

ALASKA LEGISLATURE SPECIAL COMMITTEE / SUBJECT FILE 8672

1306 SCOMM 50: HOUSE SPECIAL COMMITTEE ON STATE LOANS 1985-86

Table IV-4

OCEAN TRANSPORTATION COSTS FOR ZINC CONCENTRATE IN 1985 US\$

	#1 Vancouver (round trip)	#2 Vancouver (round trip)	Japan (round trip)	Europe (one-way)	Eastern Canada (one-way)
Volume (SDT)	330,000	330,000	120,000	110,000	25,000
One-way distance	2,600	2,600	3,000	10,975	9,335
Ship Data					
DWT, tonnes	37,500	60,000	26,500	60,000	26,750
Cargo capacity, tonnes	36,615	58,906	25,294	58,019	25,163
Draft, ft	35	43	34	43	34
Knots	12	13	14.5	13	14.5
Intermediate fuel consumption, tonnes per day	17	29	35	35	35
Marine diesel consumption, tonnes per day	2.0	2.5	2.0	3.0	2.0
Time charter rate per day, \$	\$5,130	\$9,500	\$4,000	\$6,000	\$4,000
Panama Canal toll	\$0	\$0	\$0	\$50,000	\$25,000
Port Data					
Destination port water depth, ft	35	45	34	45	45
Loading rate per day, tons	20,000	20,000	20,000	20,000	20,000
Discharging rate per day, tons	10,000	10,000	5,000	10,000	10,000
Fuel oil cost per tonne, \$	\$185	\$185	\$185	\$185	\$185
Diesel oil cost per tonne, \$	\$275	\$275	\$275	\$275	\$275
Port charges, \$	*	*	\$20,000	\$40,000	\$15,000
Trip Data					
Loaded cargo (SWT)	35,640	59,400	25,920	59,400	27,000
Loaded cargo (SDT)	33,000	55,000	24,000	55,000	25,000
Voyage steam time	19.5	18.0	18.6	38.0	29.0
Loading time	2.782	3.97	2.296	3.97	2.35
Discharging time	4.564	6.94	6.184	6.94	3.7
Canal transit time	0	0	0	1.5	1.5
Total voyage days	26.8	28.9	27.1	50.4	36.5
Cost Calculations					
Intermediate fuel cost	\$61,328	\$96,570	\$120,569	\$245,988	\$187,585
Marine diesel fuel cost	\$14,765	\$19,876	\$14,905	\$41,580	\$20,086
Canal charges	\$0	\$0	\$0	\$50,000	\$25,000
Port charges	*	*	\$20,000	\$40,000	\$15,000
Time charter cost	\$137,720	\$274,645	\$108,403	\$302,402	\$146,083
Insurance	\$12,000	\$25,000	\$10,000	\$25,000	\$10,000
Total voyage cost	\$225,813	\$416,091	\$273,877	\$704,970	\$403,754
Cost per SWT	\$6.34	\$7.00	\$10.57	\$11.87	\$14.95
Transship to smelters	\$24.00	\$24.00	\$5.00	\$10.00	\$5.00
Vancouver storage/handling*	\$12.00	\$12.00	\$0.00	\$0.00	\$0.00
Total cost per SWT	\$42.34	\$43.00	\$15.57	\$21.87	\$19.95

if movement of at least 250,000 tons per year through the port was guaranteed. Vancouver Wharves, however, has a shallow draft and ships requiring greater than 35 feet draft would be tide dependant. An alternative port is Roberts Bank, which could easily handle ships as large as 60,000 dead weight tons (dwt). Unloading and storage facilities would have to be installed at this facility, too, however.

Little inland haulage is anticipated, except for Trail, British Columbia, where the cost of moving the cargo is about \$24 per ton. We have assumed that inland haulage will be about \$5.00 per ton for Japan and Eastern Canada; and \$10 per ton for Europe. Most of the smelters that might be used are relatively close to the port of discharge. Forecasts of these costs are provided in Table IV.5.

