Segment adjacent railroad right-of-way and one railroad crossing
b) railroad crossing at the east end of Segment 18

Observer Position: railroad transportation route

Viewshed: characterized by flat land dominated by forested and urban use. Visual quality is low.

Potential Viewers: viewing potential more frequent yet remains at low levels; a result of nearby urban areas and the adjacent railroad right-of-way

Viewing Distance: potential for viewing will occur within 1/4 mile of the transmission corridor.

Segment 19. Transmission Line in Anchorage City Limits

Viewpoints: Viewed from vehicle traffic, residential and recreational areas along Tudor and Muldoon streets, and along Glenn Highway; views on the south and east edges of Anchorage; views along border of Ft.

Richardson and Elmendorf A.F.B.; and views along approximately 5 miles of Glenn Highway east of Anchorage.

Viewsheds: dominated by mixed forest, dwarf tree stubs, and urban use

Potential Viewers: Anchorage residents and vehicle travelers along Glenn Highway and access road to Arctic Bowl Recreation Area

Distance: Foreground, usually within 1000 feet.

NORTHERN TRANSMISSION LINE ROUTE - HEALY TO FAIRBANKS

Segment 2. Nenana Uplands Physiographic Subunit

Potential Viewpoints:
a) 9.7 miles of parallel with Parks Highway
b) 7.9 miles of parallel with Alaska Railroad
c) railroad crossing, northeast of junction of Rock Creek and the Nenana River
d) 2 scenic turnouts
e) 2 recreation sites within 1 to 3 miles of this segment
f) 1 low-volume (900/day) road crossing

Observer Position:
a) vehicle transportation routes
b) railroad transportation routes
c) recreation sites

Viewsheds: generally open along entire segment since vegetation is low and the viewer positions are raised. Dominant views are to the east from Parks Highway.

Potential Viewers: travelers along Parks Highway, and passengers along Alaska Railroad - approximately 1125/day

Viewing Distance: 0.5 - 1.0 miles off in distance, middleground distances

Segment 5. Nenana River Crossing Nenana Uplands Physiographic Subunit

Potential Viewpoints:
a) Railroad crossing and Alaska Railroad parallel for entire length
b) 2.6 miles parallel with Parks Highwyay
c) 2 scenic turnouts

Observer Position:
a) railroad transportation route
b) vehicle transportation route

Viewshed: visibility is generally open throughout this segment due to low vegetation; visual quality of this segment is moderate

Potential Viewers: Highway travelers and Alaska Railroad passengers - approximately 1125/day

Viewing Distance: generally less than 0.5 miles, foreground distances

Segment 8 - Nenana Uplands Physiographic Subunit

Potential Viewpoint: 4 scenic turnouts along Parks Hwy. occur within 1 to 3 miles; visibility is also afforded from 7.7 miles parallel with Alaska Railroad

Observer Position:
a) vehicle transportation route
b) railroad transportation route

Viewshed: major views are to east and intermittent at distances of 1 to 3 miles

Potential Viewers: vehicles along Parks Highway and Alaska Railroad passengers.

Viewing Distance: 1 - 3 miles, middleground and background distances

Segment 9 Nenana River Lowlands

Potential Viewpoints: toward the north or south from highway, with limited viewing from the roadways to the west

Observer Position: vechile transportation routes

Viewsheds: visual quality ranges from moderate at south end to low at north end. Major views along highway are to north and south because of dense screen of vegetation on either side of highway

Potential Viewers: Very limited due to screening by dense vegetation and long (1-3 miles) distances from roadways.

