

ALASKA LEGISLATURE COMMITTEE FILES 1991-1992 8072
7046 HOUSE LABOR & COMMERCE

IV. SUMMARY AND CONCLUSIONS

The Northeast Intertie suggested routing basically follows the Glenn Highway East from O'Neill Substation near Sutton to Glennallen and then turns north and follows the Richardson Highway to Jarvis Creek Substation at Delta Junction. This portion of the Northeast Intertie is 273 miles constructed 230kV with double bundled ACSR conductor on steel towers. The 230kV line section between Glennallen and Gakona Junction Substation (approximately 12 miles) is double circuit. The second circuit is a 138kV line from Gakona Substation to Copper Valley's existing Pump Station 11 substation, tying into Copper Valley's 138kV transmission system. The Northeast Intertie connection to Fairbanks is completed with a 138kV tie between Carney Substation and North Pole Substation. This section of line is 22 miles and constructed with 795 ACSR conductor on wood poles.

The main considerations for the choice of the Suggested Route between O'Neill Substation and Jarvis Creek Substation were availability of right-of-way, aesthetics, environmental concerns and impacts, permitting, and cost of construction. For the Suggested Route, the right-of-way is considered to be feasible to obtain. There are no identified environmental concerns which would prevent construction, or identified impacts which cannot be mitigated. Permitting is considered to be feasible within a reasonable schedule, and cost of construction is competitive with alternate routes considered.

Two new substations are required, and upgrades of four existing substations are required. In the MEA system, a new switching station is required at O'Neill Tap to provide protection and sectionalizing of the 115kV transmission system which connects the O'Neill Substation end of the Northeast Intertie to Teeland Substation. At O'Neill Substation, a stepup transformer from 115kV to 138kV and associated line protection equipment is required. North of Glennallen, a new substation is planned at Gakona Junction. This substation will provide a connection to Copper Valley's 138kV transmission system at Pump Station 11 and provide distribution to Copper Valley's loads in the Gakona area, including the Backscatter Project. At Jarvis Creek, Carney and North Pole substations, additional line protection equipment is required.

Electrical system studies of the proposed Northeast Intertie show that the intertie system, when operating at 138kV, can deliver 150 MW from O'Neill Tap to the Northeast Intertie. An SVS of +100 - 30 Mvar is required at Gakona Substation to provide voltage stability on the intertie. Fixed reactors are required at Gakona and Jarvis Creek substations for voltage control and line reactive compensation. Line outage studies show that a single line outage condition on the intertie or feeds to the intertie greatly decreases the intertie transfer capability. To prevent major system disturbances due to line outages, capacity upgrades are required on the existing Anchorage-Fairbanks intertie and the transmission system from Teeland Substation to Point McKenzie Substation. Transient stability studies show that the Northeast Intertie improves stability of the Railbelt interconnected transmission system for faults on the Anchorage-Fairbanks intertie. When transfers are maintained within the 70MW limit of the existing intertie, the transmission system remained stable for line faults conditions on the intertie. This improved stability will improve the reliability of electrical service to both Fairbanks and Anchorage.

The Northeast Intertie will also improve the stability of the Copper Valley system. Loss of the Solomon Gulch Hydro facility will have virtually no impact on the transmission system or the ability of Copper Valley to serve load. Both rate stability and service reliability of the Copper Valley system will be improved with the Northeast Intertie. The interconnection will also allow sale of approximately fourteen million KWH of energy now being spilled annually at Solomon Gulch.

The MEA system will be impacted by the Northeast Intertie connection to O'Neill substation. Both MW and Mvar flows thru the MEA system will increase losses in the system. Power swings during system disturbances on the intertie may cause outages in the MEA system. Reinforcement of the transmission system feeding Teeland substation and upgrading the existing Anchorage Fairbanks intertie to 150 MW transfer capability will decrease the impact of the Northeast Intertie on the MEA system. Further load flow and stability studies are required to define additional facility requirements.

The project schedule for the Northeast Intertie, from initiation to completion, is estimated to be sixty (60) months. This schedule period includes all aspects of the project. Actual construction schedules will be impacted by construction windows dictated by environmental concerns, which will be addressed and defined in the

initial stages of the project. Construction costs for the project, which includes permitting, right-of-way acquisition, engineering, construction and construction management is \$155,384,417.

Study Assumptions and Criteria

1. The N.E. Intertie transmission system consists of the following components:
 - a. A 100/133/167MVA, 115-138kV, $Z = 3\%$, autotransformer at O'Neill Substation.
 - b. A 105 mile, two conductor bundle, 954 ACSR transmission line constructed 230kV between O'Neill Substation and Glennallen Switch Station.
 - c. An SVS is located at Gakona Substation for reactive compensation.
 - d. A 20 mile, two conductor bundle, 954 ACSR transmission line constructed 230kV between Glennallen Switch Station and a new substation at Gakona.
 - e. A 160 mile, two conductor bundle, 954 ACSR transmission line constructed 230kV between Gakona and Jarvis Creek Substation.
 - f. A 22 mile, 795 ACSR transmission line constructed 138kV between Carney Substation and North Pole Substation.

2. The entire N.E. Intertie is operated at 138kV.

3. The 115kV transmission line between Dow and Eklutna in the MEA system is closed on both ends. This forms a transmission path between Tealand Substation and MLP2 Substation.

4. The year 2008 system has the following upgrades:
 - a. The Bradley Lake generation is on line.
 - b. The University Substation 138-115kV transformer is paralleled with an identical unit.
 - c. A 69kV transmission tie line is between Tesoro and Beaver Substations.
 - d. A ± 7 Mvar SVS is installed at Daves Creek Substation for reactive support of the 115kV transmission line.
 - e. The Quartz Creek Substation 115-69kV transformer is replaced with a 25MVA unit.

5. Generation Schedule guide is as follows:
Summer Valley Loads -
Hydro: Eklutna shutdown
 Bradley Lake shutdown

Cooper Lake shutdown
Solomon Gulch 12MW

Fairbanks: Healy and Chena 5 on line
15MW of cogen on line in 10 to 20 years
Import remainder from Anchorage

MLP: Units 5, 6 and 7 on line as required

CEA: Beluga 5, 6, 7, 8 on line
Bernice 1 unit on line

HEA: Soldotna shutdown

Winter Peak Loads -

Hydro: Eklutna maximum
Bradley Lake maximum
Cooper Lake maximum
Solomon Gulch 4MW

Fairbanks: Healy and Chena 5 near maximum
15MW of cogen on line in 10 to 20 years
Import up to limit of intertie
Run North Pole when import is inadequate

MLP: Units 5, 6, 7 on line
Units 4 and 8 added if needed to meet load

CEA: Beluga 3, 5, 6, 7, 8 on line
Bernice as necessary to meet load

HEA: Soldotna off currently, on in 10 to 20 years to meet load

6. Maximum line loading by conductor and voltage is assumed to be as follows:

Maximum conductor loading is based upon a conductor thermal rise of 50°C above 25°C ambient with a wind of 1.4 miles per hour.

Conductor ACSR	Ampacity AMPS	Line Load MVA		
		115kV	138kV	230kV
397	590	118	141	235
556	730	145	175	291
795	900	179	215	359
954	1060	211	253	422

7. Breaker clearing times are four cycles for the zone 1 near end faults and six cycles for zone 2 far end faults. This assumes transfer tripping on all lines.

Conclusions

Power transfer from Anchorage to Fairbanks is increased by the N.E. Intertie and service from the Railbelt interconnected power system is provided to the Copper Valley system. With all transmission lines in service, 150MW can be transferred from Anchorage over the interties to Fairbanks and an additional 17MW can be transferred to the Cooper Valley system. None of the existing transmission lines or facilities ratings will be exceeded at this transfer level. An SVS of ± 30 Mvars is required in the vicinity of Glennallen for voltage stability.

Transferring 150MW from O'Neill Tap over the N.E. Intertie will result in 140MW delivered to Glennallen and 122 MW delivered to the Fairbanks system at Jarvis Creek. An SVS of approximately +100 Mvar -30Mvar located in the vicinity of Glennallen is required for voltage stability. At this transfer level from O'Neill Tap to the N.E. Intertie, the 115kV line from O'Neill Tap to O'Neill Substation will be at 103% of rated capacity and the Teeland to O'Neill Tap 115kV line will be at 104% of rated capacity. The rated capacity is based upon 50° C conductor thermal rise above 25°C (77° F) ambient air temperature (summer conditions). It is assumed that a 150MW transfer from O'Neill Tap will be a winter operating condition. For winter

air temperature conditions, transferring 150 MW from O'Neill Tap to the N.E. Intertie will not exceed the Teeland to O'Neill Tap and the O'Neill Tap to O'Neill Substation 115kV line winter ratings. These lines will be near rated winter capacity which will result in high losses.

Although the N.E. Intertie, with a +100Mvar-30Mvar SVS at Glennallen, has a transfer capability of 150MW from O'Neill Tap, the remaining Railbelt system does not have the capability to supply power at this level if any of the major interties to the N.E. Intertie are open. The maximum interchange capability of the existing intertie is approximately 70MW. This limitation limits the single contingency line outage transfer from the standpoint of reliability. If more than 70MW is being transferred and the N.E. Intertie trips out, rapid load shedding in the Fairbanks area would be required. For maximum system reliability, the existing intertie interchange capability should be increased to 150MW transferred from Douglas. This would allow a single contingency outage of either intertie at a transfer level of 150MW without interrupting service to Fairbanks and the Copper Valley system.

A single contingency line outage in the 115kV MEA transmission system will limit the N.E. Intertie transmission capability to approximately 70MW. If the existing Anchorage-Fairbanks intertie capacity is upgraded to 150MW transfer capability, an outage in the MEA 115kV transmission system should not cause an outage in Fairbanks. The power transfer to Fairbanks could be scheduled from the N.E. Intertie to the existing intertie without interrupting power to Fairbanks.

The most limiting line outage condition for the Anchorage-Fairbanks intertie is the Teeland-Pt MacKenzie 230kV line. An outage of this line will limit the transfer north from Anchorage to approximately 20MW. This would result in islanding the Fairbanks and Copper Valley systems during heavy transfer conditions. Both systems would experience power outages until generation could be restored. Another transmission tie line between Pt MacKenzie and the Anchorage interties will be required to alleviate this condition.

Additional generation will be required in the Anchorage area prior to the year 2008 to meet a requirement of 150MW transfer to Fairbanks or, a larger capacity tie line to the Kenai. The Kenai will have available generation with Bradley Lake on line. The spinning reserve requirement of the interconnected system must also be met

which may require additional generation in the Anchorage area, a larger tie line to the Kenai, or a comprehensive system wide load shedding scheme. A combination of all three options is possible.

The N.E. Intertie will improve the reliability of service to the Fairbanks area by providing an alternate path for power transfer. Without the N.E. Intertie, a line outage between Teeland and Gold Hill substations will result in Fairbanks being islanded, causing consumer outages. With the N.E. Intertie, islanding would not occur for transfer levels within the system ratings. Outage records indicate that twenty outages have occurred between Teeland and Gold Hill substations since 1983. The N.E. Intertie will add approximately 285 miles of line exposure to the interconnected system. With the terrain and weather conditions in the area it is conceivable that several outages a year could occur. With both interties in service and operating within stable single line outage contingency transfers, faults on the N.E. Intertie will not decrease the intertie system reliability. Rapid fault clearing will be a requirement for the intertie to insure system reliability.

The Copper Valley system reliability will be improved with the N.E. Intertie. The system will be loop fed from both Anchorage-Fairbanks interties. A single contingency outage of either intertie will not cause an outage in the Copper Valley system. Also, loss of the Solomon Gulch hydro generator will not cause a major disturbance in the system. The new substation at Gakona will provide a reliable power source for a feed to the Backscatter project and will allow the Copper Valley system to provide power to other consumers in the area. The interconnection with the Railbelt System should improve and stabilize rates for Copper Valley's consumers. The interconnection will also allow sale of approximately fourteen million KWH of energy now being spilled annually at Solomon Gulch.

Stability of the interconnected Railbelt power system and of the Copper Valley system will be improved by the N.E. Intertie. The N.E. Intertie will eliminate the islanding problem between Anchorage and Fairbanks when an outage occurs on the intertie. For the Copper Valley system, the N.E. Intertie will eliminate the problem of islanding Glennallen from the Solomon Gulch hydro generator when an outage occurs on the Glennallen-Valdez line.

In summary, the advantages and disadvantages of the N.E. Intertie being in service are:

Advantages

- a. Greater transfer capability to Fairbanks.
- b. Greater capacity for the Copper Valley system.
- c. Improved transient stability of the entire Railbelt system for faults on the Anchorage-Fairbanks intertie.
- d. Improved reliability of service to Fairbanks.
- e. Lower losses in the GVEA system.
- f. Improved transient stability of the Copper Valley system for faults on the Glennallen-Valdez intertie.
- g. Improved service and rates in the Copper Valley System.
- h. Allow full utilization of Solomon Gulch Hydrogeneration output.

Disadvantages

- a. Larger power and var flows in the MEA system.
- b. Greater losses in the MEA system.
- c. The possibility of outages in the MEA system caused by power swings during system disturbances.

Recommendations

It is recommended that additional system improvements be investigated in conjunction with the N.E. Intertie in order to derive full advantage of the N.E. Intertie capability. The recommended system improvement investigations are:

1. Improve the existing Anchorage-Fairbanks intertie transfer capability to be consistent with the N.E. Intertie and the desired system transfer requirements. The design of both interties should allow for an outage of either intertie without islanding Fairbanks.
2. Review the system load shedding scheme and provide improvements as necessary for stability during system disturbances.

3. Reinforce the transmission system between Pt MacKenzie and the existing and N.E. interties to provide greater capacity for the case of a line outage contingency. Sufficient reinforcement should be provided to prevent the MEA transmission system from tripping on system power swings.
4. Investigate transfer tripping and rapid reclosing of all transmission lines involved in the transfer of power over the interties.
5. Investigate single pole tripping of critical lines involved in the intertie.
6. Coordinate all improvements into a system stability and reliability plan.

Engineering studies required for the detailed line and station design are:

1. Economic conductor size.
2. SVS optimization and placement.
3. Fixed reactive optimization and placement.
4. TNA to determine insulation coordination and switching requirements.
5. Critical clearing time of relaying.
6. Short circuit study.
7. Soils testing.

Discussion of Results

Load Flow Study

The load flow study of the Railbelt Utilities interconnected transmission system was performed on an Apollo computer using Electrocon International Power System Analysis (PSA) software. This is the same software used by the University of Alaska (U of A) who maintains the Railbelt Utility transmission system data base. The base data case for this study was provided by the U of A and labeled power flow case 87 PEAK 40 N.E II.

Present and projected loads were obtained from the utilities. These loads are summarized in Table 1 as winter peak and summer valley loads for each utility (Lawing refers to the Seward load). Current, 10 year, and 20 year projected loads are tabulated.

Generation schedules used for the load flow cases are given in Tables 2 thru 7. The term HW88 refers to Heavy Winter 1988 loads (winter peak), LS88 refers to Light Summer 1988 loads (summer valley). HW08 and LS08 refers to Heavy Winter and Light Summer 2008 loads. The generation schedules are set for specific power transfers over the Anchorage-Fairbanks interties.

Load flow cases were run using the U of A base case modified to include the N.E. Intertie transmission system and the CVEA transmission system including Solomon Gulch hydrogenerators in Valdez. The load flow cases are listed at the end of this section for 1988 loads and for 2008 loads. The cases represent various import levels from Anchorage to Fairbanks with various line outage conditions that effect power flows in the existing and N.E. Anchorage-Fairbanks interties, and the transmission lines feeding these interties. Items noted in the comments in the load flow case listings are the flows on the Anchorage-Fairbanks interties, the reactive compensation requirement at Gakona Substation, and any line overload condition or undesirable system operating condition.

Using 1988 loads and transferring up to 100MW on the interties, the only line that reached maximum loading was the Teeland-O'Neill line in Case 5. The SVS reactive requirements at Gakona varied from +25 Mvars to -53Mvars. The maximum var flow into the MEA system was 25Mvars. The transfer limit on the existing Anchorage-Fairbanks intertie is approximately 70MW. Therefore, a 70MW transfer limit was used for load flow cases involving outages of the N.E. Intertie.

Using 2008 winter loads, load flow cases were run transferring 70, 100 and 150MW on the Anchorage-Fairbanks interties. Line overloading occurred on the MEA 115kV system for certain line outage conditions. No other line overloading occurred and no transformer overloading occurred. Maximum import from the Kenai into University Substation is approximately 68MW. Generation scheduling was adjusted such that this import was not exceeded. This limitation from the Kenai required scheduling excessive generation from MLP and Beluga for the cases of 150MW transfer to Fairbanks. The SVS reactive requirement at Gakona varied from +30Mvar to -30Mvar for all cases except the 150MW transfer over the N.E. Intertie which required ± 97 Mvar of reactive compensation.

High voltage occurred at PS 11 with the transmission line open from PS 11 to Gakona. A 15Mvar reactor is required to bring the voltage within 5% of nominal. A 15Mvar reactor will also be required at Gakona if the SVS is out of service and the GVEA system is fed radial from O'Neill.

System loss summaries are tabulated in Tables 8 through 16 for the U of A base case; The U of A base case with the N.E. Intertie; 1988 cases 2 HW88, 10 HW88 and LS88; 2008 cases 1 HW08, 2 HW08, 13 HW08 and LS08. Losses are indicated by utility with the system total. Loss tabulations have not been included for line outage conditions.

The load flow study utilized the U of A data base. No attempt was made in the data base to adjust transformer tap to adjust voltage or var flow. During heavy winter loading, the capacitor bank at Soldotna was on line. During light summer loading, all system reactors were on line and the Soldotna capacitor bank was off line.

VII. SUGGESTED ROUTE

Suggested Route Description

The Suggested Route is one selected for more detailed study based on the initial route evaluation. This route is suggested because:

1. It is feasible to obtain the right-of-way.
2. It does not have any environmental concerns which would prevent construction, or impacts which cannot be mitigated.
3. Permitting is feasible within a reasonable schedule.
4. It is competitive from a cost of construction point of view.

The route from the O'Neill Substation to just east of Glennallen is identical to the Northwest Route described in Section VI, Route Selection Alternatives. At Glennallen, a change was made from the original alternatives in which the 230kV route crosses the pipeline and proceeds north to the proposed Gakona Junction Substation. From just east of the pipeline to the Gakona Junction Substation would be a double circuit line to accommodate the 138kV tie back to the Pump Station No. 11 Substation at Glennallen.

From the Gakona Junction Substation north, the line travels almost exactly northward until it reaches a point just south of the Gakona River. At this point, it departs from the original Northwest Route and crosses the Gakona River and connects to what was the original Southeast Alternative Route. From this point, which is approximately 2-1/2 miles south of Sourdough, the Suggested Route follows the Southeast Route to the Jarvis Creek Substation in Delta Junction,

Discussion of Suggested Route Selection

Several factors affect the choice of a Suggested Route for more detailed study. In the initial portion of the intertie between the O'Neill Substation and Glennallen, the main considerations are availability of right-of-way and aesthetics. In a direct comparison between the two routes, it is apparent that land ownership is less complicated and, therefore, right-of-way acquisition more likely to be accomplished in a reasonable time frame on the Northwest segment in this area.

Aesthetics were viewed primarily as the viewer would see it from the highway. However, the impact to the viewer was considered from recreational access areas and lakes. The Northwest segment afforded fewer highway crossings than the Southeast route. In fact, there are no crossings of the Glenn Highway between Sutton and Glennallen.

All other environmental factors were not significantly different, and cost for right-of-way use was estimated to be lower for the Northwest segment.

North of Glennallen, the western route was chosen because it offered a relatively simple tie-in to Gakona Junction by locating the proposed substation near the oil pipeline right-of-way and allowing the Copper Valley Electric Association to utilize existing or new right-of-way to run a line to Gakona Junction. The route in this area will have almost no visual impact, being located away from the highway.