Table IV-5

ESTIMATED TRANSPORTATION COST FOR ZINC CONCENTRATE
(per short wet ton)

	<u>1989</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>	<u>2005</u>	<u>2010</u>	<u>2018</u>
Barge capital and operating costs	\$14.48	\$5.98	\$6.16	\$6.78	\$7.57	\$10.20	\$12.85
Voyage, storage and handling, and transshipment costs							
Vancouver, B.C.	\$48.85	\$46.84	\$54.43	\$63.42	\$74.10	\$87.62	\$110.29
Japan	\$21.12	\$19.23	\$23.80	\$29.53	\$36.74	\$49.22	\$70.54
Eastern Canada	\$25.47	\$26.62	\$33.23	\$41.57	\$52.10	\$79.67	\$115.54
Europe	\$31.31	\$32.63	\$32.37	\$39.63	\$48.68	\$66.79	\$94.33

V MINE ECONOMICS AND PROFITABILITY

The SRI cost model of the Red Dog mine and mill considers individual cost elements. Costs are broken down into the following major categories: operating costs, transportation charges, other costs, depreciation, and depletion. The model calculates an internal rate of return on investment (ROI), after state and federal taxes, that is based on capital costs during the life of the project. Capital investments include the initial investment spent before start-up of the operation, sustaining capital during the years of production, and working capital. The analysis considers the cash flow during the development and construction years, 1979 to 1989, and for a 30-year mine production life, 1989-2018.

The project is considered to be a "stand-alone" operation; corporate overhead costs are included in the overall cost structure. The ROI has been determined on the assumption that the project is financed totally by equity. In practice, a significant share of the initial capital for all mining projects is debt-financed and such an approach could have been selected, and an ROI based on the equity share of the project could have been determined. However, making an initial determination of the profitability and return on mine investment on the basis of the total equity condition is in accordance with standard mining economic practices. (An ROI based on the equity share of a partially debt-financed project generally results in a higher ROI than that of a totally equity-financed project.)

The data used in our cost model have been taken from a variety of sources. The mine and mill capital and operating costs have generally been extracted from various published Cominco reports and submissions to AIDA. These data have been carefully examined and compared with information available to SRI through other sources. SRI has estimated the transportation charges for concentrate shipments from the port to smelters throughout the world. Other costs, including royalties for the Northwest Alaska Native Association (NANA) and the State Mining License Tax, have been calculated by formulas used by Cominco in its profitability determination. Income taxes and the minimum tax paid to the State have been calculated by considering investment tax credits and appropriate depreciation and depletion schedules.

In estimating cash flow profitability and internal rate of return, the major uncertainty is the future flow of revenues, which depends on the projected sales value of the commodity produced--in Red Dog's case, zinc and lead concentrates. The future sales value of these concentrates will be determined by metal--zinc, lead, and silver--prices, less penalties for impurities in the concentrate and treatment charges (i.e.,

the cost of converting the concentrate to metallic zinc, lead, and silver). Clearly, precise forecasts of commodity prices cannot be made. Instead, we have formulated a base price case, an optimistic price case, and a pessimistic price case for the metals. Our analysis of this major task in the project is summarized below.

Assumptions and Data Sources

Capital Costs

The capital costs for the initial charges spent before start-up of the mine and mill have been based on a Cominco memorandum of March 1, 1985, which was supplied to SRI by Cominco and AIDA. (This memorandum has also been used as the information source for the future production schedule; ore and concentrate grade, market distribution; sales value of the concentrate; and formulas for determining management and selling fees, royalties, investment tax credits, and federal and state taxes). The estimated fixed capital costs for the construction of the mine and mill, development costs, start-up costs, and various other expenses and advance payments are given in Table V-1. The costs have been escalated to account for inflation (discussed in Chapter I) during the years of construction.

The total initial capital costs are estimated to be \$270 million for development and construction of the mine, mill, and on-site mine facilities, excluding interest during construction and working capital. Given the estimated future production of 2 million dry short tons per year (dst/y) of ore, the capital cost per ton for the mine and mill complex is \$135. This cost per ton compares favorably with other new surface mines and mills now being considered throughout the world. Some of the proposed new South American operations have capital costs in the range of \$90 to \$115/dst of ore. But given the less expensive labor in South America and the remoteness of the Red Dog project, Cominco's capital cost estimates for its operation in Northern Alaska seem reasonable. (The Cominco Polaris mine in Canada, completed in 1983, was developed at a capital cost of \$145/dst.)