Viewing Distance: 1 - 3 miles from Parks Highway, middleground and background distances

Segment 12 Nenana River Lowlands, South of Tanana Ridge

Potential Viewpoints: segment passes through dog musher's area and may encounter some visual interaction from Parks Highway

Observer Position: recreation site

Viewsheds: vehicle transporation routes dominated by flat topography, scrub vegetation, and dwarf conifers; limited viewsheds of low visual quality

Potential Viewers: limited views by outdoor recreationists; long distance views by vehicles along Parks Highway

Viewing Distance: major visual contact is from 1.5 - 4 miles, middleground and background distances

Segment 15 - Nenana River Lowlands Physiographic Subunit

Potential Viewpoints: extremely limited; only the river crossing (Tanana) and one recreation site exist within 1 mile

Observer Position: recreation site

Viewsheds: limited viewpoints exist and area is of low visual quality

Potential Viewers: recreational users of river and 1 nearby recreation site

Viewing Distance: most visibility from greater than 1 mile, middleground distances

Segment 17. Tanana Ridge Physiographic Subunit

Potential Viewpoints: the northern tip of this segment will be visible from viewpoints along the Parks Hwy. Limited potential viewer contact occurs within Segment 17. One

recreation site exists within 3 miles of the north end.

Observer Position: vehicle transportation route

Viewsheds: characterized by flat topography, closed deciduous and conifer forests, and dwarf conifer woodlands.

Potential Viewers: travelers along Parks Hwy, approximately 1125/day

Viewing Distance: usually greater than 3 miles, background distances

Segment 20. Nenana Ridge Physiographic Subunit

Potential Viewpoints: along Parks Highway looking south for entire segment distance; two scenic overlooks provide views to the south-southeast of highway; one highway crossing by corridor

Viewsheds: characterized by closed coniferous and deciduous forest, an dwarf conifer vegetation

Potential Viewers: vehicle traffic along 12 - 13 miles of highway is approximately 1000/day

Viewing Distance: within 1 - 2 miles on south side of highway, middleground distances

Segment 22 - Tanana Ridge Physiographic Subunit, Northwest of Tanana Ridge

Potential Viewpoints: along Parks Hwy; 3 scenic overlooks provide views to the northwest of

Tanana Ridge along approximately 6 miles of Parks Highway

Observer Position: vehicle transportation route; visual quality of segment is moderate

Viewsheds: Sloped topography; closed mixed forest and dwarf conifer woodlands

Potential Viewers: vehicle traffic: approximately 1000/day

Viewing Distance: Transmission corridor is within .5 - 1.0 mile northwest of highway, middleground distances

Segment 25 - Tanana Ridge Physiographic Subunit, Northeast of Tanana Ridge East to Fairbanks City Limits

Potential Viewpoints: along Parks Highway for entire segment; three scenic viewpoints and two highway crossovers exist along approximately ten miles of Parks Highway which basically parallels the transmission corridor into Fairbanks; east end is within urban areas of Fairbanks.

Obsever Position: vehicle transportation route

Viewsheds: characterized by flat valley bottoms and steepside slopes; closed dwarf conifer, closed mixed and deciduous forest,and closed tall shrub scrub

Potential Viewers: mostly vehicle traffic at an approximate rate of 1000/day, along 10 miles of parallel highway; also

urban areas on east end of segment.

Viewing Distance: corridor crosses the highway at two points and is generally within 0 - 1.5 miles of Parks Hwy.

Segment 28 - Nenana River Lowlands Physiographic Subunit, Transmission corridor within Fairbanks City Limits