The crossing was made at the Gakona River, south of Sourdough, because of the designation of Wild and Scenic Rivers for both the Gakona and Delta Rivers north of there. The route on the east side, which is an extension of the Southeast Route, has easier construction access and minimal aesthetic impacts compared to the Northwest Route in this area. Although three highway crossings are needed, in one case to avoid an avalanche hazard area at Rainbow Ridge, the visual impact of the line would be much less than the Northwest alternative. All other environmental, permitting, and right-of-way issues between Sourdough and Delta Junction were not significantly different enough to affect the choice.

Golden Valley Electric Association has permitted a right-of-way between the North Pole Substation and the Carney Substation. This right-of-way follows section lines and contains several parcels of land belonging to the State of Alaska. In addition, there are two crossings of the Alyeska Pipeline.

The route leaves the North Pole Substation and crosses Section 21, T2S, R2E and from the point where it meets the south section line of Section 22, T2S, R2E, it follows the section lines approximately 27 miles to the Carney Substation. The total length of line is approximately 28 miles. The line will be 138kV, constructed on wood piles in a 30-foot right-of-way adjacent to a 50-foot section line easement.

The route stays to the west of the Richardson Highway for 16 miles and then crosses to the east side of the highway. It crosses the Alyeska Pipeline at Mile 25 and 27.3. The route has thirteen 90° corners and one 45° angle.

The GVEA route map and data sheets on the route and land ownership are contained in Exhibit V.

Cost Summary:

The Northeast Intertie cost for the Suggested Route is summarized as follows:

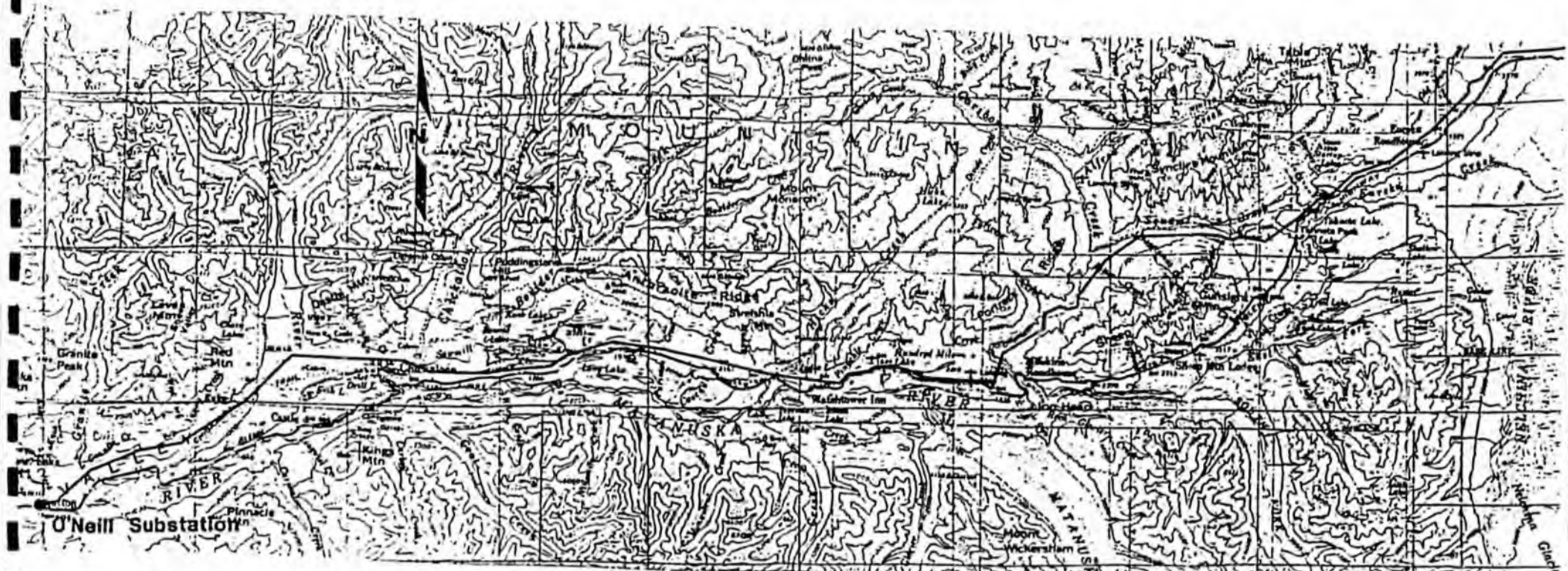
Environmental Costs	\$ 3,521,875.00
Right-of-Way Acquisition Costs	1,520,300.00
Transmission Line Costs	119,205,000.00
Station Costs	<u>31,137,242.00</u>
Total Cost	\$ 155,384,417.00

SUMMARY TRANSMISSION LINES COSTS

The cost comparison of the Southeast, Northwest, and Suggested Route are as follows:

ROUTE	COST
Southeast-O'Neill to North Pole - O'Neill to Glennallen Switch Station - Glennallen Switch Station to Gakona - Gakona to Jarvis - Carney to North Pole (Wood Pole) <p style="text-align: right;">Total</p> Annual - O&M	47,076,000 5,205,000 58,886,000 7,136,000 118,303,000 1,775,000
Northwest-O'Neill to North Pole - O'Neill to Glennallen - Glennallen to Gakona - Gakona to Jarvis - Carney to North Pole (Wood Pole) <p style="text-align: right;">Total</p> Annual - O&M	48,078,000 7,379,000 58,613,000 7,136,000 121,206,000 1,818,000
Suggested Route-O'Neill to North Pole - O'Neill to Crossover at Sourdough - Crossover at Sourdough to Jarvis - Carney to North Pole (Wood Pole) <p style="text-align: right;">Total</p> Annual - O&M	61,570,000 50,499,000 7,136,000 119,205,000 1,788,000



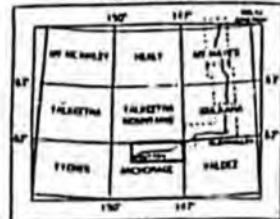


O'Neill Substation

SCALE 1:250,000

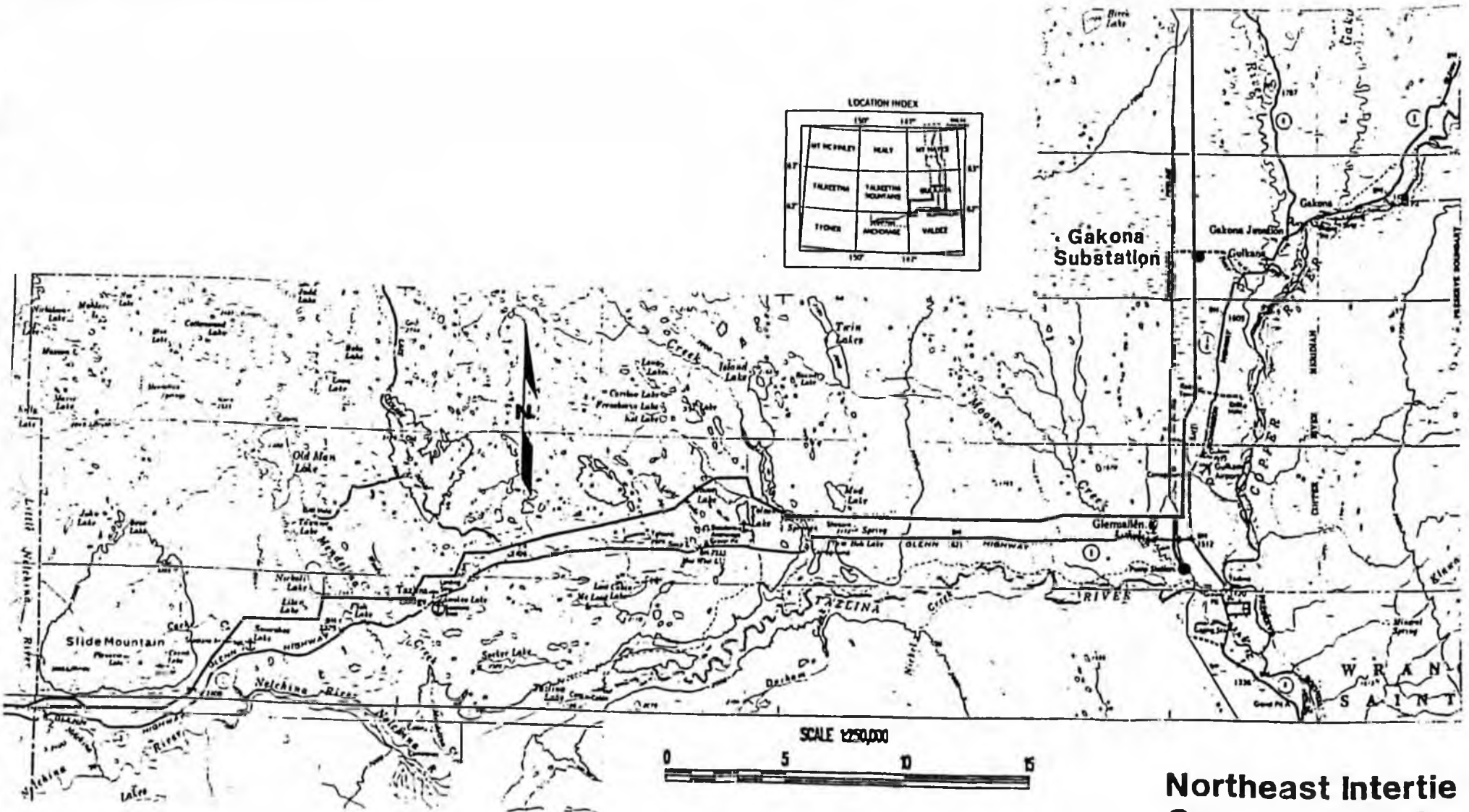


LOCATION INDEX



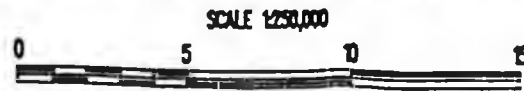
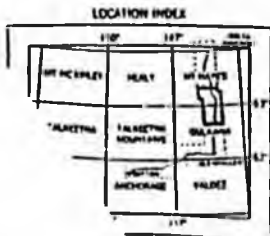
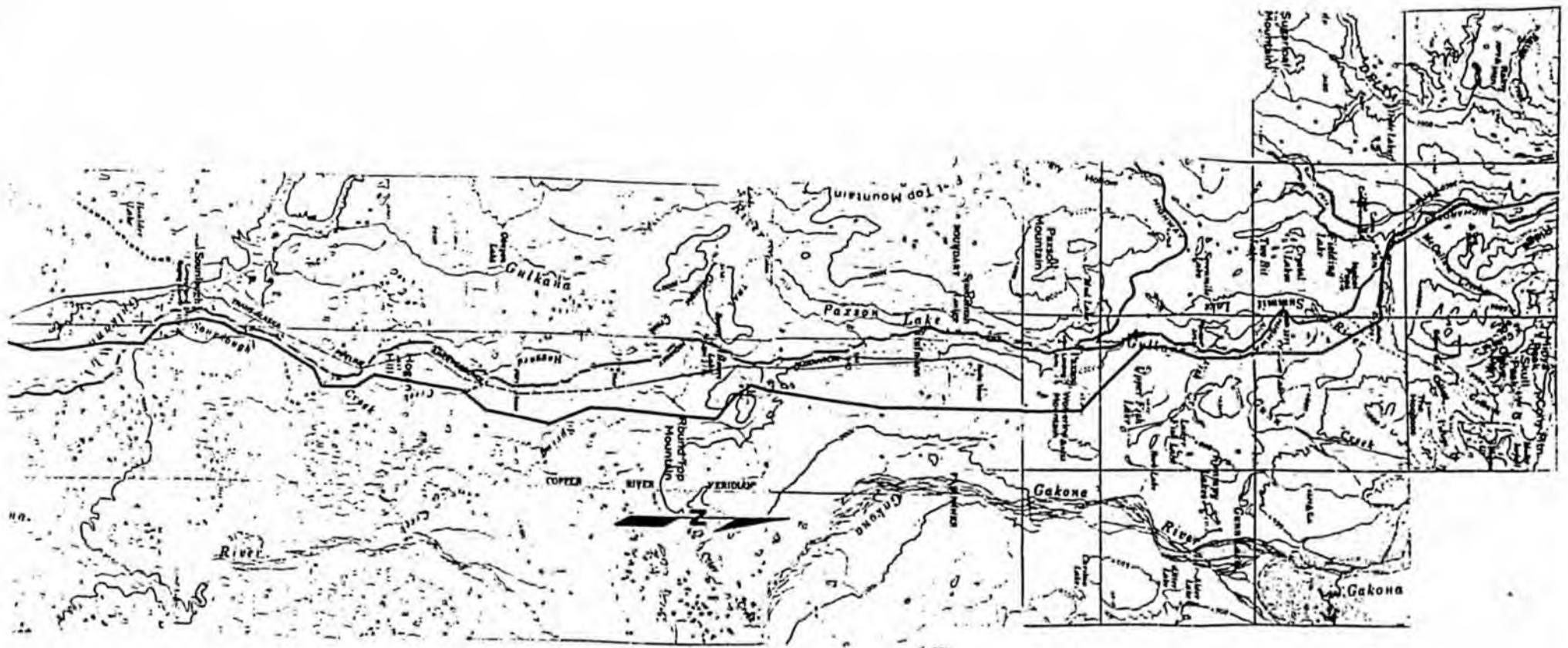
Northeast Intertie Suggested Route

Figure 1



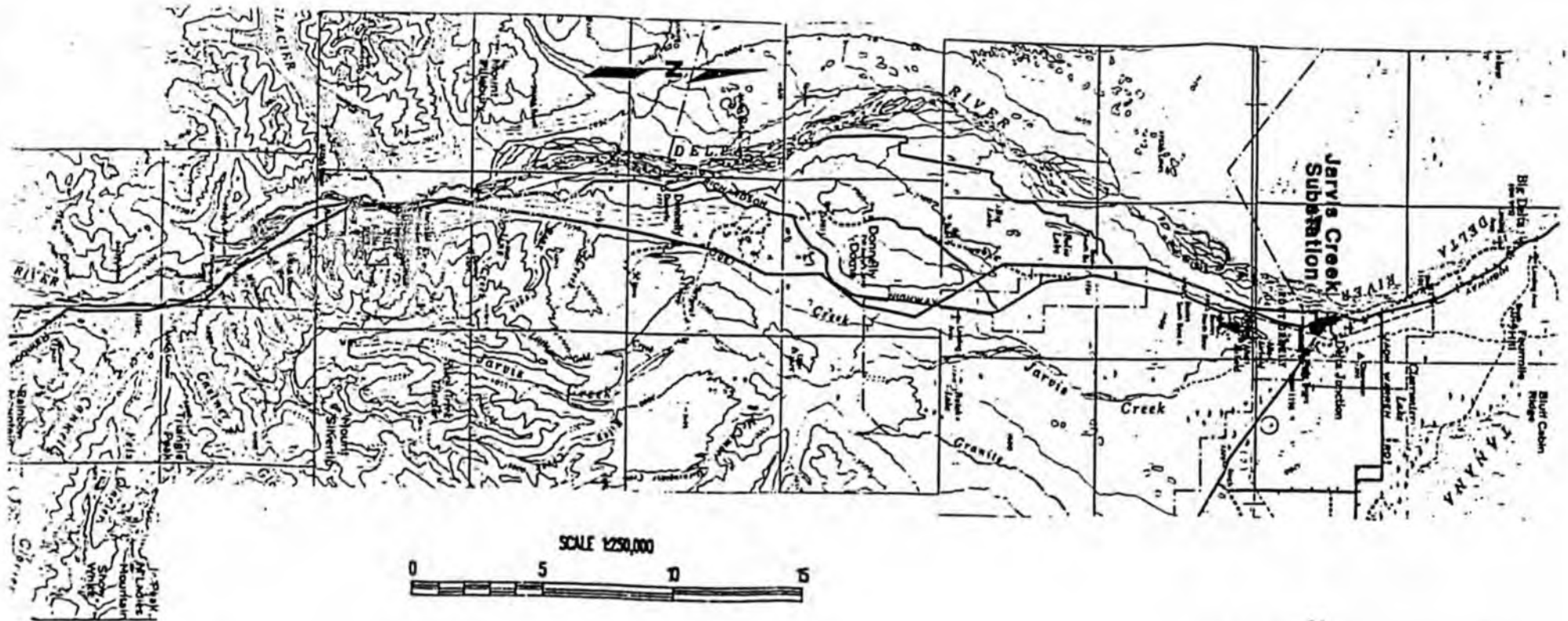
**Northeast Intertie
Suggested Route**

Figure 2



**Northeast Intertie
Suggested Route**

Figure 3



**Northeast Intertie
Suggested Route**

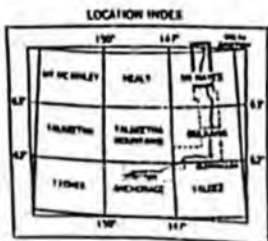
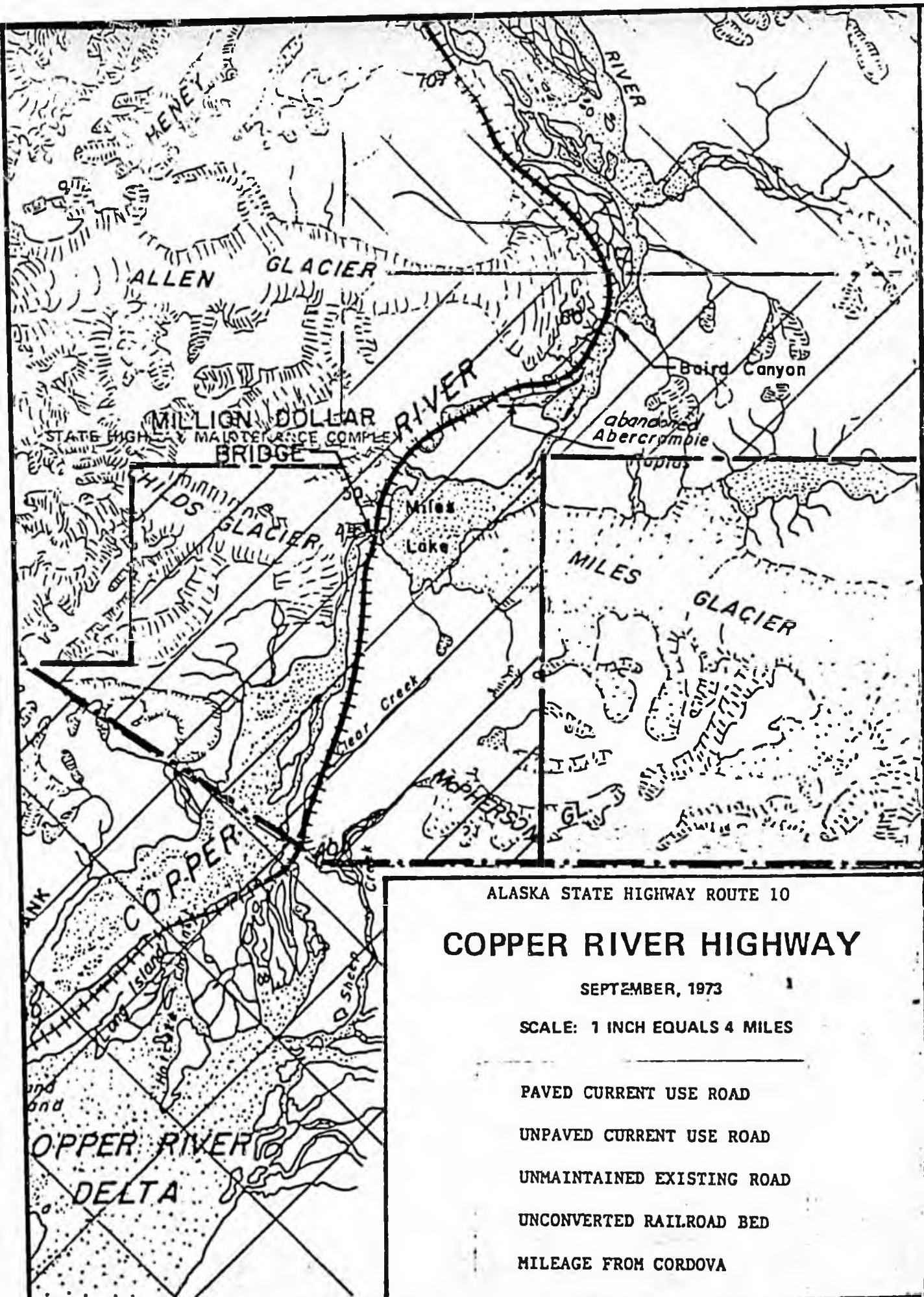


Figure 4

**THE FOLLOWING DOCUMENT
HAS NOT BEEN FILMED
BUT IS AVAILABLE IN THE
ORIGINAL FILE**



ALASKA STATE HIGHWAY ROUTE 10

COPPER RIVER HIGHWAY

SEPTEMBER, 1973

SCALE: 1 INCH EQUALS 4 MILES

- PAVED CURRENT USE ROAD
- UNPAVED CURRENT USE ROAD
- UNMAINTAINED EXISTING ROAD
- UNCONVERTED RAILROAD BED
- MILEAGE FROM CORDOVA

Homer News
Feb. 21,

02-21-91 03:14 pm MicroFax 907 235 4199 page 001 of 003

Bradley Lake Interties face still more debate

"If they need an 88 percent state subsidy, what does that say about the merits of the project?" -- Alan Mitchell

"We have right now an opportunity to provide stability and reliability, not only for the Kenai Peninsula but for the whole railbelt." -- Gail Phillips

<byline>by Liz Ruskin

<byline2>Staff Writer

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Kenai Peninsula lawmakers are firmly behind spending \$125 million of state money to build two new electrical transmission lines to carry Bradley Lake power, even though, according to several analyses, the costs may exceed benefits.