Sustaining capital charges incurred over the life of the project vary, depending on the expenditure, from \$2 to \$8 million/y. (An exception to this range of capital charges occurs in the fourth and fifth years after mine start-up when additional worker accommodations are installed.) The sustaining capital costs are for the mine and mill, and for concentrate haulage from the mine to the port. Sustaining capital costs for road maintenance and port facilities have been included in the costs for the transportation system. (The estimates for sustaining capital were obtained from information provided in the Appendix of Cominco's "Feasibility Report" of July 1984.)

Table V-1
FIXED CAPITAL FOR RED DOG MINE AND MILL
(Millions of Dollars)

Cost Item	Year of Expenditure					
	1979 to 1984	1985	1986	1987	1988	1989
Exploration	0.62	0.30	0.42	0.56	-	-
Ore delineation	6.02	-	-	-	-	-
Advance NANA royalties	3.53	1.00	1.00	1.00	1.00	-
Airstrip	1.44	0.10	-	0.11	0.47	-
Concentrator	3.78	5.80	21.21	20.48	51.56	7.50
Power plant	0.78	2.10	13.08	10.91	8.26	2.13
Accommodations	0.15	0.60	-	6.01	18.40	-
Mine development	-	1.20	2.11	5.23	19.11	1.00
Mine and surface equipment	0.97	1.70	3.48	11.35	14.39	2.63
Start-up costs	-	-	-	-	-	5.63
Surface buildings	-	0.40	1.16	4.79	2.36	-
Other expenses	1.07	0.30	0.11	0.11	0.24	-
Total(a)	18.35	13.50	42.57	60.55	115.80	18.88

(a) Totals may not add because of rounding.

The estimates of working capital are those of SRI and have been based on accounts receivable, accounts payable, production inventory, and supplies inventory. The initial working capital has been estimated to be about \$65 million spent during the first 3 years of mine operation, increasing by \$4 to \$6 million/y thereafter.

Operating Costs

Detailed operating costs were provided in Cominco's July 1984 Feasibility Report. After examining additional manning tables, salary schedules, fuel consumption, other supplies use, and details about overhead expenditures provided by Cominco, and comparing those data with SRI information of other mines and mills, we have accepted Cominco's operating costs as accurate and reasonable.

The operating costs are listed in the following categories: mining, milling, maintenance, power generation, mine and mill overhead, costs for start-up procedures (lasting 3 years), and cost contingency. These cost

categories, except for start-up and contingency, are broken down into labor, fuel, supplies, and other charges. Total operating cost, per ton of ore mined, is about \$41/dst in 1989--the initial year of mine operation. (Wet concentrate, containing about 8% moisture, will be the actual product shipped.) The concentrate cost, based on the appropriate ratio of ore mined to concentrate shipped, will be about \$106/dst of concentrate. These costs are estimated to decrease to \$103/dst of concentrate in 1992 when the operation is in full production and the additional operating costs for start-up are no longer needed.

Transportation Charges

The transportation of the concentrate initially involves moving the concentrate 55 miles from the mine and mill site to the port. This cost will be incurred by Cominco. The rest of the transportation costs will be fees, or charges, to be paid by Cominco to outside contractors. A road and port user-fee will be paid to the State. (This is essentially the revenue the State will collect to cover its capital and operating costs for the transportation system.) Cominco will also have to pay a fee for loading the concentrate at the port and hauling it by barge to oceangoing ships. It will then incur the costs for ocean transportation to ship the concentrate to Vancouver, British Columbia, Eastern Canada, Europe, and Japan. (We have assumed that, depending on the destination, ships in the 26,000 DWT to 60,000 DWT range will be used.) Finally, a rail transportation cost will be imposed at the destinations to transport the concentrate to the smelter sites.

As mentioned, SRI has estimated these costs. In 1992, the total transportation cost is about \$73/dst of concentrate, of which the user fee of \$19/dst reflects the "Cominco-based" proposal.