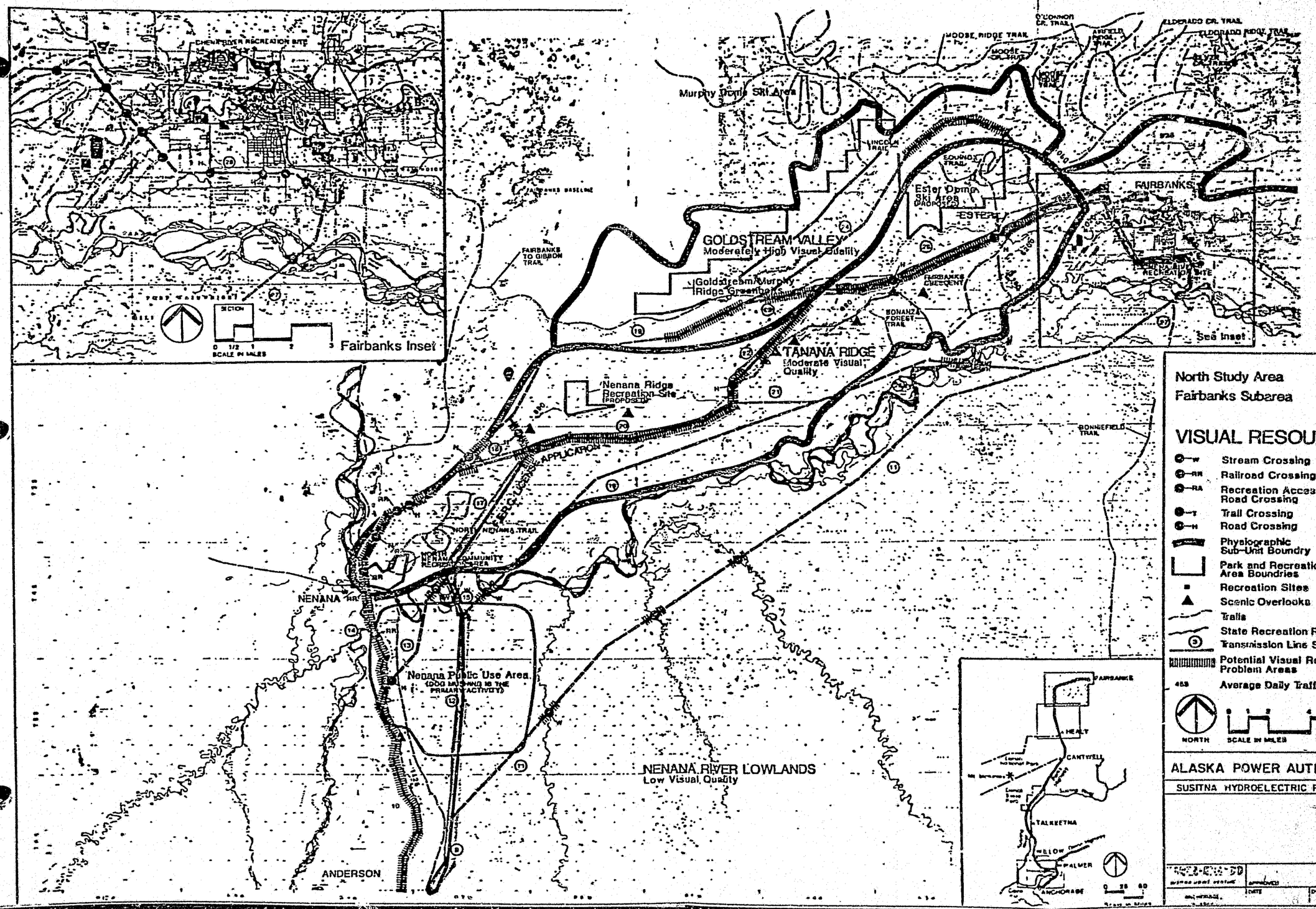
Potential Viewpoints: high levels of potential viewer contact occur within segment 28. The segment is bounded by a wide range of urban land uses. Numerous road crossings occur along the segment.