Proponents of the projects say consumers in the railbelt will see fewer power outages if the lines are built, but opponents say the dollar value of that benefit is well below the project's cost.

The debate is headed for the legislature.

A move to fund the project failed last session, though legislators set money aside in an Interties Reserve Account. House Bill 77 would appropriate the \$100-million Interties Reserve Account plus another \$25 million from the General Fund to build the two transmission lines -- one from Soldotna to Anchorage and another from Healy to Fairbanks.

The House has yet to debate the bill, which is sponsored by Rep. Mike Navarre, D-Kenai, and is co-sponsored by Rep. Gail Phillips, R-Homer.

The Homer City Council, the Kenai Peninsula Borough Assembly and the Anchorage Assembly recently passed resolutions in favor of the projects.

The total cost of the two lines is now estimated at about \$150 million. Homer Electric Association and the other railbelt utilities have agreed to pay all costs exceeding the \$125 million appropriation. The utilities have also agreed to pay for the operation and maintenance of the lines.

The benefits of the interties, which include fewer outages and the capacity to deliver more Bradley Lake power to the rest of the railbelt, are difficult to quantify. The half-dozen economic analyses of the lines -- some of them funded by the Alaska Energy Authority and others by the railbelt utilities, the legislature and a state consumer advocate -- show a tremendous range in the value of the benefits. At the low end of the range, the studies show the southern line could produce benefits to consumers of only 45 cents for every dollar spent. At the high end, the southern line would bring in more than \$2 for every dollar spent. Benefits for the northern line range from \$1.07 to \$1.63 for every dollar spent, according to an Alaska Energy Authority study

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released last month.

Norm Story, general manager of Homer Electric, said he looks to the top end of those figures.

"We feel we are going to get benefits in excess of costs over time," he said.

The single transmission line now serving the Kenai Peninsula is vulnerable to weather and avalanche. A second line would help prevent outages, he said.

A study commissioned by the railbelt utilities estimates that outages cost HEA consumers \$1.86 million each year, with 91 percent of that cost borne by Kenai-area industries.

But even if the costs do exceed the estimated benefits, it doesn't mean the interties lack merit, according to Story. Transmission lines, he said, shouldn't really be subject to cost-benefit analysis. Rather, he said, they should be viewed in the same light as highways, which aren't built on the basis of economic return.

While the power isn't needed right now, eventually the utilities will need the transmission lines, Story said. It's just a question of who pays the bill, he said.

The state should pay, he said, because the interties would benefit all railbelt consumers, or 75 percent of the state population. The rest of the state benefits from either state subsidies of electric rates or past state-funded energy projects, he said.

None of those arguments fly with Alan Mitchell, an analyst under contract with the state to act as consumer advocate on utilities issues. Mitchell says the lines, particularly the southern line, aren't needed now and probably won't be in the future.

If the projects were worthwhile, he said, the utilities would fund them themselves.

"If they need an 80 percent state subsidy, what does that say about the merits of the project?"

From the utilities' perspective, he said, it makes sense to ask the state to fund the project because the appropriation would amount to free money.

Consumers want to reduce power outages, he said, but they have a host of other concerns -- such as schools, roads, daycare and ports -- that they would like to see funded.

Even the utilities have better uses for the money, he said, but the prospect of free money is clouding their decision-making process.

The utilities, he said, have a lot of smaller capital improvement projects that have merit. They include such mundane things as new substation equipment to improve efficiency and power plant modifications.

"They're not big, sexy projects like the interties so they're not as sellable to the Legislature," Mitchell said.

If legislators decide for political reasons that railbelt

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Electricity consumers deserve the money, he said, they should just give it to the utilities and let them decide how to spend it.

Mitchell has also proposed spending the intertie money on a "railbelt energy dividend" to help consumers pay their electric bills or using it to retire the utilities' debts.

Rep. David Finkelstein, D-Anchorage, says the legislature should seriously consider a consumer rebate or retirement of utility debt load.

"If our goal is to lower rates, we have a number of options," he said. "My hope is that there is a compromise to build some of the smaller projects."

Finkelstein said railbelt legislators seem to be split on the interties. While those from Fairbanks and the Kenai Peninsula seem united in their support, the Anchorage and Mat-Su Valley delegation is soft on the project.

The transmission lines have even fewer supporters in the Senate, where Sen. Sam Cotton, D-Eagle River, is a vocal opponent of the project. No senator has yet introduced an intertie bill.

Rep. Phillips, however, remains staunch in her support of the transmission lines.

"We have right now an opportunity to provide stability and reliability, not only for the Kenai Peninsula but for the whole railbelt," she said.

Building the transmission lines would provide electrical infrastructure for future generations, she said.

Her reading of the cost-benefit studies indicates the projects are worthwhile, she said.

"I would have to question the qualifications" of authors of studies showing that costs exceed benefits, she said.

Cliff,

David wanted a
copy of this

Group says there are alternatives to building Healy electric plant

By LIN GALE
Staff Writer

A Fairbanks organization opposed to construction of a \$190 million, coal-fired electric plant in Healy says the project is unnecessary, and is only being built to take advantage of federal funds without any regard for the environmental costs.



NEWMAN

"The way to make sound and rational energy decisions should not be based on how much government pork you can get to subsidize it," said Gary Newman of the Alaska Federation for Community Self Reliance, a non-profit organization best known for its annual community garden project.

However, the project's chief backer, Golden Valley Electric Association, argues that turning away the federal funds now would mean bigger bills in the future for electric customers.

Newman's organization and two environmental groups have asked the state's public utility watchdog agency to consider including environmental effects as costs when deciding whether the plant is worth building. Golden Valley said including those costs could delay or stop the plant. The Alaska Public Utilities Commission is expected to make its decision this week.

The U.S. Department of Energy has promised \$93 million in Clean Coal Technology funds for construction of the coal-fired plant. Through the use of a new burning process and low-sulfur Alaska coal, the plant may become one of the cleanest coal-burning plants in the world.

Golden Valley said the \$93 million in federal funds is indeed a catalyst for the project's construction.

"Yes, it is an opportunity to take advantage of grant funds that will not be available later," said Vayla Colonell, GVEA's manager of member services. "If somebody offered to pay half of a new car, you'd probably buy one even if you hadn't planned to this year."

And the electric association argues that environmental concerns will be addressed in an Environmental Impact Statement.

The state Legislature appropriated \$25 million from the Railbelt Energy Fund last spring, and the Alaska Industrial Development and Export Authority, which will own the project, will finance the remainder through bonds.

Golden Valley will buy the plant's power and manage its operations.

GVEA, a Fairbanks-based cooperative, will pay AIDEA back \$40 million with money from power sales.

Need argued

Newman's organization contends that GVEA has not adequately explored alternatives to the plant.

Newman, who works as facilities manager for Tanana Chiefs Conference, said he wants Golden Valley to step up its conservation efforts and use better technology to decrease energy consumption.

"The question is do we need the extra capacity at all?" Newman said. Golden Valley can produce about 200 megawatts of power, and faced a peak winter demand of 113 megawatts in the winter of 1989-90. The Healy project would provide an additional 50 megawatts.

However, Newman said, a study commissioned by GVEA determined that demand will increase only about 2 percent annually for the next 10 years.

The electric association draws power from its two North Pole oil-fired generators, its existing Healy coal plant, and several smaller plants in the city. It also purchases power from Anchorage utility companies over intertie lines, and is one of six utilities lined up to purchase power from the Bradley Lake hydroelectric project near Homer, due to be completed in 1992.

The new Healy plant is needed, according to GVEA, because its existing plants will be worn out by 2007. In addition, the intertie lines are limited in the amount of power they can carry, so the shortfall can't presently be made up by drawing electricity from Anchorage.

However, the proposed Healy coal plant, due to be completed in 1996, would provide power 11 years before it's needed and should be put on hold, Newman argued.

Environmental costs

Newman's group recently joined two environmental organizations—the Northern Alaska Environmen-

tal Center and Trustees for Alaska—in their efforts to force Golden Valley to add the project's environmental costs to the overall projected cost of the coal plant. Rex Blazer, director of the environmental center, referred questions about the dispute to Newman.

However, Golden Valley argues that environmental concerns will be addressed and should not be used to delay the project or to jeopardize federal funding.

The groups opposing the project said the EIS is not enough because it won't be part of a process that identifies the project's true pricetag.

Conservation costs

Newman accuses Golden Valley of doing little to promote energy conservation.

"They've committed zip resources toward conservation," he said.

Colonell said the utility gives away electric outlet covers, which help block warm air that can escape through the small holes. The cooperative also urges conservation methods in newspaper and radio advertisements.

The utility does not offer programs to pay or rebate customers for making buildings more energy efficient, as many utilities in the Lower 48 have done.

Colonell said the programs are not "cost-effective measures" and would result in increased rates if developed now. However, she said, the utility expects to develop such programs in the near future.

"We're reaching a point where it will be cost-effective," she said.

The Alaska Economic Report

APUC Decision Could Stall \$180 Million Project

March 8, 1991
No. 5/91

Healy Coal Plant: \$30 Million Short?

Last week's action by the Alaska Public Utilities Commission in turning down a power sales agreement by Golden Valley Electric Co-Op to buy power from a \$190 million new-technology power plant at Healy may jeopardize a \$93 million federal Department of Energy coal research grant and other funding, and delay the scheduled start of construction in 1992. On the other hand, a \$20 million "gap" in financing — which was why APUC turned down the power sales agreement as an incomplete filing — could be bridged in a variety of ways, sources close to the project say.

Costs of the project have increased above estimates made last year through normal inflation and unanticipated increases in the cost of some key components from suppliers. There are four ways the gap could be covered: (1) GVEA could assume more than \$40 million in debt-guarantee; (2) Usibelli Mines could lower the cost of coal supplied to the plant; (3) suppliers, who are also participants in the DOE demonstration project, could absorb increases in

costs of their own components; (4) the legislature could appropriate more than \$25 million authorized last year as a match to the federal DOE grant.

The problem for GVEA, the prime power customer, is that to commit to more than \$40 million as its share of debt for the project would get its estimated future cost-of-power (now estimated at about five to six cents/kilowatt hour) out of line with the estimated cost of alternatives, mainly 4.5 cents/kwh power delivered via the Anchorage-Fairbanks intertie from Chugach Electric Assoc. One other (*Cont. Pg. 2*)

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- *** **IN TOP TEN?** Magazine cites ... incomes ... Pg. 4
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Carriers: Spill rules could add to cost of delivered fuel

Water transportation carriers are saying costs of complying with stringent new state oilspill laws scheduled to go into effect June 1 could add a nickel a gallon, or more, to fuel delivery costs to outlying areas. This will not only affect outlying rural communities who depend on seasonal barge shipments of fuel, but also fish processors in remote areas and major outlying transportation centers, like Unalaska/Dutch Harbor. An industry working group plans to meet with State DEC officials March 19 to try and sort out uncertainties. Some tug and barge operators are having a tough time getting insurance to cover tough new financial responsibility requirements;

others are concerned that, because the law will go into effect before regulations are adopted, they may have to buy costly spill prevention and cleanup gear that may not really be needed once regulations are written. Having provisions of the law - House Bill 567 adopted in the 1990 legislature - become effective before detailed regulations are written puts fuel suppliers and water carriers in a bind, they say. There are major uncertainties in the statute that regulations would clarify, but without the regs operators have to assume full implementation of the law as it is written. One bone of contention: The allowance for credit in the law for spill-prevention measures (*Cont. Pg. 2*)

CORRECTION

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Politics and government:

That shrinking budget surplus

State officials in Juneau are nervously watching oil markets, which are extremely volatile in the wake of the Persian Gulf war. Average Alaska North Slope spot markets edged up to \$17/barrel as this goes to press after having dipped to the \$15 range. The concern is for state revenues, which are 85 percent dependent on oil royalties and taxes.

Budget analysts, looking in a rather cloudy crystal ball, feel that if prices stay down in the \$15-\$16/barrel range for the remaining three months of the FY 1991 fiscal year, that means oil prices will have averaged about \$21 through the entire year. That translates into a "surplus" of \$250 million over what had been projected last year as the "mid-case" oil revenue scenario, using a \$19.33 average price. A few weeks ago, surpluses of \$700 million, \$800 million were predicted assuming oil prices remained higher, in the \$21 range for the remaining months of the year.

What all this means is this: If a smaller \$250 million surplus is left, that's about sufficient to fund a \$250 million capital budget proposed by the Hickel administration (\$200 million in as a supplemental FY 1991 capital appropriation, \$50 million as an FY 1992 capital budget). If a larger surplus is left, that might leave money for other things, such as an appropriation to the governor's proposed new Alaska Investment Fund, intended to pay debt service and ultimately finance economic development projects. *What could be a "fly in the ointment," however, is cash needed to fund a settlement of the mental health lands litigation (now stalling a number of development projects and land transactions around the state), which could soak up \$200 to \$400 million.*

Heavy jet maintenance facilities: Federal Express should let state officials know whether they intend to go ahead with a \$25 million heavy jet maintenance facility at Anchorage airport by March 18. Sources close to the project say they wouldn't be surprised if FedEx delays the project because of general poor conditions affecting the entire airline industry. But it will eventually go, they think. This will mean 12 to 15 new mechanics jobs and 30 new flight crew being based here. Alaska Airlines, meanwhile, will make a decision on a major new maintenance and expanded cargo facility in Anchorage at their June board meeting. This is a \$30-\$35 million project. *(Cont. top right)*

Jet maintenance facilities (Cont.)

Alaska Industrial Development and Export Authority is talking with both carriers in terms of helping finance maintenance facilities. Both carriers are also open to third-party user agreements. Northwest Airlines is reportedly very interested, with substantial numbers of widebody cargo jets being now being routed through Alaska. MarkAir also remains interested in doing more in-state maintenance on its Boeing 737 fleet. AIDEA would build the facilities under agreement with the carriers. *The authority is now in final stages of selecting a design and engineering firm for one or both of the new hangers.*

\$30 million more for Healy plant?

(Cont. from Pg. 1) alternative would be for Usibelli Coal Mines, Inc. to reduce the cost of coal supplied to the plant. If Usibelli could absorb about a 25 percent reduction in coal cost, it would make a significant difference, insiders say. Another alternative is to ask suppliers, who are partners in the coal research grant application to Dept. of Energy, to absorb some of cost increases. These firms stand to benefit if their new pollution-control technologies are successfully demonstrated. A final alternative is to go to the legislature for more state subsidy to the project, an option that might not go over well in Juneau, with oil prices falling and an anticipated state "surplus" shrinking fast.

Spill law will add costs (Cont.)

(Cont. from Pg. 1) in calculating a maximum possible spill (which then determines the amount of spill cleanup gear and storage capacity an operator must have on hand.) Another uncertainty: Just how having sufficient "storage" on hand to contain a spill is to be interpreted: Does a protective berm around a ruptured tank constitute "storage?" How about vacant space in other tanks in a tank farm? One major fuel distributor is considering flying extra fuel bladders to Dutch Harbor, so as to have enough storage in place. There are about 250 oil producers, crude oil or fuel oil storage facilities or transporters who must file spill contingency plans. In a letter sent out March 4, DEC Commissioner John Sandor said revised spill contingency plans should be submitted to the department before June 1. The new law requires (1) new response planning standards; (2) new financial responsibility requirements; (3) for prevention measures to be incorporated into contingency plans.

Bulk commodity exports could pay the way

The new Fire Island port study

Commonwealth North, the Anchorage-based business public policy "think tank" unveiled its long-anticipated report on a proposed Fire Island major port complex last week. Fire Island is in Cook Inlet, off the tip of Anchorage near the city's international airport. Highlights of the study:

Some 2,849 jobs could be created by economic activity stimulated by the new port. This total includes 1,523 in construction of modular facilities, mostly for expansion of oilfield activity on the North Slope; 1,083 jobs in handling timber exports; 43 jobs in international sea-air cargo (freight shipped by ocean from the Far East to Alaska and loaded on airfreighters for an onward trip to Europe,) 90 jobs in coal export handling; 18 jobs in gravel loading; nine jobs in port operations. The land area available on Fire Island also has potential to attract other businesses, such as fish processing, activities related to trade and commerce with the Soviet Union, marine vessel servicing, educational and research activities, and ocean-related environmental services.

Development costs are estimated at \$226 million, about half for a causeway to connect the island to the nearby mainland and half for the port itself. Commonwealth North suggested that the landowner, Cook Inlet Region, Inc., be invited to participate in the project, since they would be a major beneficiary.

A key part of the development would be conversion of the existing Ship Creek industrial area into a light industry, commercial and tourism/ recreation area, moving heavy port-related activities to the new Fire Island port. Ship Creek redevelopment, initial phases of which are already underway, is expected to add 300 new jobs and \$10 million new payroll.

The conceptual plan for the Fire Island port envisions a 100-acre staging area adjacent to a 2,000 ft. platform dock and a 700-ft. graving dock. An added 50 acres would be used to road access and additional port service buildings, leaving 1,350 acres on the island still vacant for additional support facilities and businesses.

Tourism: New statistics, new potential

Alaska visitor statistics, compiled by Division of Tourism under a contract to McDowell & Assoc. of Juneau, profile new trends in tourism that local firms may be able to take advantage of: The recently-issued analysis of fall-winter-spring visitors showed increasing numbers of fall-winter-spring visitors — 249,000 compared to 215,000 in the last similar survey in '85-'86. Business visitors mixing pleasure and sightseeing increased substantially — 13% in '89-'90 compared to 1% in the last such survey, '85-'86. "This suggests the fall-winter-spring visitor/pleasure market may be underserved in terms of sightseeing opportunities. Foreign visitors accounted for 7% of the fall-winter-spring visitors, up from 4 percent in '85-'86. "Japan is an untapped market...creative marketing and product development, such as the Aurora Borealis tour in Fairbanks, will draw overseas visitors," McDowell wrote.

Fall-winter-spring visitors also tend to be younger and to travel in smaller groups than summer tourists, McDowell's surveys indicate.

McDowell surveys indicate Alaska visitors spent \$832.5 million in travel to, within and from Alaska in 1989. Of this, \$304.1 million, or 37 percent, was spent on goods and services within Alaska. Some of the remaining \$528.4 million spent on transportation to and from the state does impact the Alaska economy, through wages paid and goods and services demanded by transportation companies. In-state spending was slightly higher in 1989 than in 1986, when McDowell last did expenditure surveys. Skagway arrivals were not included in 1986; excluding these, visitors spent \$285 million in the state in '86, to \$297 million in 1990.