Other Costs

We have included corporate overhead (sales, general and administration) costs, NANA royalties, and the Alaska mining license tax in our "other cost" category. We have allocated a Cominco corporate overhead charge at 4% of the concentrate sales. (Although Cominco incurs an actual corporate overhead cost of about 6% on all sales, we have reduced this percentage because we consider the sales expense of Red Dog's concentrate product is likely to be less than Cominco's overall selling expenses.) The NANA royalty and the mining license tax are calculated by formulas defined by the State and NANA. No mining license tax is imposed in the first 3.5 years of the mining operation.

Total "other costs" are about \$25 to \$30/dst in the initial years of mine operation. They may escalate rapidly, however, depending on the NANA royalty. The royalty, in the initial years of mine operation, is 4.5% of "net smelter return" (i.e., concentrate sales, less selling and distribution expenses). The royalty based on 4.5% of net smelter return will prevail until Cominco recovers nearly all of its previously spent

capital and operating funds. Once Cominco has recovered these funds, the NANA royalty increases to a 25% (with further 5% incremental increases every 5 years until 50% is reached) of what is defined as "net proceeds from production"; that is, the net smelter return, less operating costs, management fees, and royalties.

In the years that the "percentage of net proceeds" constitutes the basis of the NANA royalty, this royalty is the largest single cost item incurred by Cominco for the project. Even when the royalty is "only" 25% of net proceeds, it can amount to \$40 to \$50/dst of concentrate. In years when the royalty reaches 40% to 45%, the royalty that Cominco has to pay can amount to as much as one-half of the total of all the operating costs (e.g., those for mining and milling).

Depreciation and Depletion

Although they are not "cash" costs, depreciation and depletion are critical in any cash flow analysis because they affect the Mining License Tax, state and federal income taxes, and the "minimum" state and federal tax.

Depletion allowances have been determined by standard depletion calculations--using the lesser of 22% of gross income of the operation or 50% of the net income from the mine. Depreciation has been determined by assigning the appropriate depreciation schedule to the various capital assets. We have used either a straight-line 5-year schedule, or and 18-year schedule, depending on the capital item. Rather than expense some of the initial fixed capital costs as they were incurred, we have carried these expenses to the first year of project operation and included them in the first year's depreciation. This results in a high depreciation charge in 1989, but in no way alters the tax calculation.

Production and Sales

The production schedule used is the one proposed in the Cominco memorandum (see Table V-2). We have assumed that sales of concentrates in each year will equal their production in that year. We recognize, however, that in practice a lag will occur before actual sales begin relative to production during the first 2 or 3 years of the mine operation.

The value of the concentrates has been calculated by using formulas defined by Cominco. These are based on the grade of zinc, lead, and silver in the concentrates; the metal prices; and the normal recovery factor in smelting the concentrate. Deductions from the metallic values of the concentrates have been made for iron and other impurities in the concentrates and for the treatment charge (i.e., the cost of smelting the concentrate to metal).

Table V-2

RED DOG PRODUCTION SCHEDULE
(Thousands of Dry Short Tons per Year)

	1989	1990 to 1991	1992 to 2008	2009 to 2018
Ore mined	1,000.0	1,826.0	2,050.0	2,050.0
Zinc concentrate	316.0	585.0	587.5	492.0
Lead concentrate	69.0	127.8	119.6	119.6

Metal Prices and Pricing Mechanisms

This section briefly discusses the assumptions SRI has used to project zinc and lead prices for the anticipated duration of the project. Silver prices, like those for all precious metals, are subject to greater uncertainty than the prices commodity metals. They are influenced by speculation and by the relatively smaller proportion of industrial applications to total consumption. Using a simplifying assumption, SRI has thus assumed that future silver prices will escalate from current levels at a slightly lower rate than inflation.

SRI recognizes that the present strength of the U.S. dollar can distort the relative cost position of international zinc and lead producers. However, in our calculations we have assumed that other major international currencies will gain value with respect to the dollar and, in turn, that international production costs when expressed in dollars will increase accordingly. Zinc and lead prices have been projected under three conditions: a base price case, an optimistic price case and a pessimistic price case. We provide for each case key assumptions and a brief description of our methodology.