Observer Positions: residential areas, vehicle transportation route

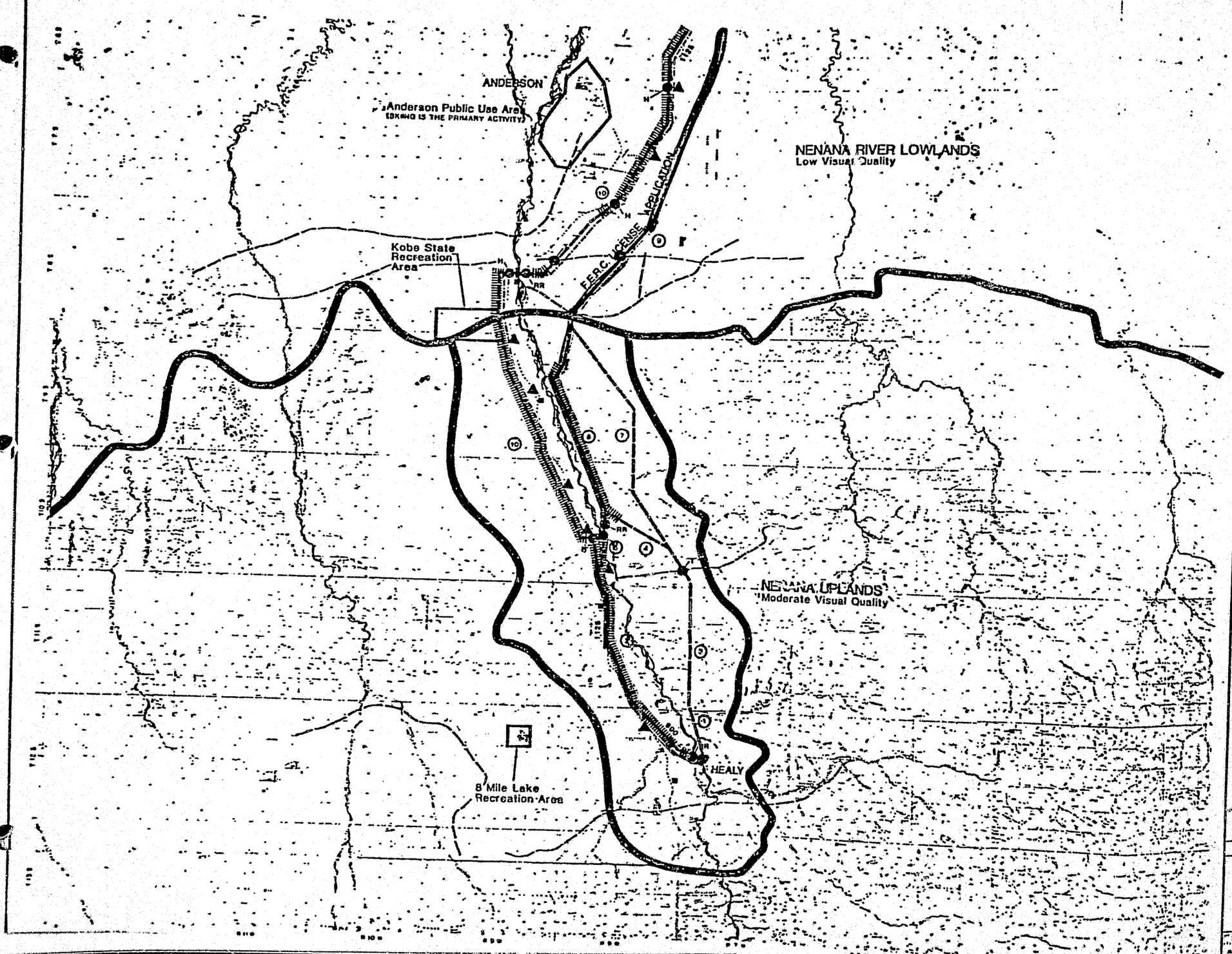
Viewsheds: predominantly urban usage and many road crossings occur within the segment.

Potential Viewers: a large number of urban users of the area will potentially be impacted