<u>Category</u>	<u>\$/millions</u>
Lodging:	65.8
Transport	66.0
Tours/ Recreation	60.6
Food/ Beverage	46.8
Personal expenses	12.4

Alaska Business News Summaries

Anchorage in top 10 cities in family income?

Money Magazine has ranked Anchorage in the top ten cities in the U.S. in terms of average family income. The magazine used surveys by Woods and Poole Economics Inc., a Washington, D.C. consulting firm, which showed Anchorage families averaging \$70,175 per year. State labor economists are somewhat dubious of the figure. They show average Alaska family income for 1989 at \$60,853, based on U.S. Commerce Dept. and state data, with Anchorage usually tracking statewide averages, they say. However, any discrepancy could be explained by differing ways of interpreting income data, they say. Woods and Poole data show Anchorage 38 percent above national averages, while state data shows Alaska family income 32 percent higher. One major reason why Alaska incomes are higher is because there are a large percentage of households with two or more people working, state economists said.

IRS CHALLENGES BERING STRAITS TAX LOSS SALE: Bering Straits Native Corporation faces an Internal Revenue Service challenge to a sales of tax losses that resulted in \$27 million in revenues to the financially-pressed corporation. Bering Straits has about \$16 million in escrow, not enough to pay the back tax claim, and if the IRS decision stands it could severely hamper the corporation's plan for recovery from a Chapter 11 bankruptcy filing. It could also hurt some 16 other Seward Peninsula village corporations hoping for a share of the \$16 million held in escrow, part of a settlement of earlier litigation over Bering Straits' management of village corporation assets. This is the second major IRS challenge of an Alaska Native corporation sales of tax losses. Last year, the service objected to a tax loss sale by Sitka-based Shee Atika Corp.

ALASKA'S COMMERCIAL BANKS DOING WELL: Alaska's seven commercial banks averaged 1.52 percent return on assets in the first nine months of 1990, the fourth strongest performance in the U.S., according to rankings compiled by Alex Sheshunoff & Co. Information Services, of Austin, Tex. South Dakota banks turned in the strongest performance, with 2.75 percent return on assets. This is a key measurement of bank profitability. \$1 return for \$100 in total assets would be a one percent return, for example. Within Alaska, First National of Anchorage showed the strongest performance, with 2.45 percent R.O.A., compared to 1.24 percent a year ago. What boosted First National was sale of foreclosed real estate purchased from First Federal Bank of Alaska. National Bank of Alaska, another strong regional bank, showed an R.O.A. of 1.24 percent for 1990.

ANCHORAGE NEW CONSTRUCTION CONTRACTS SURGE: Construction activity is surging sharply in Anchorage, compared to a year ago. \$12.4 million in nonresidential construction contracts were awarded in January, triple the amount in January 1990, says F.W. Dodge Information Systems in its monthly survey. New contracts for residential construction decreased seven percent, however, from \$2.4 million last year to \$2.2 million this year. In 1990 overall, Anchorage showed \$173.6 million in construction, more than double \$75.6 million in 1989. Through March 2, building permits for 50 single family homes have been issued, compared to 23 permits last year. Industry sources say overall construction work in 1991 should be 10 to 15 percent over 1990.

REAL ESTATE MARKETS LIFT CONDO, SINGLE-FAMILY VALUES: Average price of condominiums in Anchorage increased by 66 percent last year, Multiple Listing Service figures indicate. From January to January, average condo costs increased from \$33,382 to \$53,539, real estate analyst Connie Yoshimura writes. Single-family homes increased in average values from \$95,500 to \$130,000 during the same period, a 37 percent increase. Condos are now selling, on average, above asking prices, with sales usually closing at 101.18 percent above listed prices in January. Condo sales are also declining, pointing to a possible tightening of supply, Yoshimura writes. In January 1990, MLS reported sales of 200 units; there were only 52 sales this last January. Single-family homes are still selling, on average, just below asking prices; in January, closed sales averaged 2.5 percent below listed prices. In a related development, average price for an Anchorage home in fourth quarter of 1990 was \$152,625, according to national surveys by Coldwell Banker. The national median price was \$199,036. The survey included 219 markets in the U.S., Canada and Puerto Rico.

ANCHORAGE WILL BUILD A NEW DOWNTOWN CITY HALL: The Anchorage Municipality has opted to build a new downtown city hall building, and is negotiating with Northwest Properties Development Corp. to build at a Fifth Avenue and Cordova St. location downtown. Meanwhile, the city is negotiating lease extensions on its current quarters in the downtown Hill Building with owner Weyerhaeuser Co.

CORDOVA ROAD GETS NEW PRIORITY IN HICKEL ADMINISTRATION: The Hickel administration is putting top priority on a \$60 million, unpaved road to Cordova, branching off the existing Richardson Highway near Thompson Pass. State officials say engineering money for the road is in this year's budget, and that they hope to have completed the project in four to five years. Cordova itself, meanwhile, is split over the road. One faction in the community supports it, while another is in opposition. State transportation officials also say \$27 million may not be enough to complete road access to Whittier by widening the existing tunnel for a toll road. \$50 million may be needed, which would include a new tunnel. That may be too much for tolls to pay for, state officials are concerned.

DENNIS NOTTINGHAM: BUILD NEW RURAL ROADS, NOT COSTLY URBAN PROJECTS. Highway Users of Alaska President Dennis Nottingham says the State of Alaska should use its available highway resources to get roads into new areas of the state, and stay away from costly urban projects like highway overpasses. Nottingham criticized the \$45 million South Anchorage Seward Highway overpass. The money could have been better spent finishing a road to Cordova, he said. Nottingham had a list of 14 no-frills, 30-ft. rural roads to connect places like Cordova, Juneau, Eagle, Kantishna and Whittier. Meanwhile, a State Department of Transportation team is now assessing a new rural road-building plan, and hopes to have a plan to DOTPF Commissioner Frank Turpin by May.

TURPIN SAYS STATE'S PRIORITY WILL BE ON INFRASTRUCTURE REPAIR: Meanwhile, Commissioner Turpin pitched the administration's road and harbor maintenance catch-up program to Anchorage business leaders. Turpin said \$65 million in a \$208 million state capital supplemental appropriation bill was allocated to badly needed state road, bridge and harbor repair. The Dalton Highway is singled out for particular attention, but the administration hopes to recover part of its Dalton fix-up costs from the oil industry.

WITH ECONOMY IMPROVING, PEOPLE MOVING TO ALASKA AGAIN: Fairbanks North Star Borough researchers reported more than 12,000 people drove north on the Alaska Highway than left the state, indicating the first population influx since 1985. 146,553 arrivals by highway were counted in 1990. 12,620, or 9.4 percent, remained in the state, researchers said, enough to push the state's population to 550,043. 120,000 to 148,000 people drive the Alaska highway every year, most of them tourists. Immigration usually happens when the economy suffers in the lower 48 states and people come north looking for work. In 1982, 38,575 people drove the highway and stayed; in 1985, 17,932 stayed. When Alaska's recession set in, the trend reversed. From 1986 to 1990, 37,000 more people headed south by road than north.

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Petroleum:

Pt. McIntyre field gets ARCO go-ahead

The new Point McIntyre field on the North Slope is moving toward development. ARCO's board, meeting in Los Angeles, approved \$727 million for ARCO's share of development expenditures. Exxon USA and BP Exploration also own shares in the field. In a related development, the State of Alaska and ARCO reached agreement for a twice-monthly production testing procedure to measure flow rates. This gets around a problem of metering flow for state tax and royalty purposes, since Pt. McIntyre output will be processed in ARCO's nearby Lisburne flow station, being comingled with Lisburne oil. BP said it would make a decision on its share of Pt. McIntyre development costs by the end of the year. The project is expected to generate some 800 construction jobs, initially produce 80,000 barrels daily, increasing to a peak of 100,000 barrels daily.

Local gas supply: Natural gas will be plentiful in the Anchorage and North Kenai areas for at least twenty years, Enstar Natural Gas says. Chugach Electric Association, which buys gas for electrical generation, recently signed contracts that will insure supply through 2013. However, gas prices are expected to rise, from an average \$1.59/mcf to \$1.84 and \$2.20/mcf.

Erickson fired: The Hickel administration fired Gregg Erickson, in charge of oilspill damage assessment with Dept. of Fish and Game, for making remarks critical of Exxon. The administration has been negotiating a possible out-of-court settlement with Exxon over the 1989 *Exxon Valdez* oilspill.

New VECO contract. VECO International landed a contract with Texaco, Inc. to clean up a spill at the company's refinery near Anacortes, Wash. Company vice president for construction Mack McKee is heading a team responsible for cleanup in marsh and tidal areas around the refinery. VECO sent a chartered aircraft with 40 spill cleanup technicians, followed by a second aircraft with spill equipment and booming materials.

Corps staff to gulf: Seventy five Alaska U.S. Army Corps of Engineers staff have volunteered to work on the corps' contract to do damage assessment in Kuwait City. The Kuwaiti government let a \$45 million contract to the Corps of Engineers to plan a reconstruction effort, and about 100 corps staff, including one Alaskan, have been dispatched to the gulf.

Minerals:

Opposition to Windy Craggy pipeline?

The proposed Windy Craggy Mine near Haines in far northwest British Columbia would be one of the world's largest copper mines, but the project is running into a buzz-saw of opposition from environmental, fishing and local community groups. Geddes Resources' latest plan, to build a slurry pipeline as an alternate to trucking ore to Haines (the trucking plan prompted opposition to the estimated 60 trucks a day down the highway) will bring other protests over water discharges, from environmental groups and fishermen. Geddes is also encountering criticism from Canadian environmental officials over plans for tailings disposal at the mine, and potential problems with acids. The amount of ore mined will eventually reach 20,000-30,000 tons/day.

Klukwan, Inc., Juneau-based Native corporation, will run the ore shipping operation for Geddes. Klukwan is attempting to gain ownership of the old U.S. Army fuel depot at Haines, which has existing dock facilities. Geddes and Klukwan are also looking at a second site on the east side of Haines.

Alaska gold output: Alaska produced three percent of the nation's domestic gold production in 1990, said the New York-based Gold Institute. Alaska ranked sixth in production, behind Nevada, California, South Dakota, Utah and Montana.

Valdez Creek production: Cambior Alaska, operator of the reopened Valdez Creek Mine in the Alaska Range, expects to produce 92,000 ounces of gold in 1991, company officials said. The mine was closed for a period in 1990 for reconstruction, reopening late last year. Valdez Creek is a large placer operation working year-around off the Denali Highway east of Cantwell.

Production values double: Alaska's 1990 mineral production values reached \$534 million, almost double 1989 values of \$277 million, and state and industry experts believe production values will reach \$1 billion within a few years. Red Dog Mine in northwest Alaska alone accounted for \$225 million in production values; Greens Creek Mine near Juneau produced some \$50 million in ore value last year. Alaska Gold Co., working two onshore dredges at Nome, produced about 20,000 ounces last year. Alaska Gold was recently purchased from Sharon Steel Corp. of Farrell, Penn. by Mueller Industries, Inc. of Wichita, Kan.

Timber:

Forest Service: \$11.7 million net revenues

The U.S. Forest Service reported \$11.7 million more revenues than expenses in Alaska, \$9 million of which will be shared with the State of Alaska and local governments under federal timber receipts revenue-sharing. Despite low timber prices and less supply, due to new restrictions in Tongass National Forest, 1991 should see a similar revenue performance, due to changes in stumpage pricing formulas in new Tongass legislation, USFS says. *Some 476 million board feet were sold from Tongass last year, and sales are expected to be about the same this year.*

Tongass timber sales contract changes

Alaska Pulp Co. in Sitka says unilateral changes by the U.S. Forest Service in its long-term timber contracts will reduce the volume of timber available to the company by 15 to 30 percent, without any compensation to the company. Potentially, the changes open the government to claims for damages by APC. Another contract change removes the economic viability criteria for timber offerings that could affect the quality of timber the company will be offered.

Of particular concern to the company is a change that requires low-quality logs for pulp to be included in the stumpage volume purchased in the long-term contracts. In some areas, pulp logs account for 30 percent of the timber, the company said. APC, with 800 employees, is Southeast Alaska's second largest private employer. Besides the Sitka pulp plant, the company operates a sawmill in Wrangell and two logging camps. Changes also took place in long-term sale contracts with the other Southeast pulp plant, Ketchikan Pulp Co.

Alaska Pulp Co. officials also say world pulp prices are slightly below production costs at the Sitka plant, but feel markets are at the low ebb of a cycle and that things should improve. The company is optimistic about new markets in the Soviet Union, China, Eastern Europe and the Pacific, but is asking employees to help make operations more efficient.

Hickel park: Timber operators don't like it

Chugach Alaska Corp. says Gov. Hickel's proposed Prince William Sound marine park, if it precludes timber development, could threaten future supply for the company's sawmill in Seward, now supplying Alaska and export markets. Corporation officials say

Concerns over Hickel park (Cont.)

the mill now has supply, but needs a future timber base to be assured of future log supply. The Seward mill opened last year and will have a permanent workforce of about 150 by this summer. Another Native timber entity, Koncor Forest Products, has holdings on Montague and Knight Islands in Prince William Sound.

Attacking spruce beetle infestation

The state administration is asking for a \$2.5 million appropriation to attack spruce bark beetle infestation in Southcentral and Interior forests. More intensive forest management can prevent more devastating outbreaks, such as that in Chugach National Forest around Cooper Landing south of Anchorage, state forest officials say. State and federal officials have \$1 million budgeted for removal of several thousand acres of dead spruce, with another \$1 million planned for reforestation. Infestation can be handled by increased logging and, in some cases, controlled burning. Costs to federal, state and private landowners in controlling the statewide outbreak could eventually reach \$20 million to \$30 million.

Fisheries:

Huge '91 salmon run anticipated

State fisheries biologists are predicting the best salmon returns in 100 years in 1991. Fishermen should harvest 164.3 million salmon of all species statewide, a six percent increase over 1990's harvest of 154.8 million. What's driving up the numbers is an expected massive return of pink salmon expected in Kodiak, Prince William Sound and Southeast waters. Kodiak's pink catch is projected at 17 million, almost triple the 5.9 million harvest in 1990. *The huge run brings two worries: Insufficient processing capability and a depressing effect on prices, which last year averaged 35 to 40 cents/lb. for Prince William Sound pinks. There's also worries about an unsold 1990 inventory.*

State may assert Glacier Bay control

The State of Alaska may assert authority over Glacier Bay as an inland body of water, State Resources Commissioner Harold Heinze says, as a way to alleviate disputes over subsistence and commercial fishing in the area. The half million-acre water body, with productive salmon, halibut and crab fisheries, is now under the control of the U.S. Park Service. It is surrounded by Glacier Bay National Monument.

Yakutat wants new borough, tax revenue-sharing

Yakutat may dissolve itself as a city and form a 7,776-square mile regional borough government to take advantage of fish tax and timber revenue-sharing. The local boundary commission will review Yakutat's application, and whether it meets minimum criteria of having at least 1,000 residents or two communities within its boundaries. Yakutat proposes a one percent raw fish tax, three percent general sales tax, property taxes of 12.3 mills within the area connected by roads and nine percent elsewhere in the borough. Yakutat city officials say the local boundary commission's minimums are set by regulation, not statute, and that the new borough may win an exception. 1.25 million acres of Tongass National Forest would be within the boundaries of the new borough; based on last year's Tongass revenues, the Yakutat Borough's share would be \$675,000.

CITY MORTGAGE NOW DOMINATES ALASKA MORTGAGE MARKET: City Mortgage Corp. now has 29 percent of the state's mortgage market, Motznik Computer Services says. Northland Mortgage Co., a unit of National Bank of Alaska, has 19 percent, with NBA's own mortgage lending department taking 11 percent and GMAC Financing 12 percent. Other major lenders include Seattle Mortgage, Key Bank, Commonwealth Manufacturing, First National Bank, Alaska USA Federal Credit Union and Northern Schools.

AEROFLOT WILL START SERVICE IN MAY: Aeroflot, the Soviet national air carrier, will begin its long-anticipated passenger service through Alaska May 12. By the end of the month, four Aeroflot flights a week should be coming through, one a "turnaround" from Khabarovsk through Magadan to Anchorage, a second going on to San Francisco, followed by twice-weekly Moscow-Anchorage-San Francisco flights starting at the end of May. In June, Alaska Airlines will begin its summer passenger service from Anchorage to Magadan and Khabarovsk; Anchorage-based Northern Air Cargo will begin scheduled cargo service to the Soviet Far East on Aug. 1. Northern is hoping to land postal contracts to carry Alaska-Soviet Far East mail, which now goes via the Atlantic.

SEALASKA ASKS STATE HELP IN SHAREHOLDER BATTLE: Embattled Sealaska Corp. management asked the State Division of Banking and Securities to investigate what it called misleading charges by two dissident shareholder groups in their bid to take over control of Sealaska's board. Dissidents have charged Sealaska is unprofitable, but company financial reports show \$125 million in profits over the last five years. State officials refuse to say when they might act on Sealaska's application for a hearing.

FEDERAL EMPLOYEES CHALLENGE COLA STUDY: Alaska federal employees have organized, retained counsel, and are preparing to rip into a new cost-of-living survey that shows Anchorage living costs on par with Washington, D.C. COLA Defense Committee of Anchorage, Inc. has retained Seattle attorney Bennet McConaughy. Wisconsin-based Runzheimer International did the study for the federal Office of Personnel Management, as part of the OPM's evaluation of the continued 25 percent tax-free cost of living allowance for federal employees in Alaska. One criticism: Runzheimer looked at only nine Anchorage house costs to derive a base for Anchorage housing costs.

FEDERAL CUTS MAY DELAY \$150 MILLION NEW HOSPITAL: Federal budget cuts may doom a long-planned \$150 million new Indian Health Service hospital in Anchorage, for this year at least. The Bush administration recommends Congress allocate no money for it this year. Also recommended to no funding are a proposed \$25 million new hospital in Kotzebue and \$50 million in new living accommodations for hospital staff in Kotzebue and Barrow. The proposed 150-bed new Anchorage hospital had been planned for a 1992 groundbreaking, with completion scheduled for 1995. The new facility would also have added 200 new jobs in Anchorage, increasing IHS employment locally from 600 to 800. Postponement of funding may open the door to an alternate approach for construction, Alaska Sen. Ted Stevens said: Possible lease-back financing and construction by an Alaska Native corporation. That had been suggested before, and was recommended as more cost-effective in a 1988 House Appropriations Committee study, but was rejected by the federal Office of Management and Budget.

NE. intertie study
8



State of Alaska
Steve Cowper, Governor

Alaska Energy Authority

A Public Corporation

August 21, 1989

The Honorable Terry Martin
Alaska State Representative
3111 C Street, Suite 415
Anchorage, AK 99503

Subject: Railbelt Intertie Studies - Benefit/Cost Analysis

Dear Representative Martin:

Enclosed is the final report of results from the Railbelt intertie studies conducted by the Alaska Energy Authority. This volume is the culmination of a series of studies that, taken together, fulfill the "reconnaissance study" requirements of our statutory project review process. A complete list of these studies is attached.

According to our analysis of projected costs and discounted present value of projected benefits, the alternatives for which expected benefits exceed costs include:

- a. Limited upgrade of the Anchorage-Fairbanks intertie from 70 MW to 100 MW;
- b. Electric end-use conservation programs;
- c. A natural gas pipeline linking Fairbanks with the Cook Inlet area.

The alternatives for which projected costs appear to exceed discounted present value of expected benefits include:

- a. New 230 KV intertie between Anchorage and the Kenai Peninsula;
- b. Full upgrade of the Anchorage-Fairbanks intertie;
- c. The proposed Northeast intertie linking Anchorage and Fairbanks via Glennallen;

Railbelt Intertie Studies

August 21, 1989

Page 2

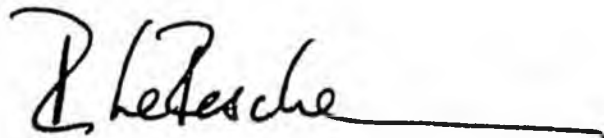
- d. The proposed 50 MW coal-fired power plant at Healy.