For the base price case we have assumed that ideally the economics of supply/demand balance will apply to future zinc and lead producers throughout the Western world. Simply stated, future prices are assumed to be determined by the "marginal" producers; their output is required to meet current demand, and they neither profit nor lose excessively by maintaining operations.

However, in actual practice, a simple balance between supply and demand is not sufficient for analysis for a number of reasons. First, prices are not a simple function of production costs. Speculation, intermaterial substitution, and technical innovations all play different roles, particularly when the market is in balance or demand exceeds supply. Only when supply greatly exceeds demand are operating costs more important than the other factors.

In other words, only when recessionary economic conditions are in effect or when metals are under great pressure from substitutes does economic analysis allow the assessment of likely price movements. Thus, such price assessments can only be undertaken when market conditions are poor; accordingly, prices determined through these methods tend to correspond to what the industry calls "floor prices"-- prices that do not become lower because such price erosion would subtract significant supplies from the market place. "Normal" prices (in fact, a misnomer, because prices either go up or down but seldom remain at a "normal" level) can then be determined by historical relationships between floor and normal (or median) prices.

SRI's procedure in projecting zinc prices entails (1) first estimating future net demand (e.g., demand, less the portion of recycled scrap that contributes to total demand), (2) then identifying the marginal zinc producer that is required to meet such demand, and, (3) ending with price adjustments that reflect normal rather than recessionary conditions. Table V-3 summarizes the results for zinc and lead. Note that the lead figures have not been adjusted to normal conditions because the current contributions of scrap lead should prolong the near-recessionary conditions that primary lead producers are now experiencing for some time.

No provisions have been made in the base price case for profits or for meeting capital-related obligations. Naturally, low-cost producers-- those whose operating cash costs are substantially lower than marginal

Table V-3
METAL PRICE OUTLOOK

	Zinc		Lead	
	1990	1995	1990	1995
Demand metal demand (millions of dst/y)	5.37	5.50	4.47	4.54
Scrap use (percent of demand)	7.0	7.0	44.0	44.0
Net metal demand (millions of dst/y)	4.49	5.12	2.51	2.54
Prices (\$/lb)				
Base price case	0.503	0.739	0.238	0.395
Optimistic price case	0.544	0.794	0.293	0.473
Pessimistic price case	0.430	0.601	0.225	0.319

Source: SRI International

producers--automatically receive some profits as long as prices allow marginal suppliers to meet operating cash costs. However, the base price case largely excludes the influence of capital charges. In contrast, the optimistic price case includes them and establishes the price levels that potential suppliers require to expand capacity. The implication is that such prices should not only be sufficient to meet depreciation and interest charges, but enough to provide a comfortable return on investment.

In arriving at the optimistic price case, SRI has adopted cash operating costs that correspond to floor price conditions. Then, we have added the cost of depreciation, interest, taxes, and other miscellaneous expenses that, when subtracted from metal revenues, will still provide a net profit. For this purpose, the specific investment requirements for new zinc and lead capacity have been assumed to be in line with that anticipated for the Red Dog deposit.

Unlike the previous two cases, the pessimistic price case takes account of the substantial shift in production from developed to developing countries, particularly at the mine and mill stage, and assigns that shift to the national differences in perceptions regarding what is a profitable operation. The pessimistic price case arbitrarily discounts major cost factors (e.g., labor, or hydro-power) in production in developing countries to reflect the cost perceptions of those countries. In addition, the pessimistic price case assumes that the proportion of secondary zinc and lead that enters into refined metal production will be greater than in the base price case (e.g., secondary lead use increases from 44% to more than 55%).

In SRI's experience, price projections that are based on production economics entail the risk of becoming increasingly less accurate after about 10 years. However, we see no reason to assume further cost escalations in real terms or deflationary influences for the period after 1995 in the many Western countries that supply zinc and lead. Accordingly, SRI's price projections for zinc and lead simply follow long-term inflation (which has been assumed to be about 5.5%) for that period.