Viewing Distance: 0 - 2 miles, foreground and middleground distances


CHENA RIVER RECREATION SITE
Fairbanks Inset
Murphy Dome Ski Area
MOOSE RIDGE TRAIL
O'CONNOR CR. TRAIL
ELDERADO CR. TRAIL
ELDORADO RIDGE TRAIL
LINCOLN TRAIL
EDGINGTON TRAIL
Ester Dome Ski Area (PROPOSED)
ESTER
FAIRBANKS
See Inset
GOLDSTREAM VALLEY
Moderately High Visual Quality
Goldstream/Murphy Ridge Greenbelts
FAIRBANKS TO GIBBON TRAIL
FAIRBANKS CRESCENT
BONANZA FOREST TRAIL
TANANA RIDGE
Moderate Visual Quality
Nenana Ridge Recreation Site (PROPOSED)
HIGHWAY-RAILROAD CORRIDOR
ROAD LICENSE APPLICATION
BONNIEFIELD TRAIL
NORTH NENANA TRAIL
NORTH NENANA COMMUNITY RECREATION AREA
NENANA
Nenana Public Use Area (DOG MUSHING IS THE PRIMARY ACTIVITY)
NENANA RIVER LOWLANDS
Low Visual Quality
ANDERSON
FAIRBANKS
HEALY
CANTWELL
TALKEETNA
WILLOW
PALMER
ANCHORAGE
North Study Area
Fairbanks Subarea
VISUAL RESOURCES
Stream Crossing
Railroad Crossing
Recreation Access Road Crossing
Trail Crossing
Road Crossing
Physiographic Sub-Unit Boundry
Park and Recreation Area Boundries
Recreation Sites
Scenic Overlooks
Trails
State Recreation River
Transmission Line Segments
Potential Visual Resource Problem Areas
453 Average Daily Traffic....
NORTH
SCALE IN MILES
ALASKA POWER AUTHORITY
SUSITNA HYDROELECTRIC PROJECT

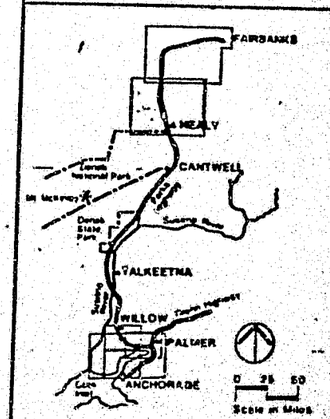
North Study Area
Healy Subarea
VISUAL RESOURCES



- Road Crossing (H)
- Stream Crossing (W)
- Railroad Crossing (RR)
- Recreation Access Road Crossing (RA)
- Trail Crossing (T)
- 645 Average Daily Traffic
- Physiographic Sub-Unit Boundry
- Park and Recreation Area Boundries
- Recreation Sites
- Scenic Overlooks
- Trails
- State Recreation River
- (3) Transmission Line Segments
- Potential Visual Resource Problem Areas

NORTH

SCALE IN MILES 0 1 2 4 6



ALASKA POWER AUTHORITY

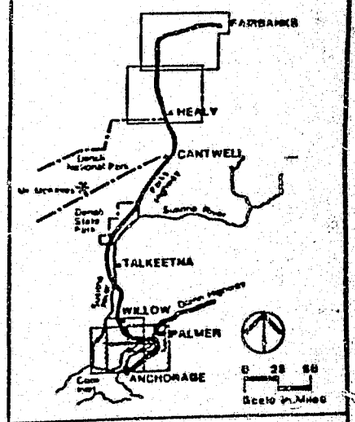
SUSITNA HYDROELECTRIC PROJECT

South Study Area

VISUAL RESOURCES

- Road Crossing
- W Stream Crossing
- RR Railroad Crossing
- RA Recreation Access Road Crossing
- T Trail Crossing
- 524 Average Daily Traffic
- Physiographic Sub-Unit Boundry
- Park and Recreation Area Boundries
- Recreation Sites
- Scenic Overlooks
- Trails
- State Recreation River
- (3) Transmission Line Segments
- Potential Visual Resource Problem Areas

NORTH SCALE IN MILES 0 1 2 4 6



ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

Comment - C, Section 8, No. 3:

If available, request all of the "significant view" maps for the transmission line corridor using the same map scale as found on the "significant view" maps provided in APA's response to Exhibit E, Section 8, Request No. 2.

Response:

"Significant view" problem areas are identified on the visual resource maps supplied in answer to Comment - C, Section 8, No. 2.

Comment - D, Section 10, No. 1:

Request copies of maps showing locations of the following potential hydroelectric sites evaluated by APA: Browne, Keetna, Snow, Johnson, Vee Canyon, MacLaren, Susitna II (Olsen), Susitna III, Butte Creek, Gold Creek, and Tyone. For each potential development, request data or estimates on (a) type and height of dam, (b) reservoir surface area, and (c) total area inundated and disturbed.