Near the end of the last legislative session, two modified intertie proposals were advanced by the Railbelt utilities:

- a. A new 138 KV line between Anchorage and the Kenai Peninsula, estimated by the utilities to cost roughly \$20 million less than the original, 230 KV proposal.
- b. A modified Anchorage-Fairbanks upgrade that would combine the "limited upgrade" evaluated in our reconnaissance study with a new 138 KV line between Healy and Fairbanks. This modified upgrade proposal is estimated by the utilities to cost roughly \$60 million less than the original, full upgrade proposal.

The utilities have independently commissioned Decision Focus Inc., our contractor for the enclosed benefit/cost analysis report, to evaluate the merits of these modified proposals. I expect that their analysis will be complete before the start of the next legislative session, and urge you to review the modified proposals in conjunction with our attached report.

Sincerely,



Robert E. LeResche
Executive Director

**RAILBELT INTERTIE RECONNAISSANCE STUDY
LIST OF VOLUMES**

1. Economic and Demographic Projections for the Alaska Railbelt: 1988-2010, Institute of Social and Economic Research, August, 1988.
- 2.. Forecast of Electricity Demand in the Alaska Railbelt Region: 1988-2010, Institute of Social and Economic Research, April 1989.
3. Analysis of Electrical End Use Efficiency Programs for the Alaskan Railbelt, Institute of Social and Economic Research, April 1989.
4. Fuel Price Outlooks: Crude Oil, Natural Gas, and Fuel Oil, ICF Incorporated, August 1988.
5. Anchorage-Kenai Transmission Intertie Project, Power Engineers Inc. & Hart-Crowser Inc., May 1987.
6. Anchorage-Fairbanks Transmission Intertie Expansion and Upgrade Project, Harza Engineering Co., August 1987.
7. Railbelt Stability Study, Power Technologies Inc., January/May 1989.
8. Northeast Transmission Intertie Project, Power Engineers Inc. & Hart-Crowser Inc., June 1989.
9. Estimated Costs and Environmental Impacts of Coal-fired Power Plants in the Alaska Railbelt Region, Stone & Webster Engineering Corp., November 1988.
10. Estimated Costs and Environmental Impacts of a Natural Gas Pipeline System Linking Fairbanks with the Cook Inlet Area, Stone & Webster Engineering Corp., January 1989.
11. Benefit/Cost Analysis, Decision Focus Inc., June 1989.

3 interties + one road.

① #1361 - Wassella to 155M's
NE. Transmission intertie

② Intertie \$59M's

Lordova to Solomon Gulch
2 1/2 + road from ^{Huffman Pass thru} Marshall Canyon Pass
to Copper River Road into old R.R.

perimeter of Prince William Sound and crosses to the Lowe River via the approximate routing proposed by the El Paso Alaska Company in 1974 for a gas pipeline. The approximate length is 67.8 miles.

This line would be designed for a peak load of 15 MW at a 0.9 power factor. Voltage would be 138 kV nominal. The line would be sized to limit voltage drop to 5 percent.

Meteorologic investigations indicate that radial icing on conductors of up to 5 1/2 inches in conjunction with a 50 mph wind can be anticipated. This extremely severe mechanical loading dictates that the conductor must be a 37 #8 Alumoweld-type cable. No shield wire would be required, as the outage rate due to lightning for unshielded conductors is expected to be less than 1.4/100 miles/year.

Guyed tubular steel structures used in developing cost estimates are similar to those presently in use for power lines in Alaska; however, a structure study will be required to optimize types to be used.

The capital cost for the Cordova to Solomon Gulch - Coastal Route is estimated to be \$28.6 million. This includes design, right-of-way procurement and clearing, material and construction costs, and a 10 percent allowance for indeterminates. A value of \$1,500/mile/year for the operation and maintenance of overhead transmission lines was used for this study. Transmission line life was assumed to be 40 years.

1.8.4 Cordova to Solomon Gulch - with Tap to Silver Lake (T02)

The Cordova to Solomon Gulch - with Tap to Silver Lake route consists of three 138/12.5 kV substations and an overland transmission line constructed on guyed, steel structures. The transmission route is along a portion of the eastern perimeter of Prince William Sound and crosses to the Valdez Arm along Jack Bay, with a tap to Silver Lake. The approximate length is 82.8 miles.

The capital cost for the Cordova to Solomon Gulch - with Tap to Silver Lake Route is estimated to be \$35.2 million. This includes design, right-of-way procurement and clearing, material and construction costs, and a 10 percent allowance for indeterminates. Operations and maintenance costs are estimated at \$1,500/mile/year.

1.8.5 Cordova to Solomon Gulch - Copper River Route (T03)

The Cordova to Solomon Gulch - Copper River Route consists of two 138/12.5 kV substations and an overland transmission line constructed on guyed, steel structures. The transmission route parallels the Copper River Highway to Miles Lake, then follows an old railroad bed to the mouth of the Tasnuna River. From there it runs up the Tasnuna River Valley and goes over Marshall Pass to Heiden Canyon. From Heiden Canyon to Solomon Gulch, the line would parallel the existing Glennallen to Solomon Gulch 138 kV transmission line. The approximate length is 132 miles.



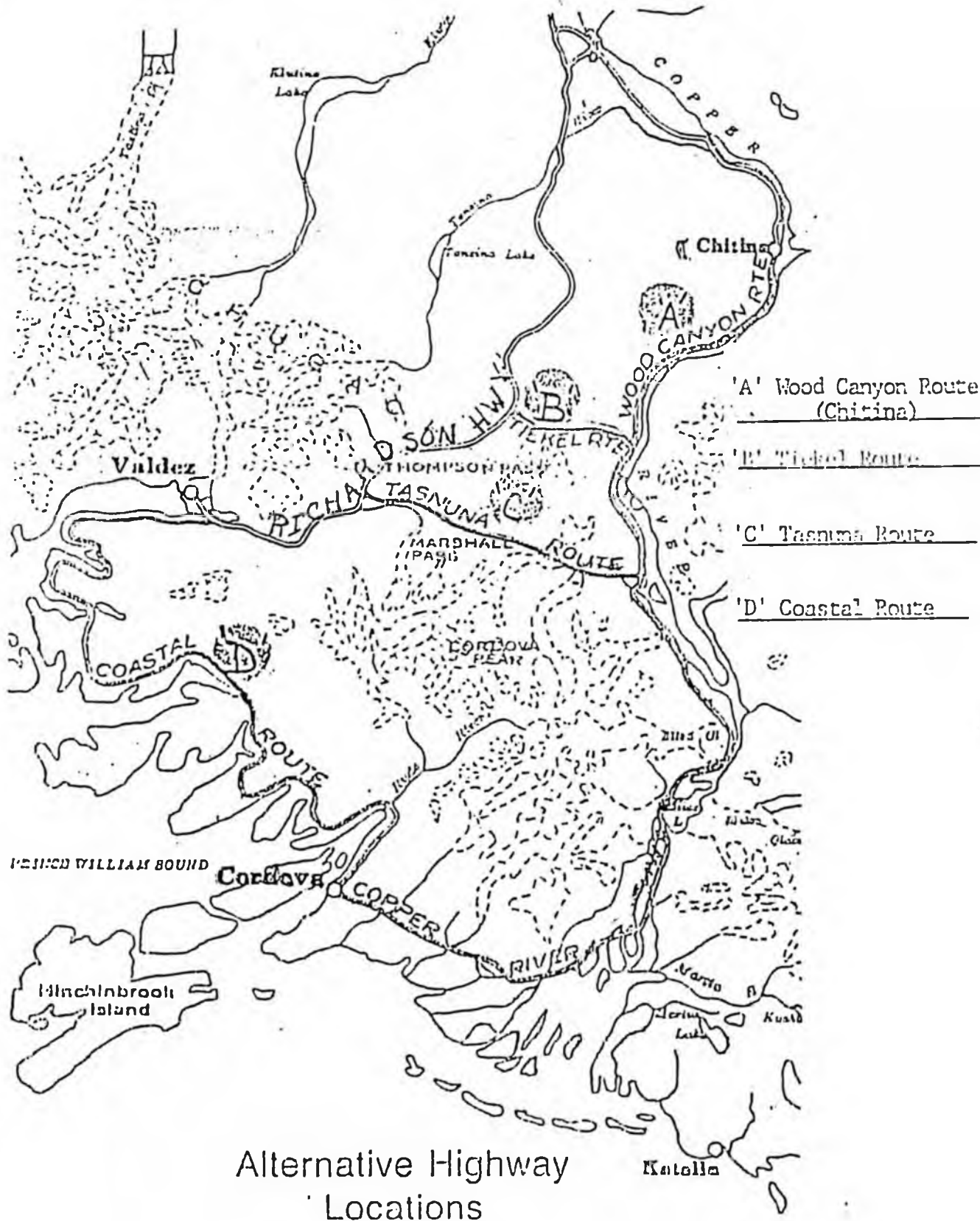


EXHIBIT #14

The transmission line would be designed for a peak load of 12 MW at a 0.9 power factor. Voltage would be 138 kV nominal. Voltage drop would be limited to 5 percent.

Meteorologic investigations indicate that on certain areas of the line, radial icing on conductors of up to 5 1/2 inches in conjunction with a 50 mph wind can be anticipated. These areas represent roughly one-third of the line length and include the portion of line across the Copper River Delta from McKinley Peak to Miles Lake and a short segment across Marshall Pass.

The capital cost for the Cordova to Solomon Gulch - Copper River Route is estimated to be \$59 million. This includes design, right-of-way procurement and clearing, material and construction costs, and a 10 percent allowance for indeterminates.

1.8.6 Cordova to Bering River Coal Field (T04)

The Cordova to Bering River Coal Field route consists of two 138/12.5 kV substations and an overland transmission line constructed on guyed, steel structures. The transmission route follows the Copper River Highway to the east side of the Copper River near Sheep Creek, where it turns and heads east to Carbon Camp. The approximate length is 61.2 miles.

The capital cost for the Cordova to Bering River Coal Field Route is estimated to be \$28.6 million. This figure includes design, right-of-way procurement and clearing, material and construction costs, and a 10 percent allowance for indeterminates, with associated operations and maintenance costs estimated at \$1,500/mile/year.

1.8.7 Cordova to Solomon Gulch - Submarine Cable Route (T05)

The Cordova to Solomon Gulch - Submarine Cable Route consists of two 138/12.5 kV substations, approximately 18 miles of overhead DC transmission line, approximately 73 miles of direct circuit submarine cable, and two converter substations.

The route for this alternative begins at a DC converter station located at Cordova. An overhead line would run to Bluff Point, where both conductors would be changed to armored submarine cable for the Orca Inlet crossing. On emerging from the water on Hawkins Island, both cables would continue with overhead construction to the south end of Canoe Passage. The conductor would continue in a northwesterly direction along Canoe Passage for at least one mile before entering the sea and heading toward Valdez. It would then emerge on the north side of Jack Bay, and would continue overhead to a bay located midway between Anderson Bay and Sawmill Spit.

At this point, the overhead construction would pick up the ground wire that would be terminated at a sea electrode located in this bay. Both the power conductor and ground wire would continue, as overhead construction, along the south shore of Port Valdez (bay) to a converter substation located where Solomon Creek enters Port Valdez (bay).



IN THE SUPERIOR COURT FOR THE STATE OF ALASKA
THIRD JUDICIAL DISTRICT AT ANCHORAGE

MATANUSKA ELECTRIC ASSOCIATION, INC.,)
)
) Plaintiff,)
)
) vs.)
)
) THOMAS G. STAUDENMAIER,)
)
) Defendant.)

Filed in the Trial Courts
STATE OF ALASKA THIRD DISTRICT
DEC 17 1984
Clerk of the Trial Courts
By TSD Deputy

Case No. 3AN-84-8009 Civil

AMENDED JUDGMENT GRANTING PERMANENT INJUNCTION

Upon stipulation of the parties for entry of judgment, and this matter having come on for hearing before the court on September 10, 1984, October 31, 1984, and December 17, 1984, and plaintiff having further moved to amend the judgment previously entered in this matter, and the court being fully advised in the premises,

IT IS ORDERED, ADJUDGED AND DECREED that:

(1) Defendant, Thomas G. Staudenmaier, is permanently enjoined from publicizing, disseminating, revealing, disclosing and/or distributing in any manner any documents or information which, in his capacity as director of plaintiff, he receives from the management, employees, agents, and/or contractors of plaintiff, which document or information said persons request remain confidential. If at the same meeting at which the material is distributed to board members or at the next, subsequently lawfully convened meeting if the material is distributed to board members between meetings of the board, the board by majority vote resolves to not discuss the material in executive session, defendant is at liberty to do anything with the material so received which is consistent with his duties as a director of plaintiff. If, at the same meeting at which the material is distributed to board members or at the next, subsequently lawfully convened meeting if the material is distributed to board members between meetings of the board, the board by majority vote determines

STEVE COWPER, GOVERNOR

DEPARTMENT OF REVENUE

TREASURY DIVISION

ELEVENTH FLOOR
STATE OFFICE BUILDING
P.O. BOX SB
JUNEAU, ALASKA 99811-0400

September 8, 1989

As you requested, I am providing the following information:

Railbelt Energy Fund

June 30, 1989 Balance	\$229,981,022.86
Interest Earned	
Fiscal Year 1987	21,145,067.98
Fiscal Year 1988	20,164,841.96
Fiscal Year 1989	19,037,794.53
Appropriations Outstanding	
CH. 117, SLA 1989	
Sec. 217(a)	(30,000,000.00)
Sec. 217(b)	30,000,000.00
Sec. 219(a)	(5,000,000.00)
Sec. 219(b)	5,000,000.00

I enclose copies of the two sections of CH. 117, SLA 89 cited above. The sections took effect July 1, 1989. The June 30, 1989 balance does not include any of the interest earned. It would have to be appropriated to the fund by law.

Please let me know if you have any questions.

Yours truly,



Milton B. Barker
Deputy Commissioner

MBB/mem
Enclosures

STEVE COWPER, GOVERNOR

DEPARTMENT OF REVENUE

TREASURY DIVISION

ELEVENTH FLOOR
STATE OFFICE BUILDING
P.O. BOX SB
JUNEAU, ALASKA 99811-0400

September 8, 1989

Tom Staudenmaier
Box 140170
Anchorage, AK 99514

Dear Mr. Staudenmaier:

As you requested, I am providing the following information:

Railbelt Energy Fund

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Interest Earned	
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Please let me know if you have any questions.

Yours truly,



Milton B. Barker
Deputy Commissioner

MBB/mem
Enclosures

MEMORANDUM

State of Alaska

TO: Lydia Jones
Office of Representative
Terry Martin

DATE: September 21, 1989

FILE NO:

TELEPHONE NO:

THRU:

SUBJECT: Railbelt Intertie Study

FROM: Marnie Isaacs *M. Isaacs*
Information Officer
Alaska Energy Authority

As we discussed, attached is a summary of the Alaska Energy Authority's Railbelt Intertie Reconnaissance study as presented to the Board September 20. You will note consideration of the Anchorage-Fairbanks intertie options is contained on pages 7-10; cost estimates are included. The Board adopted staff recommendations, which defer further action on the northern intertie proposal until studies underway by the utilities can be considered. These studies will be completed prior to the 1990 legislative session.

Should you have further questions reviewing this material please do not hesitate to contact us.

MI:dm

Attachment as stated

CONSIDERATION OF FINDINGS AND RECOMMENDATIONS
RAILBELT INTERTIE RECONNAISSANCE STUDY

A. ACTION ITEM

Consideration of findings and recommendations pursuant to completion of the Railbelt Intertie Reconnaissance study. The study consists of the 11 volumes listed in Attachment A.

B. BACKGROUND

Statutory direction to undertake the study was provided in the capital budget passed during the special legislative session in July 1987:

The sum of \$2,500,000 is appropriated from the Railbelt energy fund in the general fund to the Alaska Power Authority for preparing studies required under AS 44.83.177 - 44.83.185 for electric interties between the Kenai Peninsula and Fairbanks.

This language directed the Alaska Power Authority to perform reconnaissance and feasibility studies of Railbelt intertie alternatives, and also to prepare a plan of finance and independent cost estimate for any recommended project. Further action in the 1988 legislative session resulted in a reduction of the appropriation to \$2,250,000 and added legislative intent that the feasibility of a proposed natural gas pipeline between Cook Inlet and Fairbanks also be assessed as part of the overall study.

The electric intertie projects that were initially identified for review were:

1. A new 230 KV transmission line between Anchorage and the Kenai Peninsula.
2. Full upgrade of the existing intertie between Anchorage and Fairbanks to substantially higher transfer capability.

Two additional intertie projects were later added for consideration as alternatives to the proposed upgrade of the Anchorage-Fairbanks line:

3. A new transmission line from Palmer through Glennallen to Delta Junction, where it would connect with the Golden Valley system in the Fairbanks area. (This project has been referred to as the "Northeast Intertie.")

4. A limited upgrade of the existing Anchorage-Fairbanks intertie from 70 MW to 100 MW transfer capability.

Further, although the statutory direction makes it clear that the intertie projects are intended as the main focus of the study, it was decided that the feasibility of several other Railbelt energy proposals would also be assessed within the study's overall framework, specifically:

1. A natural gas pipeline from Cook Inlet to Fairbanks.
2. Coal-fired power plants in the Railbelt.
3. Electric end-use conservation programs (i.e. programs designed to induce higher levels of efficiency among electric energy consumers).

C. FINDINGS

OVERALL METHODOLOGY AND RESULTS

Each project was assessed according to nine "base case" scenarios reflecting all combinations of the three fuel price and three load forecast assumptions previously developed by the Authority. Joint probabilities were established for each combination based on fuel price probabilities previously adopted by the Board and load forecast probabilities adopted by Authority staff and the Institute of Social and Economic Research. The joint probabilities are shown in Table 1 below:

TABLE 1

Joint Probabilities of Base Case Scenarios

<u>Fuel Price</u>	<u>Load Forecast</u>	<u>Joint Probability</u>
Low	Low	.30
Low	Middle	.23
Low	High	.06
Middle	Low	.03
Middle	Middle	.08
Middle	High	.19
High	Low	.00
High	Middle	.02
High	High	.08

Note that the aggregate fuel price probabilities (rounding error aside) are: Low = 60%, Middle = 30%, and High = 10%. The load forecast probabilities are: Low = 33%, Middle = 33%, and High = 33%.