Figures illustrating SRI's price projections for zinc and lead in inflated and 1985 dollars are included in Appendix ____.

Mine and Mill Cost Model

Table V-4 gives the cash flow of the Red Dog operation at the base case price projections. The cash flow includes expenditures during the construction years, 1979 through 1989, and the 30-year production period, 1989 through 2018. All numbers in the table are in millions of dollars, except zinc, lead, and silver, which are given in dollars per pound (\$/lb).

RED DOG COST MODEL
Inflated U.S. Dollars

	Ownership: Capacity: Metal Prices:					Cominco American 710,000 sdt/y of concentrates Base case					Start-up Date: Capital Investments: Production Rate:					1989 \$270 million Full capacity					Millions of Dollars (Except Prices)																				
	1979 to 1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018						
U.S. PRICES																																									
Zinc - \$/lb						.49	.50	.54	.59	.63	.68	.74	.78	.82	.87	.92	.97	1.02	1.09	1.13	1.20	1.26	1.33	1.41	1.46	1.56	1.66	1.74	1.84	1.94	2.04	2.16	2.26	2.40	2.53						
Lead - \$/lb						.23	.24	.26	.29	.31	.36	.40	.42	.44	.46	.49	.52	.55	.58	.61	.64	.68	.71	.75	.79	.84	.88	.93	.98	1.04	1.09	1.15	1.22	1.26	1.35						
Silver - \$/lb						7.53	7.87	8.22	8.64	9.07	9.52	10.00	10.50	11.02	11.57	12.15	12.76	13.40	14.07	14.77	15.51	16.26	17.10	17.95	18.85	19.79	20.76	21.82	22.91	24.06	25.26	26.52	27.85	29.24	30.71						
SALES																																									
Zinc concentrates						83.85	161.33	173.96	190.17	205.48	222.03	239.96	253.18	267.10	281.66	296.87	313.38	330.53	347.73	368.11	409.12	431.76	455.37	480.26	427.17	451.98	475.36	501.21	528.70	557.82	588.29	620.66	654.86	690.55							
Lead concentrates						9.60	18.85	21.75	24.60	28.00	31.89	36.15	38.10	40.12	42.21	44.36	46.73	49.27	51.86	54.54	57.51	60.52	63.71	67.05	70.55	73.86	77.29	81.39	85.66	90.19	94.96	99.96	105.20	110.76	116.70						
TOTAL SALES						93.45	180.18	195.71	214.78	233.48	253.93	276.05	291.28	307.22	323.87	341.23	360.10	379.80	400.52	422.26	445.62	469.64	495.47	522.42	550.81	500.53	529.27	556.75	586.87	618.89	652.78	688.25	725.86	765.44	807.25						
OPERATING COSTS																																									
Mine						3.20	6.19	7.34	7.78	8.26	8.76	9.30	9.83	10.40	11.01	11.65	12.32	13.04	13.79	14.59	15.44	16.33	17.28	18.29	19.19	20.47	21.66	22.92	24.25	25.65	27.14	28.72	30.39	32.15	34.02						
Mill						5.60	10.77	12.73	13.46	14.23	15.04	15.91	16.80	17.75	18.74	19.80	20.91	22.08	23.33	24.64	26.02	27.49	29.03	30.67	32.39	34.21	36.14	38.17	40.32	42.59	44.98	47.52	50.19	53.02	56.00						
Maintenance						4.95	9.61	11.39	12.09	12.83	13.62	14.46	15.30	16.19	17.13	18.13	19.19	20.31	21.49	22.74	24.07	25.47	26.95	28.52	30.19	31.95	33.81	35.78	37.87	40.07	42.41	44.89	47.50	50.28	53.21						