Response:

A total of 11 sites have been considered as potential hydroelectric projects in the Susitna Basin and vicinity areas. (Some of these sites would be eliminated by development of other sites). A review of past studies indicates some of the data you requested are not available, since preliminary schemes, including specific dam locations, types, and heights were not developed for all the sites.

Copies of U.S.G.S. maps of the requested potential sites are enclosed. Alignments have been sketched on the individual damsite plans. These locations, although approximate, are felt to be within the site area projected for the potential hydroelectric projects. A table entitled "Summary Data on Proposed Hydroelectric Projects" is also provided which contains available data on dam height and type, reservoir surface area, and inundated and disturbed area for these sites. Additional related information concerning reservoir elevations and storage, where available, is also included.

SUMMARY DATA ON PROPOSED HYDROELECTRIC PROJECTS

Project	Stream	U.S.G.S. Map Sheet	Dam Type	Drainage Area Sq. Mi	Dam Height ft.	Full Level Elev. ft.	Crest Level Elev. ft.	Ave. Tailwater Level ft.
Browne	Nenana River	Fairbanks A-5	Rockfill	2,450	305	1,000	1,010	750
Keetna	Talkeetna R.	Talkeetna Mt. B-6	Concrete	1,260	405	950	955	605
Snow	Snow River	Seward B-7	Concrete Arch	84.7	310	1,200	1,210	500
Johnson	Tanana River	Mt. Hayes C-2	Concrete with Earth Dike	10,450	210	1,470	1,490	1,290
Vee Canyon	Susitna River	Talkeetna Mt. C-2	Fill	4,140	610	2,330	2,350	1,925
McLaren	McLaren River	Gulkana D-6	Fill	485	185	2,395	2,405	2,300
Olsen (Susitna II)	Susitna River	Talkeetna Mt. D-5	Concrete	—	160	1,020	1,030	810
Susitna III	Susitna River	Talkeetna Mt. D-3	Fill	—	670	2,340	2,360	1,810
Butte Creek	Susitna River	Healy A-2	Fill	—	150	—	—	—
Gold Creek	Susitna River	Talkeetna Mt. C-6	Fill	6,160	190	870	880	680
Tyone	Tyone River	Gulkana C-6	Fill	—	60	—	—	—

Sources: Acres 1982, Ebasco 1982, U.S. Department of Energy 1980, Federal Power Commission, 1976.

Dashed lines represent data not available

SUMMARY DATA ON PROPOSED HYDROELECTRIC PROJECTS (continued)

	Max. Reg. W.S. Elev. ft.	Active Storage 1000 ac-ft.	Range Static Head ft.	Ave. Head ft.	Ave. Annual Runoff 1000 ac-ft.	Res. Surface acres	Inundated Area, acres	Installed Cap MW	Comments
Browne	1,000	760	195 max.	170	3,258	10,640	10,640	100	
Keetna	950	675	345-173	286	1,740	—	—	74	
Snow	1,260	354	750-550	653	535	—	—	63	
Johnson	1,470	5,300	180-100	149	7,830	—	—	210	
Vee Canyon	2,350	1,000	—	430	4,730	—	—	386	
McLaren	2,395	210	—	263	1,410	—	—	55	
Olsen (Susitna II)	1,020	66	—	—	—	—	—	200	
Susitna III	2,340	-	—	—	—	—	—	350	
Butte Creek	-	-	—	—	—	—	—	40	
Gold Creek	870	-		189	7,327	—	—	260	
Tyone	2,385	700	—	—	—	—	—	6	

Sources: Acres 1982, Ebasco 1982, U.S. Department of Energy 1980, Federal Power Commission, 1976.

Dashed lines represent data not available

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REFERENCES

U.S. Department of Energy, Alaska Power Administration, February 1980. "Hydroelectric Alternatives for the Alaska Railbelt," U.S.D.O.E., Alaska Power Administration, Juneau, Alaska.

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Ebasco Services Incorporated, January 1982. "Railbelt Electric Power Alternatives Study - Browne Hydroelectric Power Alternative," Ebasco Services Incorporated, Bellevue, Washington.