The joint probabilities were used to calculate expected values of economic benefit. These expected values are reflected in the summary of benefits and costs presented in Table 2 and in the benefit/cost ratios shown in Figure 1A:

TABLE 2
RAILBELT ALTERNATIVES: COSTS AND BENEFITS

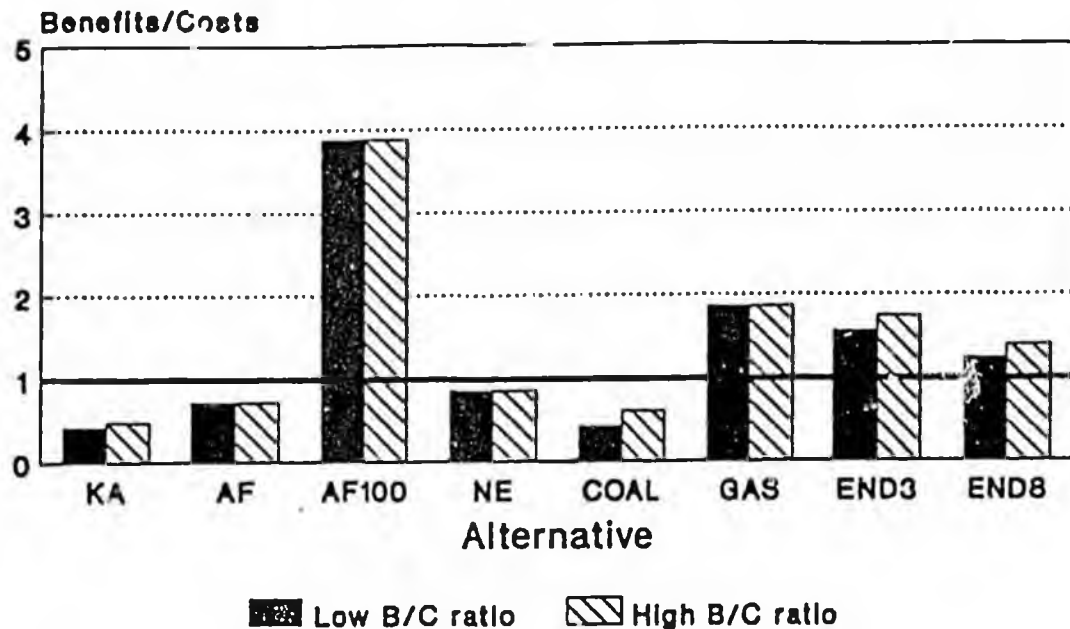
	Estimated Cost ^a (\$1987 million)	Estimated Benefits ^b (\$1987 million)	Benefit to Cost Ratio
New Kenai-Anchorage Intertie	103	43 to 49 ^c	0.42 to 0.48
Full Upgrade of Anchorage-Fairbanks Intertie	134	96	0.72
Limited Upgrade of Anchorage-Fairbanks Intertie	10	40	3.88
Northeast Intertie	188	159 ^d	0.85
50-MW Coal-Fired Power Plant	177 to 257 ^e	108 ^f	0.42 to 0.61
Gas Pipeline Between Cook Inlet and Fairbanks	284	527 ^g	1.86
Top Three End-Use Conservation Programs	16	25 to 28	1.56 to 1.74
Top Eight End-Use Conservation Programs	43	54 to 61	1.23 to 1.39 ^h

Notes:

- a. Includes both capital and O&M costs
- b. Present value of total benefits between 1994 and 2028
- c. Benefits would be \$8-9 million higher if existing line were shut down for maintenance two months per year for the next 35 years.
- d. Benefits would be \$13 million lower if none of the backscatter radar load were supplied by the grid; benefits could be \$6 million higher if the Northeast intertie allowed Fairbanks to share in future new capacity in Anchorage.
- e. Cost does not include any consideration of possible subsidy by the federal government.
- f. Benefits do not include any credit for cogeneration or coal drying.
- g. Includes all benefits, both within and outside the electric power sector.
- h. Incremental Benefit/cost ratio of remaining five programs is 1.05 to 1.19.

FIGURE 1A

RAILBELT ALTERNATIVES: BENEFIT/COST RATIOS



Based on expected net benefits for nine base case scenarios.

The alternatives for which expected benefits exceed costs include:

1. Limited upgrade of the Anchorage-Fairbanks intertie from 70 MW to 100 MW;
2. Construction of a natural gas pipeline linking Fairbanks with the Cook Inlet area;
3. Electric end-use conservation programs.

The alternatives for which costs exceed the expected benefits include:

1. New 230 KV intertie between Anchorage and the Kenai Peninsula;
2. Full upgrade of the Anchorage-Fairbanks intertie;
3. The proposed Northeast intertie linking Anchorage and Fairbanks via Glennallen;
4. The proposed 50-MW coal-fired power plant.

The projects were assessed according to a number of sensitivity cases as well. Results for the base case scenarios as well as the sensitivity cases are presented for each project in the sections below. Selected issues that may be of particular interest to the Board are also briefly discussed. Additional detail about the project evaluations is provided in the Benefit/Cost Analysis report mailed earlier to Board members.

I. NEW 230 KV KENAI-ANCHORAGE INTERTIE

Estimated capital cost

\$81.7 million (1987 dollars).

Brief project description

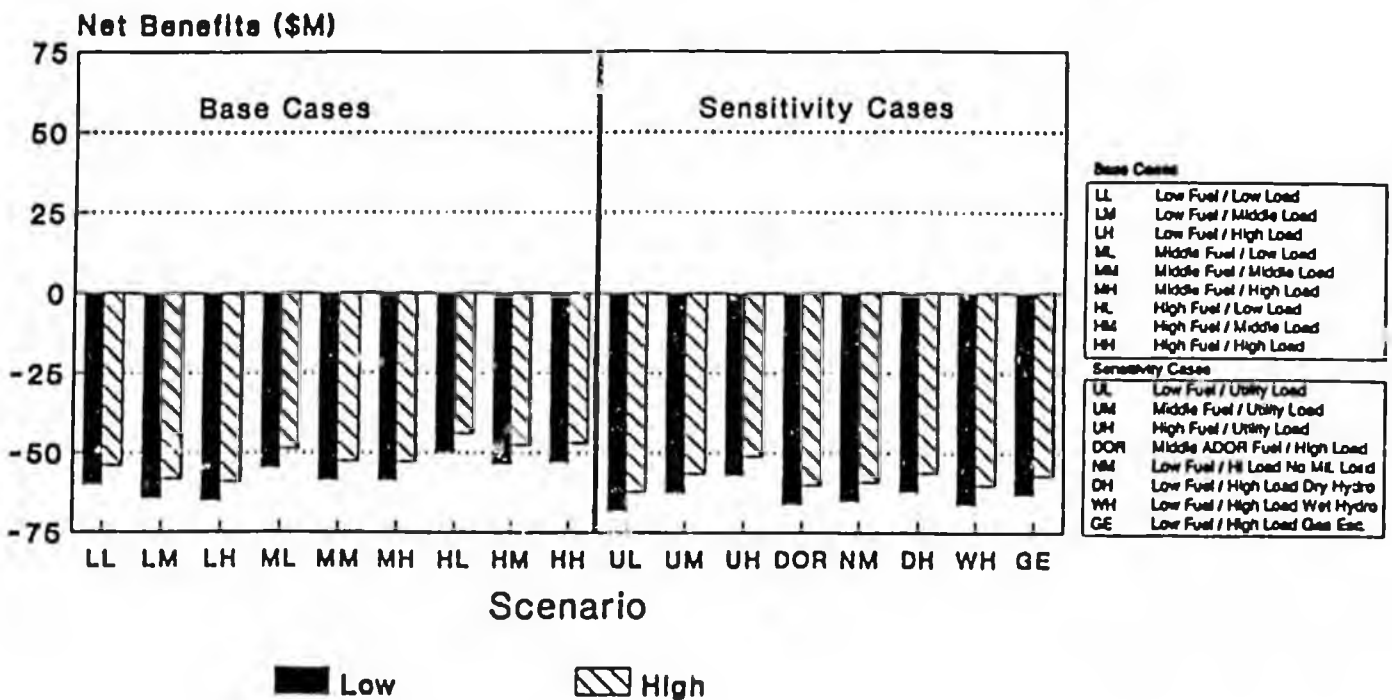
A proposed 230 KV line between Anchorage and the Kenai Peninsula. The cost estimate used in the analysis is for the preferred "Enstar" route, which crosses the Kenai National Wildlife Refuge in a corridor adjacent to the existing Enstar natural gas pipeline right-of-way, and includes an underwater crossing of Turnagain Arm.

Results

The net benefits calculated for each set of assumptions are shown in Figure 1 below:

FIGURE 1

NEW 230 KV KENAI-ANCHORAGE INTERTIE: NET BENEFITS



Selected Issues

1. System Stability with Bradley Lake. An important issue that arose during the course of the study is the impact of Bradley Lake operation on system stability, and the usefulness of a new Kenai-Anchorage intertie in resolving stability problems. "System stability" refers to the synchronous operation of all interconnected generators.

In the absence of corrective measures, operation of Bradley Lake at or near peak capacity would create a significant potential for stability problems. It was suggested by the Railbelt utilities that construction of a new Kenai-Anchorage intertie would be an important and perhaps necessary step in resolving the stability issues.

Further analysis conducted as part of the Railbelt Intertie Reconnaissance Study concluded that construction of the new intertie would help resolve stability problems, but not by much. The solution recommended by our contractor, Power Technologies Inc. (PTI), in the absence of a new intertie includes the installation of braking resistors and stabilizers at Bradley Lake in addition to a static var (SVS) unit and 3 series capacitors on the Kenai Peninsula. With the new intertie, the recommendation is the same except that the SVS is smaller and 2 series capacitors are needed instead of 3. The cost savings from these reductions was estimated at \$2.8 million, and was included as a benefit of the proposed new intertie.

The Bradley Lake project budget has now been amended by including the stability aids recommended in the absence of a new intertie. The estimated cost is \$7.75 million. The stability issue associated with the Bradley Lake project will therefore be addressed as part of that project.

2. 138 KV alternative. The Railbelt utilities have more recently proposed that the new intertie be "downsized" to 138 KV rather than 230 KV. The 138 KV line construction cost estimate prepared for the utilities is \$61.5 million (1989 dollars), which is about \$20 million less than the 230 KV cost estimate. The Authority has not performed any formal review of this estimate. Given that estimate, however, the present value of costs (including O&M costs) for this alternative would be approximately \$75 million.

If the 138 KV line captured 100 percent of the 230 KV benefits, and assuming the "high" level of benefits shown in Table 2 above (including the additional \$8-9 million

noted in footnote "c"), the estimate of benefits for the 138 KV line would be about \$58 million. This would yield a benefit/cost ratio of approximately 0.8 for the 138 KV line.

The Railbelt utilities have commissioned Decision Focus Inc., our contractor for the Railbelt intertie benefit/cost analysis, to work with them on further review of the economic potential of the 138 KV line alternative. The focus will necessarily be on the possibilities for substantial upward revision of the benefits estimated in this reconnaissance study. Their analysis will be complete prior to the 1990 legislative session.

II. FULL UPGRADE OF ANCHORAGE-FAIRBANKS INTERTIE

Estimated Capital Cost

\$118.2 million (1987 dollars)

Brief Project Description

Presently, the transmission link between the Wasilla area and Fairbanks consists of three segments:

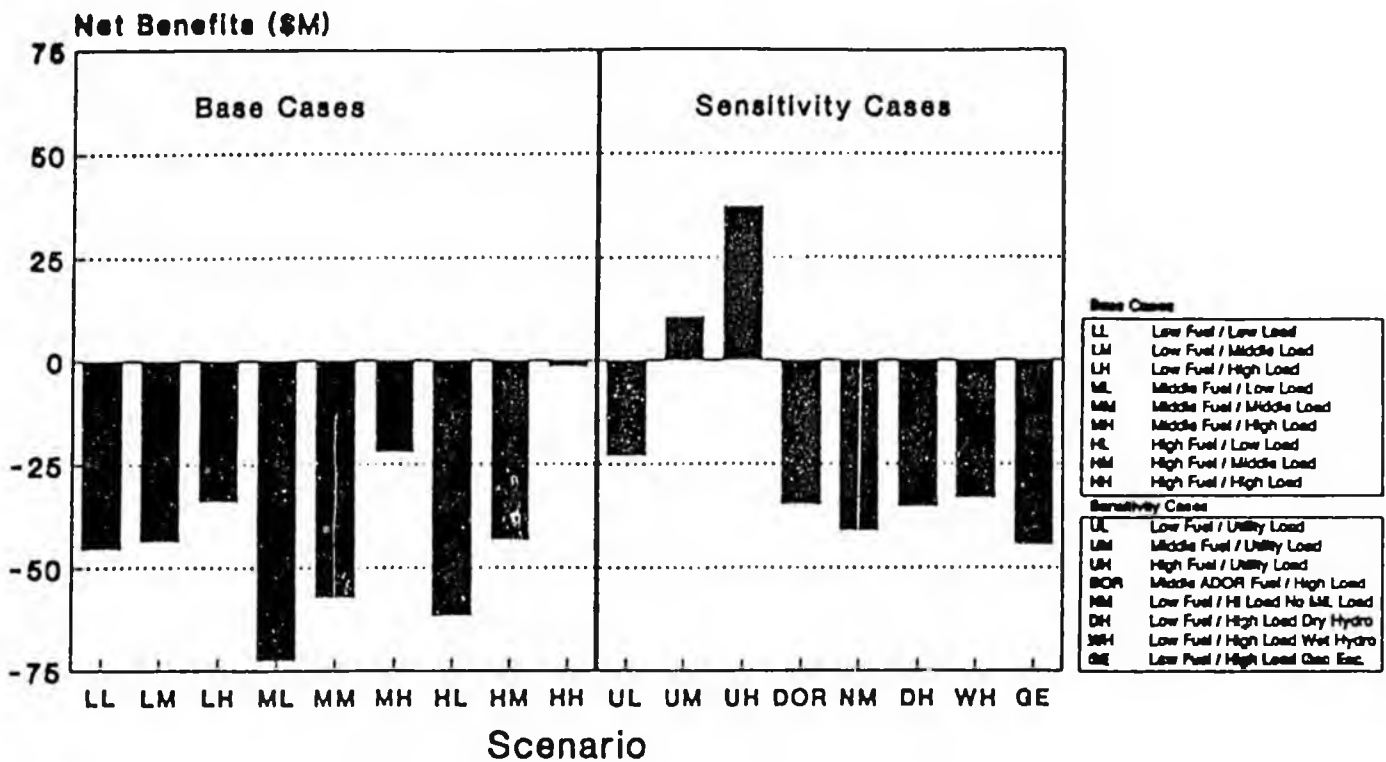
1. Wasilla to Willow -- 138 KV line owned by Matanuska Electric Association.
2. Willow to Healy -- 345 KV line owned by the Alaska Energy Authority. The line is presently operated at 138 KV, consistent with voltages at either end.
3. Healy to Fairbanks -- 138 KV line owned by Golden Valley Electric Association.

The full upgrade proposal consists primarily of new 345 KV line construction between Willow and the Chugach Electric Association transmission system south of Wasilla, and new 345 KV line construction between Healy and Fairbanks. This revised link between Anchorage and Fairbanks would initially be operated at 230 KV, raising the transfer capability from the present level of 70 MW to 225 MW.

Results

The net benefits calculated for each set of assumptions are shown in Figure 2 below:

FIGURE 2
FULL UPGRADE OF ANCHORAGE-FAIRBANKS INTERTIE: NET BENEFITS



Selected Issues

1. Revised utility proposal. Refer to "selected issues" discussed in the next section ("limited upgrade of existing Anchorage-Fairbanks intertie") for discussion of revised utility proposal.

III. LIMITED UPGRADE OF EXISTING ANCHORAGE-FAIRBANKS INTERTIE

Estimated Capital Cost

\$8.8 million (1988 dollars)

Brief Project Description

Presently, Fairbanks can receive an estimated 61.6 MW of power over the intertie when 70 MW is input from Anchorage, assuming the existing 25-MW Healy coal plant is in operation at the time. Most of the losses are incurred on the section of the line between Healy and Fairbanks. The limited upgrade would allow Fairbanks to receive an estimated 84.2 MW over the intertie when 100 MW is input from Anchorage. In other words, an additional 30 MW of power input from Anchorage would allow an additional 22.6 MW to be received in Fairbanks.

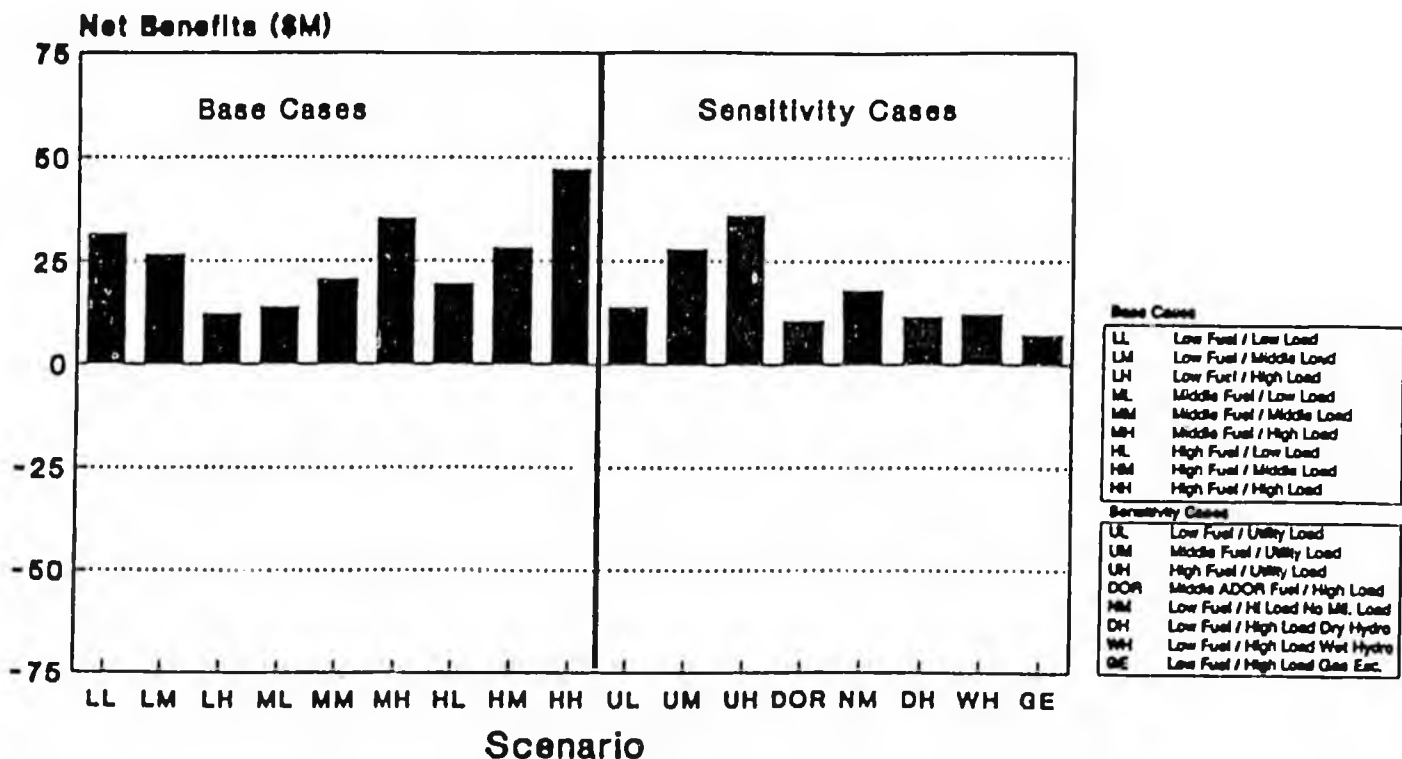
The main components of this limited upgrade consist of one static var (SVS) unit supplementing the three units now in place on the intertie, one additional transformer, and six series capacitors.

Results

The net benefits calculated for each set of assumptions are shown in Figure 3 below:

FIGURE 3

LIMITED UPGRADE OF ANCHORAGE-FAIRBANKS INTERTIE: NET BENEFITS



Selected Issues

1. Revised utility proposal. The Railbelt utilities have more recently proposed an alternative that would combine the limited upgrade described in this section with a new 138 KV line between Healy and Fairbanks. The 138 KV line construction cost estimate prepared for the utilities is \$47.2 million (1989 dollars). The Authority has not performed any formal review of this estimate. Given this estimate, however, the capital cost of the combined alternative would be approximately \$56 million.

The addition of the proposed 138 KV Healy-Fairbanks line to the "limited upgrade" alternative would accomplish primarily the following:

- a) Transmission losses would be reduced. Though accounted for in the economic analysis of the limited upgrade, these losses increase in proportion to transfer levels and are especially noteworthy on the Anchorage-Fairbanks line above 70 MW.
- b) By reducing transmission losses, the potential for cost-effective power transfers would increase beyond the level that may be economic under the limited upgrade alone.
- c) The new line would allow the existing potential for Anchorage-Fairbanks transfers to be maintained even if a new coal-fired power plant were built at Healy. Without a new line, an additional power plant at Healy would reduce the potential for Anchorage-Fairbanks transfers by the amount of its power output.

A preliminary review of this proposal suggested that the incremental benefits of a new line from Healy to Fairbanks, in the form of reduced transmission losses and marginally higher transfer capability, would be less than its estimated \$47.2 million incremental capital cost. However, given the substantial excess of benefits over costs estimated for the limited upgrade alone, the combined proposal might still exhibit a benefit/cost ratio of 1.0 or higher.