Power operation						4.62	8.84	10.43	11.01	11.62	12.27	12.96	13.68	14.44	15.24	16.08	16.97	17.91	18.91	19.96	21.04	22.23	23.46	24.77	26.14	27.59	29.12	30.73	32.44	34.24	36.14	38.14	40.26	42.49	44.85						
Mine and mill overhead						9.50	18.33	21.68	22.94	24.28	25.70	27.20	28.74	30.37	32.09	33.91	35.84	37.87	40.02	42.29	44.69	47.23	49.91	52.74	55.74	58.90	62.25	65.79	69.52	73.47	77.65	82.06	86.72	91.65	96.86						
Additional costs for start-up						10.83	5.29	6.30	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						
Contingency						2.36	4.53	5.34	5.63	5.94	6.27	6.61	6.98	7.36	7.77	8.19	8.64	9.12	9.62	10.15	10.71	11.30	11.92	12.57	13.27	14.00	14.77	15.58	16.43	17.34	18.29	19.30	20.36	21.48	22.66						
TOTAL OPERATING COSTS						41.07	63.56	75.19	72.91	77.16	81.67	86.43	91.33	96.51	101.98	107.76	113.87	120.33	127.16	134.37	141.99	150.05	158.56	167.56	177.07	187.12	197.74	208.96	220.83	233.37	246.62	260.62	275.42	291.87	307.60						
TRANSPORTATION COSTS																																									
Concentrates to port						1.65	3.19	3.78	4.01	4.26	4.51	4.79	5.06	5.36	5.67	5.99	6.34	6.71	7.09	7.50	7.94	8.40	8.88	9.40	9.94	10.52	11.12	11.77	12.45	13.17	13.93	14.74	15.59	16.49	17.45						
Road and port user fee						2.66	13.19	13.40	13.65	13.93	14.29	14.69	15.04	15.43	15.86	16.30	16.76	17.24	17.74	18.26	18.80	19.36	19.94	20.52	21.12	21.74	22.38	23.06	23.77	24.40	25.14	25.87	26.73	27.61	28.61						
Barge to ship						6.03	4.58	4.39	4.46	4.57	4.69	4.80	4.93	5.05	5.18	5.30	5.44	5.57	5.71	5.86	6.00	6.15	6.31	6.46	6.62	6.79	6.92	7.07	7.23	7.40	7.58	7.76	7.95	8.15	8.33						
Ocean shipping						8.70	15.63	15.41	15.91	16.55	17.23	17.94	18.60	19.32	20.12	20.96	21.82	22.74	23.68	24.67	25.71	26.79	27.93	29.12	30.36	31.64	32.96	34.33	35.74	37.19	38.68	40.20	41.74	43.31	44.91						
Inland freight						5.64	13.59	13.68	13.90	14.24	14.60	14.96	15.34	15.72	16.11	16.51	16.93	17.35	17.78	18.23	18.69	19.15	19.63	20.12	20.63	21.15	21.68	22.23	22.79	23.37	23.96	24.56	25.17	25.79	26.41						
TOTAL TRANSPORTATION COSTS						24.69	50.17	50.66	51.92	53.55	57.72	59.53	61.32	63.19	65.18	67.22	69.41	71.67	74.07	76.49	79.06	81.76	84.40	87.10	89.96	95.04	98.04	99.98	94.13	97.38	100.62	104.54	99.61	103.74	108.08						
OTHER COSTS																																									
Corporate overhead						3.74	7.21	7.83	8.59	9.34	10.16	11.04	11.85	12.29	12.95	13.65	14.40	15.19	16.02	16.89	17.82	18.79	19.82	20.90	22.03	20.02	21.17	22.27	23.47	24.76	26.11	27.53	29.03	30.62	32.29						
NMMA royalties						3.03	5.73	6.39	7.18	7.94	8.66	9.42	10.23	11.07	11.94	12.84	13.76	14.70	15.66	16.64	17.64	18.66	19.70	20.76	21.84	22.94	24.06	25.19	26.33	27.48	28.64	29.81	31.00	32.20	33.41						
Mining license tax						-	-	-	.60	1.79	4.57	4.02	4.31	4.57	4.84	5.28	5.12	5.48	5.85	6.29	6.28	6.03	6.26	6.99	7.49	5.55	5.27	5.55	5.94	6.33	6.71	6.18	6.77	7.20	7.64						