The Railbelt utilities have commissioned Decision Focus Inc., our contractor for the Railbelt intertie benefit/cost analysis, to work with them on further review of the economic potential of this combined alternative. Their analysis will be complete prior to the 1990 legislative session.

IV. NORTHEAST INTERTIE

*Limited upgrade
Healy to 30kV*

Estimated Capital Cost

\$155 million (1988 dollars)

Brief Project Description

This was proposed as an alternative to the Anchorage-Fairbanks intertie upgrade. The proposed line would run from Palmer through Glennallen to Delta Junction, where it would connect with the Golden Valley system in the Fairbanks area. It is distinguished from the full upgrade proposal primarily because it would provide a second, independent circuit to Fairbanks and would also tie in the Copper Valley system.

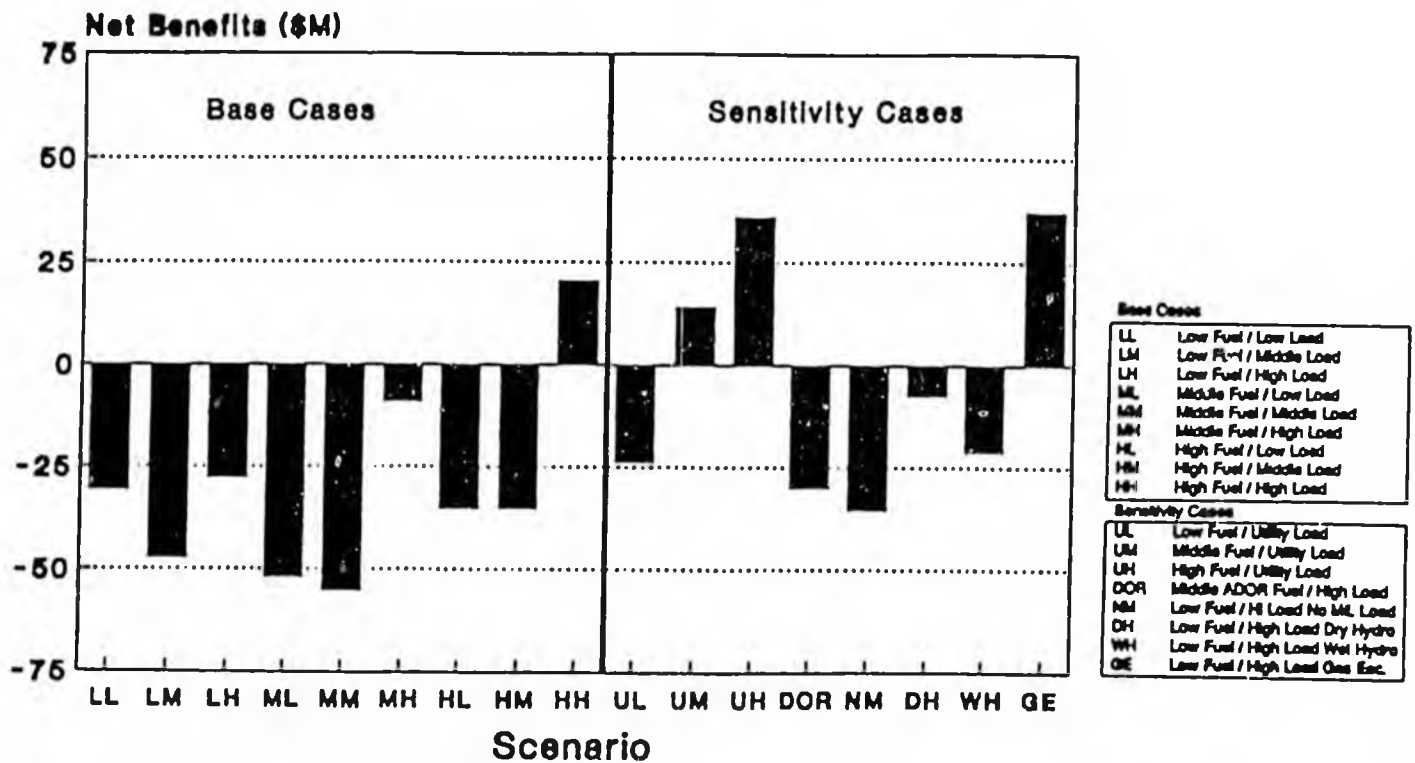
The proposed line would be constructed at 230 KV but operated initially at 138 KV with a transfer capacity of 150 MW. In combination with the existing Anchorage-Fairbanks intertie, the combined transfer capability would therefore be 220 MW, minus whatever intermediate load is served along the Northeast intertie route.

Results

The net benefits calculated for each set of assumptions are shown in Figure 4 below:

FIGURE 4

NORTHEAST INTERTIE: NET BENEFITS



Selected Issues

1. The Northeast intertie proposal generated far more public comment and concern than all of the other projects combined. Specifically, residents along the Glenn Highway have expressed anxiety about the effect of the proposed line on visual and aesthetic values in the Matanuska Valley and also on the health of those who might live near the line. Although these concerns have been addressed within the reconnaissance study, it would be premature to consider these issues resolved. As noted below in the section entitled "Reconnaissance and Feasibility Study Requirements," any further consideration of this proposal will require additional work to seek public consensus on acceptable route selection.

V. COAL-FIRED POWER PLANTS IN THE RAILBELT

Estimated Capital Cost

A 50-MW coal-fired power plant at Healy was selected for the analysis. Due to continued uncertainty regarding the capital cost of the plant, the evaluation was performed with respect to two alternative construction cost assumptions:

- a) \$1600 / kW, or \$80 million (1987 dollars);
- b) \$3200 / kW, or \$160 million (1987 dollars).

The higher cost estimate was produced by our consultant on this issue, Stone & Webster Engineering Corp., as part of a broader effort to estimate coal plant costs for a range of sizes and locations. Since then, Usibelli Coal Mine commissioned Stone & Webster to produce a site-specific cost estimate for their proposed 50-MW plant at Healy. The estimate produced for Usibelli Mine came to roughly \$2400/kW (in 1987 dollars), or about \$120 million. Based on this more detailed, site-specific assessment, it appears that the cost is likely to be near the middle of the range examined in our reconnaissance study.

Brief Project Description

As noted above, a 50-MW minemouth power plant at Healy was selected for analysis. Our consultant recommended that the evaluation be based on "atmospheric fluidized bed combustion" (AFBC) technology, primarily for the following reasons:

1. AFBC is somewhat less costly than conventional pulverized coal technology because sulfur dioxide emissions can be minimized without the use of costly scrubbers.
2. AFBC produces lower levels of nitrous oxide emissions.
3. AFBC units have excellent fuel flexibility. The combustion process can accommodate a range of fuel blends without costly retrofit.
4. AFBC is now considered an established and reliable technology.

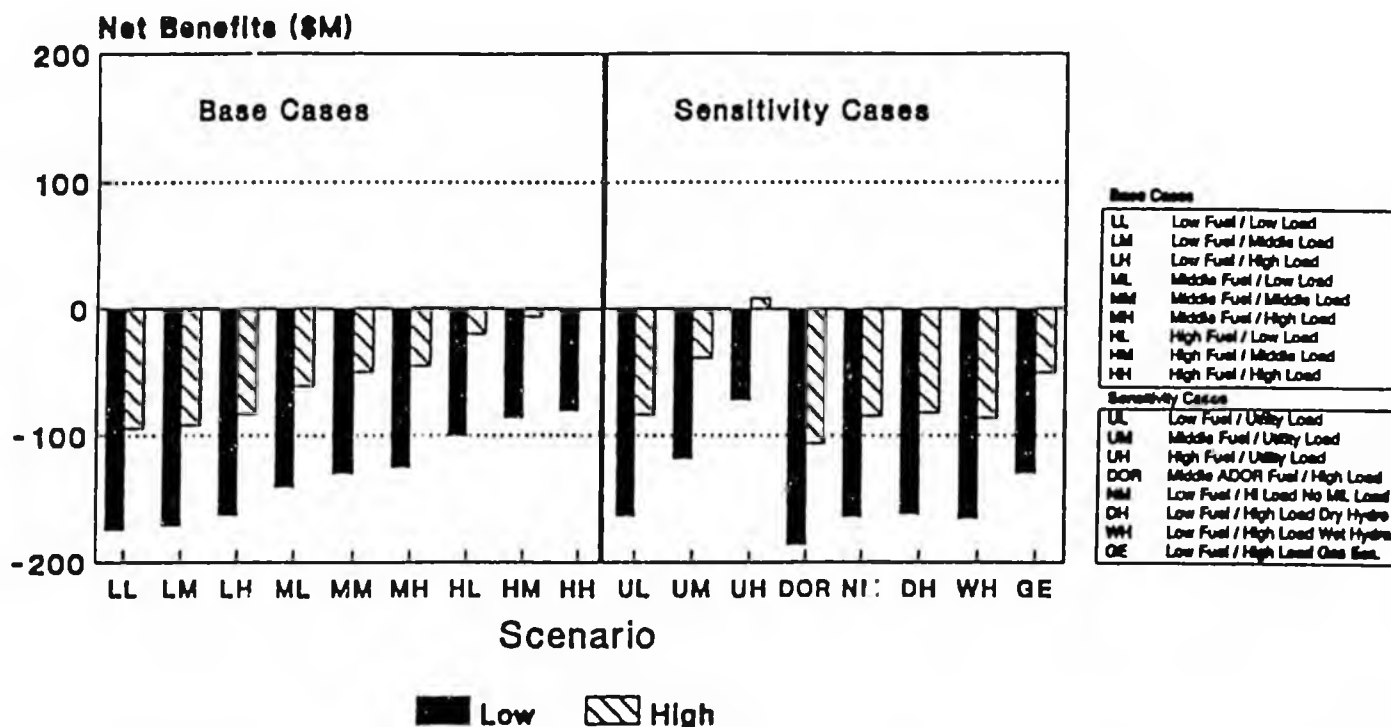
It was assumed in the economic assessment that the AFBC plant would burn a 50/50 blend of waste coal and standard coal, based on expectations expressed by the Usibelli Mine. Cogeneration for coal drying or any other purpose was not assumed. This is discussed below under "Selected Issues."

Results

The net benefits calculated for each set of assumptions are shown in Figure 5 below:

FIGURE 5

50-MW COAL-FIRED POWER PLANT AT HEALY: NET BENEFITS



Selected Issues

1. Breakeven Capital Cost. We estimated what the capital cost of the coal plant would have to be in order for the long-term system costs to be equal with and without the plant, i.e. in order for the plant economics to reach breakeven. Given the "Low" fuel price scenario for gas and oil, the coal plant would have to be essentially free. Given the "High" fuel price scenario for gas and oil, the plant would have to cost roughly between \$1000 / kW and \$1500 / kW, or roughly \$50-75 million. Our "expected value" places the breakeven capital cost at roughly \$200 / kW, or about \$10 million (1987 dollars).

Due to the existing Anchorage-Fairbanks intertie, the coal plant must compete for the most part with gas-fired generation produced in the Anchorage region. Although the assumed price of coal is lower than the assumed price of gas, both the capital cost and the operation and maintenance (O&M) costs of coal-fired power plants are far above those of gas-fired generation. Because of this, the capital cost of the coal plant must be highly subsidized under most scenarios in order for the economics of coal-fired generation to be competitive.

2. Cogeneration for Coal Drying. The Usibelli Mine proposed that the coal plant be built and operated as a cogeneration facility which would provide heat in some form to a coal drying process as well as steam for electric power production. In order for this to improve the coal plant economics, the coal dryer would have to be willing to pay more for the heat than the incremental cost of producing the heat. We were unable to learn enough about coal drying processes and economics to determine whether this would be likely.

As discussed below in item #4, further review of coal drying processes by the Usibelli Mine has, for now, cast doubt on its near-term prospects.

3. Railbelt Energy Fund: \$30 Million Reserve. The 1989 Legislature created a \$30 million reserve in the Railbelt Energy Fund for the Healy cogeneration project. Funds from this reserve may not be spent unless appropriated by the Legislature, and the unappropriated balance of the reserve lapses back to the Railbelt Energy Fund on June 30, 1990.

The legislation also expresses intent that 3 conditions be met before funds will be appropriated from the reserve:

- a. a draft power sales agreement will be obtained;
 - b. a finance plan will be developed -- project sponsors will work with the Alaska Industrial Development and Export Authority (AIDEA) to evaluate ownership and financing options;
 - c. a commitment will be obtained from the federal Department of Energy, Clean Coal Technology Program, to the Healy cogeneration project for a grant that at least matches the state contribution (i.e. \$30 million).
4. Application to Federal Department of Energy: Status of Project. The Usibelli Mine has been working with AIDEA to prepare an application for federal Clean Coal Technology program funds. The application was submitted in August, and a funding decision on the application is due from the federal Department of Energy at the end of December 1989.

The application seeks a federal contribution of roughly 50 percent of the project construction cost. The nominal construction cost (i.e. including inflation) is estimated in the application at roughly \$160 million for a proposed 50-MW power plant at Healy. Thus the application seeks a federal contribution of roughly \$80 million towards the plant capital cost.

Cogeneration is not a part of the current proposal to the Department of Energy (DOE). According to the Usibelli Mine, their most recent review of coal drying technology and economics persuades them that, for now, cogeneration for coal drying would degrade rather than enhance the project economics. As a result, though the proposed plant would be built with provision for roughly 10 percent heat extraction for possible cogeneration sometime in the future, there is at present no coal drying aspect to the power plant proposal.

Our consultant had recommended AFBC technology due in part to its acceptance as an established and reliable process on a utility scale. However, the purpose of the Clean Coal Technology program is not to subsidize technology that has already been established, but to encourage the testing and demonstration of promising new technologies. As a result, there would be no DOE contribution for construction of an AFBC plant, or any other plant that represented commercially established technology.

Alternative technologies have therefore been under consideration by project sponsors at the Usibelli Mine. Pressurized fluidized bed combustion (PFBC) was explored earlier this summer, but has since been set aside in favor of a different approach called an "entrained coal (or slagging coal) combustor." According to a Usibelli representative, the reason DOE might contribute to such a project is that the technology apparently promises to capture the environmental benefits of AFBC, but may potentially be less expensive and may also lend itself more readily to retrofit of existing coal-fired boilers. Again according to the sponsor, DOE has funded one project that incorporates this technology on a smaller scale.

A possible scenario for financing and construction of this project has emerged, and is noted briefly here for the information of the Board:

- a. DOE may approve a contribution as high as \$80 million (in nominal dollars) towards construction of the project. However, additional subsidy may still be needed to conclude a power sales agreement in order for the project to go forward.
- b. The State may then appropriate the \$30 million "reserve" from the Railbelt Energy Fund to make the project a reality, which in turn would bring the federal funds to Alaska.
- c. AIDEA may then issue bonds for the remaining project cost (perhaps \$50 million nominal), and would be the owner of the project.
- d. The Alaska Energy Authority may be asked to serve as construction manager for the project, and possibly the project operator as well. The construction management role is seen as analogous to the role played by the Alaska Department of Transportation and Public Facilities with respect to construction of the road to the Red Dog Mine on behalf of AIDEA.
- e. The Usibelli Mine would sell coal to the project, but would not participate in its construction, ownership or operation.

VI. NATURAL GAS PIPELINE BETWEEN COOK INLET AND FAIRBANKS

Estimated Capital Cost

Main Pipeline Link: \$190 million (1988 dollars)
 Fairbanks Distribution System: \$ 34 million (1988 dollars)

Brief Project Description

The project consists of a 16 inch diameter buried pipeline extending from the Cook Inlet area near Wasilla to Fairbanks. Although Enstar Natural Gas Co. originally proposed a 20 inch line, the 16 inch size would be adequate with compression to carry the maximum Fairbanks gas demand projected in this study, and could also accommodate most of the current residential and commercial demand in southcentral Alaska should the direction of flow be reversed sometime in the future.

The pipeline route generally follows the existing transportation corridor formed by the Parks Highway and the Alaska Railroad. The distribution system in the Fairbanks area would ultimately provide natural gas access to approximately 60 percent of residential households and 95 percent of commercial floorstock outside the downtown district heating system.

Results

The net benefits calculated for each set of assumptions are shown in Figure 6A below. Roughly 80 percent of the benefits were estimated to accrue outside the electric power sector. Figure 6B displays this allocation of benefits.

FIGURE 6A

COOK INLET TO FAIRBANKS GAS PIPELINE: NET BENEFITS

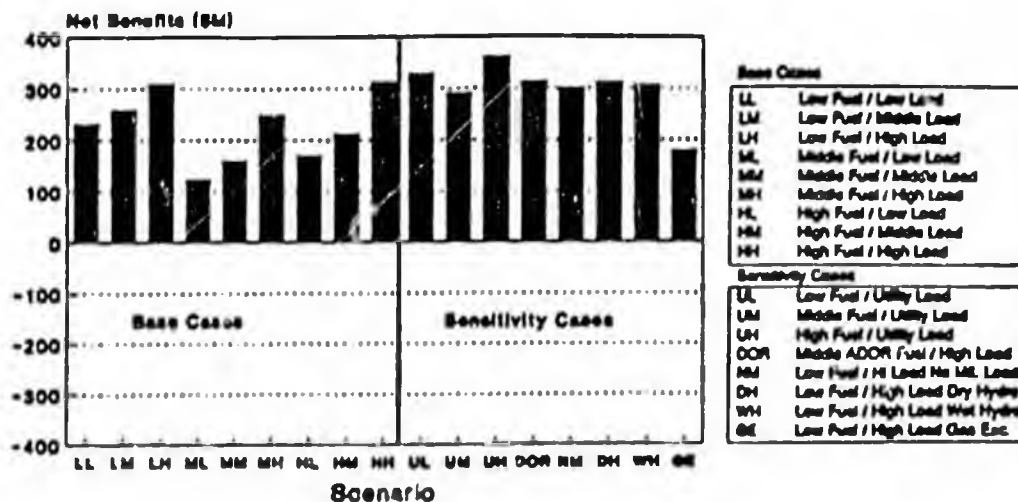
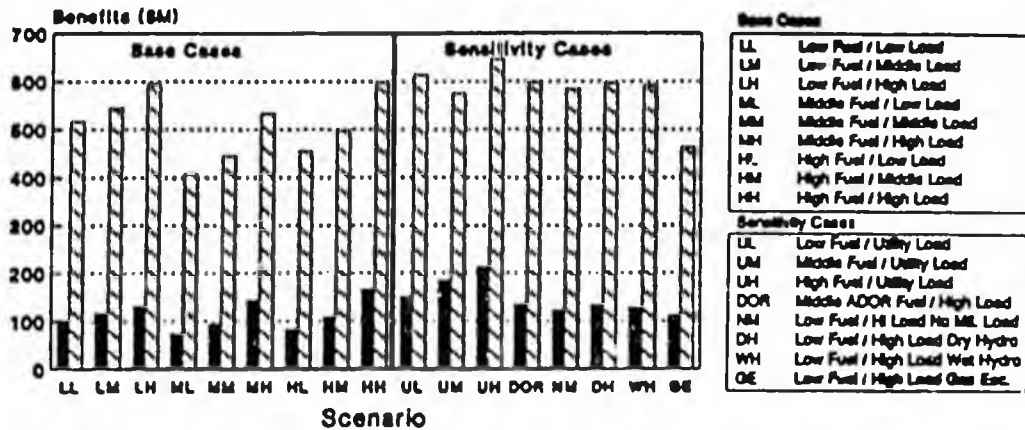


FIGURE 6B

GAS PIPELINE: BENEFITS WITHIN VERSUS OUTSIDE THE ELECTRIC POWER SECTOR



Selected Issues

1. Market Penetration for Natural Gas. The delivered price of natural gas in Fairbanks would heavily influence the rate of conversion from oil to gas. The delivered price is dependent not only on the wellhead gas price, but also on the magnitude of pipeline capital costs that must be recovered in the rates and on the volume of gas sold in the Fairbanks area. These volumes are particularly dependent on the decisions of potential major customers such as the military. In the event that delivered prices are not low enough to stimulate many conversions from oil to gas (despite our estimates of long-term economic advantage), the State may find it necessary to further subsidize conversions so that the State investment in the gas pipeline is well utilized.
2. Weatherization. The analysis assumes that fuel demand per household for space heating will decline gradually in Fairbanks due to improved furnace efficiencies and improved insulation in new construction. However, the relative merits of an aggressive weatherization program in Fairbanks are not assessed in this study.
3. North Slope Gas Development. The analysis considered one scenario in which North Slope gas becomes available in the Fairbanks area, and its price is assumed to fall below the Cook Inlet gas price shortly after 2010. Substantial benefits are realized in this case by reversing the flow of the Cook Inlet - Fairbanks line, which would bring the benefits of North Slope gas to Anchorage.

Other possibilities were not considered. For example, if North Slope gas becomes available in Fairbanks at a price roughly comparable to Cook Inlet gas, then the benefits of the proposed Cook Inlet - Fairbanks line could be nullified at that time. The plausibility of such scenarios has not been evaluated.

VII. ELECTRIC END-USE CONSERVATION PROGRAMS

Estimated Budgetary Cost

Top Three Programs: \$16.7 million (1987 dollars)
Next Five Programs: \$29.6 million (1987 dollars)

Top Eight Programs (total): \$46.3 million (1987 dollars)

Costs are based on program implementation over a ten year period.

Brief Program Descriptions

Proposed electric end-use conservation programs were analyzed in two groups: (1) three programs judged to be most economic on the basis of a preliminary economic screening, and (2) all eight programs judged to be most promising on a preliminary basis, including the top three.

The top three programs include:

1. electric-to-gas water heat conversions (Residential)
2. efficient fluorescent lamps (Commercial)
3. incandescent to fluorescent lamp conversions (Commercial)

These programs are structured around dealer/contractor rebates, i.e. rebates to the businesses that sell or install eligible efficiency equipment, thereby reducing the price of efficiency investments faced by consumers.

The top eight programs include, in addition to the three listed above, the "Next Five" programs as follows:

4. efficient electric water heaters (Residential)
5. electric-to-gas clothes dryer conversions (Residential)
6. efficient refrigerators (Residential)
7. electronic ballasts for fluorescent lamps (Commercial)
8. electric efficiency in new commercial buildings (Commercial)

Programs #4-7 are also structured around dealer/contractor rebates. Program #8 would provide rebates to the owners and designers of new or remodeled commercial buildings based on the design efficiency of lighting and ventilation systems.

Results

The net benefits calculated for each set of assumptions are shown for the top three programs in Figure 7A. Net benefits for the top eight programs are shown in Figure 7B.

FIGURE 7A

TOP THREE END-USE PROGRAMS: NET BENEFITS

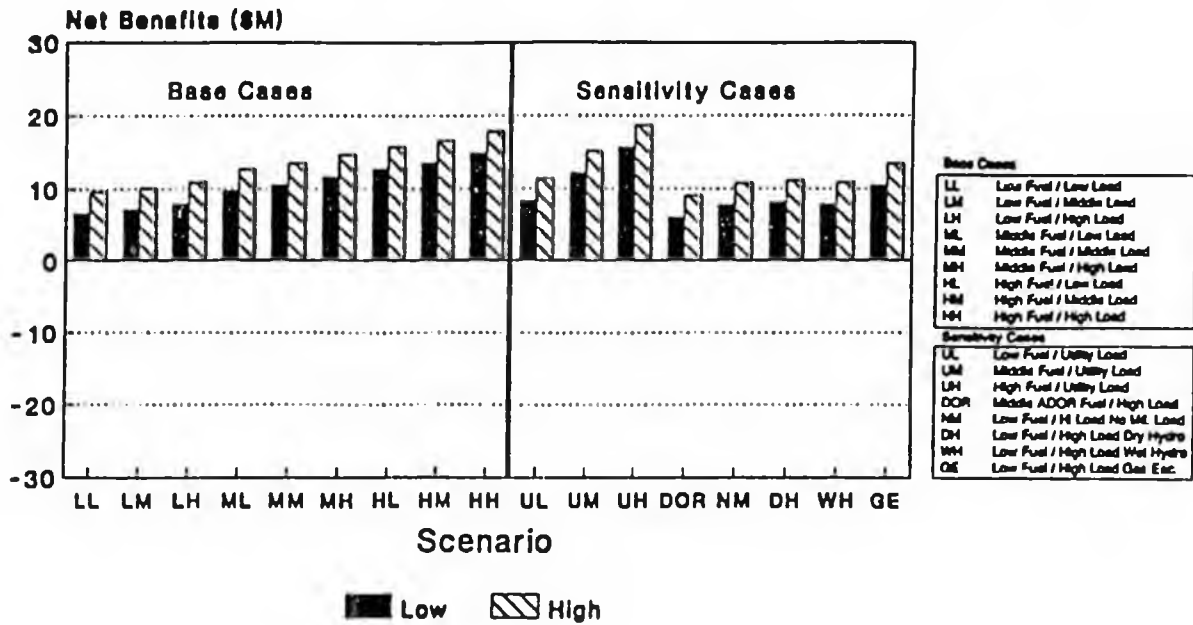
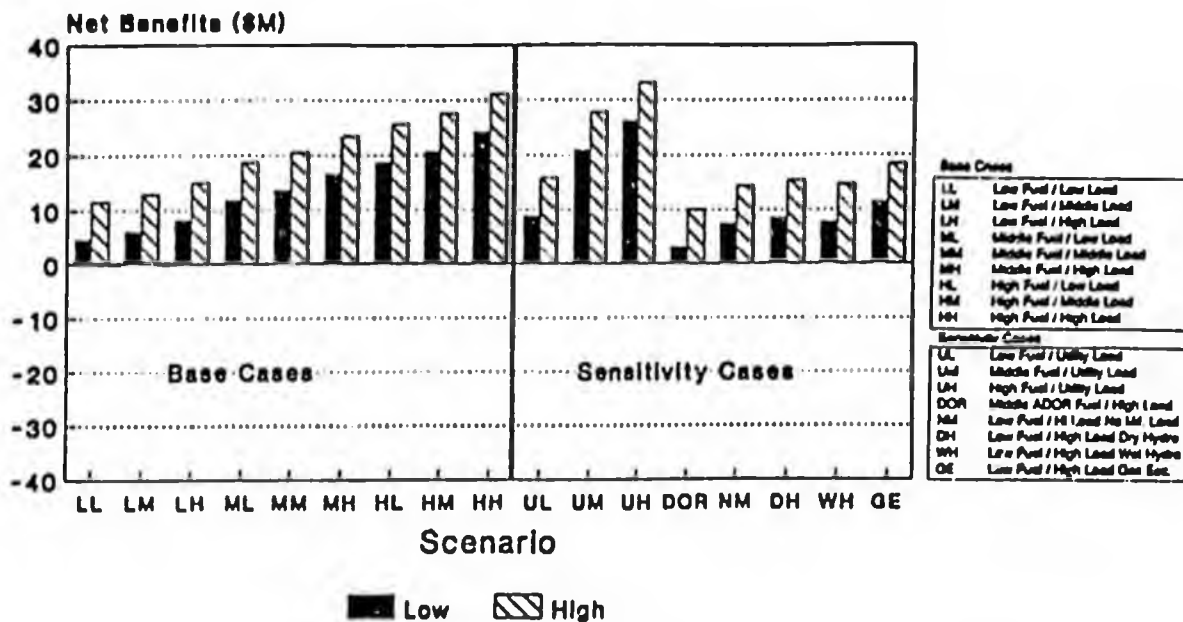


FIGURE 7B

TOP EIGHT END-USE PROGRAMS: NET BENEFITS



Particularly for the "Low" fuel price scenarios, the net benefits of the top eight programs are close to the net benefits for the top three programs alone. In other words, the benefits of the "Next Five" programs are roughly equal to their costs for these scenarios. Because the "Low" fuel price was accorded a 60 percent probability, these scenarios heavily influence the "expected value" of benefits used in the calculation of benefit/cost ratios. These benefit/cost ratios are displayed below:

	Benefit/Cost Ratio (Range)
Top Three Programs	1.6 - 1.7
Next Five Programs	1.1 - 1.2
Top Eight Programs Combined	1.2 - 1.4

Selected Issues

1. Program Duration. All of the programs are intended to encourage the installation of efficient equipment at the time of normal purchase or replacement. No intensive retrofit programs are proposed, primarily because they involve higher economic costs (useful equipment is prematurely replaced) which are harder to justify in the present Railbelt context of relatively low electrical generation costs. Although the proposed programs are more cost-effective than accelerated retrofit-type programs, they need more time for their effects to fully register. Because the stock of appliances and equipment may take 10 to 20 years to turn over, programs that encourage efficiency upgrades at the time of normal replacement may have to be in place for 10 to 20 years to have the potential for affecting the entire appliance stock.

We assumed in this analysis that the programs would remain in place for 10 years. This judgment was based on the idea that program funding over a substantially longer period was probably unrealistic, but that more than a few years of implementation would be necessary for these types of programs to have a significant impact.

Finally, although the assumption of a 10 year life was made for all eight programs, some programs may reach their peak impact in a shorter period due to faster than average turnover of the targeted appliance. For example, the fluorescent lamp rebate program, which is one of our "top three," is estimated to achieve its peak impact within 5 years of program inception.

As a result, with the exception of one project, the economic and engineering analysis contained in the Railbelt Intertie Reconnaissance Study was prepared such that no additional work in these areas would be necessary to satisfy feasibility study requirements. If one or more of the identified projects were to proceed to feasibility level (and assuming its B/C ratio developed in the reconnaissance phase exceeds 1.0), the economic and engineering portions could be resubmitted through the process without substantive revision.

The exception to this is the economic analysis of the proposed natural gas pipeline linking Cook Inlet and Fairbanks. For that project, roughly 80 percent of the benefits were estimated to occur outside the electric power sector, i.e. within the residential and commercial heating markets. These non-power benefits were estimated in an analysis for which we allocated \$25,000. Although that analysis clearly suggests that the proposed pipeline would produce net economic benefits, our judgment is that a feasibility level analysis should include further consideration of uncertainties such as market penetration for natural gas, prospects for improved weatherization, and possibilities associated with North Slope natural gas development.

For some of the other projects, a judgment would be needed regarding the necessity for additional environmental analysis. Although the requirements for such analysis defined in statute and regulation are no different for reconnaissance and feasibility studies, it may be advisable to explore further certain environmental issues during the feasibility stage should the project advance to that level of review. Specifically, these issues are:

- a) For the proposed Anchorage-Kenai intertie, the preferred route crosses the Kenai National Wildlife Refuge in a corridor adjacent to the existing Enstar gas pipeline right-of-way. The alternate route along the west coast of the Kenai Peninsula is \$18 million more expensive. It may be premature to declare the preferred route "feasible" until a formal indication is received from the U.S. Fish and Wildlife Service that an intertie right-of-way can be obtained on acceptable terms. It may be necessary to submit a right-of-way application to elicit that indication. Our consultants have advised that preparing the application may require about 9 months and \$300,000.
- b) For the proposed Northeast intertie, route selection has triggered intense concern among many Glenn Highway residents regarding primarily visual impact from the highway and possible health effects of proximity to

transmission lines. Although these concerns have been addressed to some extent within the reconnaissance study, it would be advisable to seek a consensus among the affected residents on acceptable routing before declaring the project "feasible."

In summary, the additional work that would be needed or recommended to satisfy all statutory requirements of the project review process is as follows:

- a) For the gas pipeline, additional economic analysis for the feasibility study phase.
- b) For the Anchorage-Kenai Intertie, additional environmental analysis for the feasibility study phase which may include preparation of a right-of-way application through the Kenai National Wildlife Refuge.
- c) For the Northeast Intertie, additional environmental analysis for the feasibility study phase in order to develop a public consensus on acceptable routing.
- d) For any of the projects under review, a plan of finance that would evaluate financing alternatives and also satisfy feasibility study requirements for estimating the "cost of power" based on such alternatives.
- e) For any of the projects under review, an independent cost estimate.

Additional funds would be needed in order to pursue any of these items. The \$2.25 million appropriation has been spent.

Possible Exemptions from Review Process

It appears that the limited upgrade of the Anchorage-Fairbanks intertie may be exempt from the statutory project approval process. The limited upgrade consists primarily of one additional static var (SVS) unit to supplement the three units now in place on the intertie, one additional transformer, and six series capacitors, at an estimated capital cost of \$9 million. AS 44.83.187 states that the statutory approval process does not apply to additions and modifications that are undertaken "for the purpose of completing a project." If the proposed electrical equipment qualifies under this definition, then funding for the limited upgrade could be sought without further steps in the review process.

The proposed electric end-use conservation programs and the natural gas pipeline project may be exempt from the statutory

project approval process as well. AS 44.83.187 defines the applicability of the process but refers only to generation, transmission, and distribution projects. There is no mention of conservation programs or natural gas pipelines.

D. RECOMMENDATIONS

1. Based on the negative results of the benefit/cost analysis, remove the following three proposed transmission projects from further consideration at this time:
 - a. 230 KV intertie between Anchorage and the Kenai Peninsula.
 - b. Full upgrade of the Anchorage-Fairbanks intertie.
 - c. Northeast intertie.

Direct staff to review the Railbelt utility studies regarding downsized intertie alternatives upon completion, and present the results to the Board.

2. Defer consideration of the "limited Anchorage-Fairbanks upgrade" until the utility studies are complete regarding downsized intertie alternatives. At that time, the Board may decide to seek implementation or further review of one or more of these projects.
3. Defer consideration of the proposed natural gas pipeline until the utility studies are complete regarding downsized intertie alternatives. The Board's position on the gas pipeline can then be established in the context of its intertie decisions.
4. Direct staff to prepare a detailed budget request for implementing the "top three" end-use conservation programs, for submission to the Board no later than the November Board meeting. This is contingent on Board concurrence with the interpretation that conservation programs are exempt from further steps in the project approval process. Approximately \$20 million would be requested from the Railbelt Energy Fund to implement these programs.

Because the expected benefits of the "next five" conservation programs are marginal, further consideration of these programs should be deferred.

5. Based on the negative results of the benefit/cost analysis, remove proposals for coal-fired power plants in the Railbelt from further consideration at this time. For the 50-MW plant evaluated in this study, a 50 percent capital cost subsidy by the federal government would not be enough to bring the benefit/cost ratio above 1.0.

Should the project be funded in any event, the Authority should be prepared to participate in or manage its construction and/or operation to help protect State investment in the project.

6. Direct staff to submit the reconnaissance study to the Office of Management and Budget, which is then charged with reviewing the study for compliance with relevant statutory requirements.

ATTACHMENT A

RAILBELT INTERTIE RECONNAISSANCE STUDY

LIST OF VOLUMES

- 1 Economic and Demographic Projections for the Alaska Railbelt: 1988-2010, Institute of Social and Economic Research, August 1988.
- 2 Forecast of Electricity Demand in the Alaska Railbelt Region: 1988-2010, Institute of Social and Economic Research, April 1989.
- 3 Analysis of Electrical End Use Efficiency Programs for the Alaskan Railbelt, Institute of Social and Economic Research, April 1989.
- 4 Fuel Price Outlooks: Crude Oil, Natural Gas, and Fuel Oil, ICF Incorporated, August 1988.
- 5 Anchorage-Kenai Transmission Intertie Project, Power Engineers Inc. & Hart-Crowser Inc., May 1987.
- 6 Anchorage-Fairbanks Transmission Intertie Expansion and Upgrade Project, Harza Engineering Co., August 1987.
- 7 Railbelt Stability Study, Power Technologies Inc., January/May 1989.
- 8 Northeast Transmission Intertie Project, Power Engineers Inc. & Hart-Crowser Inc., June 1989.
- 9 Estimated Costs and Environmental Impacts of Coal-Fired Power Plants in the Alaska Railbelt Region, Stone & Webster Engineering Corp., November 1988.
- 10 Estimated Costs and Environmental Impacts of a Natural Gas Pipeline System Linking Fairbanks with the Cook Inlet Area, Stone & Webster Engineering Corp., January 1989.
- 11 Benefit/Cost Analysis, Decision Focus Inc., June 1989.

H B

1 2 1

Committee Action: 4-2-91

LABOR AND COMMERCE Committee considered:

HB 121

HOUSE BILL NO. 121

UTILITY INTEGRATED RESOURCE PLANS

Act requiring certain electric utilities to prepare integrated resource plans; prohibiting state agencies and operations from participating in certain projects unless they are consistent with the approved integrated resource plan; and requiring a report concerning disruption of the state's energy supply."

RECOMMENDATIONS: [] the same title
replaced with [] a new title

- I have attached amendments(s)
I do pass
I do not pass
I no recommendations
I individual recommendations
I additional referral to the _____ Committee

DOPTS: _____ letter of Intent

ATTACHES NEW FISCAL NOTE(S): (Dept) APPROVES PREVIOUS: (Dept/Date)
I fiscal impact DCFD - APUC, DCFD - AFA, etc. DCFD [] fiscal note(s) DCRA
I zero fiscal note [] zero fiscal note(s)

Table with columns: SIGNING DO PASS, DP, OTHER RECOMMENDATIONS, DNP, NR, AM. Includes handwritten signatures and an 'X' mark in the NR column.

CHAIRMAN'S SIGNATURE

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. CSHB 121

Revision Date: March 21, 1991
 Title: An act requiring certain elect. utils. to prepare int.res. plans
 Sponsor: Rep. Kay Brown
 Requestor: Rep. Kay Brown

Department Affected: DCED
 BRU: APUC
 Component: _____
 COMPONENT SERIAL NO. _____

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES	30	60	62	64	66	68
TRAVEL	5	15	5	5	5	15
CONTRACTUAL	75	125				175
SUPPLIES		10			10	
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	110	210	67	69	81	268

CAPITAL						
---------	--	--	--	--	--	--

REVENUE						
---------	--	--	--	--	--	--

FUNDING: (Thousands of Dollars)

GENERAL FUND	110	210	67	69	81	268
FEDERAL FUNDS						
OTHER						
TOTAL	110	210	67	69	81	268

POSITIONS:

FULL-TIME						
PART-TIME	0.5					
TEMPORARY						

Estimate of current year impact: No impact in FY91

ANALYSIS: (Attach a separate page if necessary.)

Prepared by: [Signature], Acting Exec. Director Phone: 276-6222
 Division: Alaska Public Utilities Commission Date: 3/21/91

Approved by Commissioner: _____ Date: _____
 Agency: _____

Distribution (by preparer): Legislative Finance, Legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).

FISCAL NOTE

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. HB 121

APUC & Alaska Energy Authority/Department of
Commerce & Economic Development
Community & Regional Affairs; Military &
Veteran's Affairs

Revision Date: _____
Title: "An Act requiring certain electric utilities
to prepare integrated resource plans; pro-
hibiting State agencies and corps. from partici-
pating in certain projects unless consistent

Department Affected: _____
BRU: _____
Description: w/the approved integrated resource plan..."

Sponsor: BROWN, Ellis, et. al.
Requestor: (H) Labor & Commerce

COMPONENT SERIAL NO. [] [] [] []

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES	740	-0-	-0-	-0-	700	-0-
TRAVEL						
CONTRACTUAL	1450	-0-	-0-	-0-	1350	-0-
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	2190	-0-	-0-	-0-	2050	-0-

CAPITAL	-0-	-0-	-0-	-0-	-0-	-0-
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REVENUE	-0-	-0-	-0-	-0-	-0-	-0-
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FUNDING: (Thousands of Dollars)

GENERAL FUND	2190	-0-	-0-	-0-	2050	-0-
FEDERAL FUNDS						
OTHER						
TOTAL	2190	-0-	-0-	-0-	2050	-0-

POSITIONS:

FULL-TIME	8	-0-	-0-	-0-	6	-0-
PART-TIME						
TEMPORARY						

Estimate of current year impact:

ANALYSIS: (Attach a separate page if necessary.)
See attached worksheet

Prepared By: Robert E. Lorenson, Executive Director
Division: Alaska Energy Authority
Phone: 465-3575
Date: 3/22/91
Approved by Commissioner: GLENN OLDS - [Signature]
Agency: Department of Commerce & Economic Development
Date: 3-26-91

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