TOTAL OTHER COSTS						6.77	12.94	14.22	16.38	19.07	23.38	46.08	49.03	52.06	55.20	58.63	70.22	74.53	79.04	83.95	88.53	104.43	110.61	117.59	124.61	101.50	118.98	125.44	132.80	140.66	149.04	171.98	186.16	196.67	207.78						
DEPRECIATION						74.49	36.29	36.50	36.79	37.63	6.94	7.82	8.04	8.97	9.94	8.55	9.09	9.21	9.38	8.86	15.22	15.47	18.60	14.81	14.79	16.70	11.29	11.90	11.86	12.15	13.10	13.94	15.61	15.87	16.26						
DEPLETION						.00	9.87	10.89	19.97	24.80	41.26	40.61	43.32	45.94	48.68	51.55	52.03	55.48	59.08	62.73	64.41	63.17	66.07	72.39	77.16	62.37	61.13	64.49	68.64	72.94	77.26	74.44	80.69	85.54	90.62						
TOTAL COSTS						147.01	172.82	187.48	197.98	212.22	210.97	240.46	253.04	266.67	280.97	293.71	314.62	331.22	348.73	366.29	389.21	414.90	438.25	459.44	483.58	446.72	477.19	501.77	528.25	556.50	586.64	625.53	657.49	692.89	730.33						
NET INCOME BEFORE TAXES						-53.56	7.36	8.23	16.80	21.26	42.96	35.59	38.24	40.55	42.90	47.52	45.49	48.58	51.80	55.97	56.41	54.74	57.22	62.97	67.23	53.81	52.08	54.98	58.62	62.38	66.14	62.72	68.37	72.54	76.92						
TAXES																																									
State						.00	.27	.29	.54	.67	1.11	1.10	1.17	1.24	1.04	1.04	1.10	1.16	1.24	1.30	1.42	1.37	1.45	4.51	6.65	4.42	3.17	2.47	5.36	7.07	6.30	5.09	3.97	7.04	8.69						
Federal						.00	1.48	1.63	3.00	3.72	6.19	6.09	6.50	6.89	15.85	18.78	17.28	18.94	20.02	21.89	19.76	20.12	20.35	22.86	23.75	17.10	14.54	16.33	18.36	19.02	19.83	17.86	19.57	21.75	22.54						
TOTAL INCOME TAXES						.00	1.75	1.93	3.54	4.39	7.30	7.19	7.67	8.13	16.89	19.82	18.38	20.10	21.26	23.19	21.18	21.48	21.80	27.37	30.40	21.52	17.71	18.80	23.72	26.09	26.13	22.97	23.54	28.79	31.23						
NET INCOME AFTER TAXES						-53.56	5.61	6.31	13.26	16.87	35.66	28.40	30.57	32.42	26.01	27.70	27.11	28.48	30.54	32.78	35.23	33.26	35.43	35.61	36.83	32.30	34.37	36.18	34.91	36.29	40.01	39.76	44.83	43.75	45.69						
CASH FLOW						20.93	51.77	53.70	70.03	79.30	83.66	76.83	81.93	87.33	84.63	87.80	88.23	93.17	99.00	104.37	114.86	111.91	120.10	122.81	128.78	105.37	106.79	112.57	115.41	121.38	130.37	128.14	141.12	145.16	152.56						
CAPITAL INVESTMENTS																																									
Initial investment						18.35	13.50	42.57	60.55	115.80	18.86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Sustaining capital						-	-	-	-	-	1.00	1.05	2.01	13.47	13.94	5.38	2.16	5.86	6.95	2.63	8.10	2.73	6.74	4.35	34.44	9.34	18.38	2.97	4.23	14.00	12.50	24.60	3.97	5.67	18.74	16.73					
Increase in working capital						-	-	-	-	-	43.00	20.09	9.69	1.63	4.23	4.34	2.62	4.63	4.92	5.19	5.46	4.92	6.06	6.40	6.75	6.37	7.92	8.81	9.45	8.65	10.35	10.92	11.53	12.18	11.31	13.06					
TOTAL CAPITAL INVESTMENTS						18.35	13.50	42.57	60.55	115.80	61.86	21.09	10.74	1.38	17.70	18.28	8.00	6.81	10.78	12.14	8.09	13.02	8.79	13.14	11.10	41.63	15.71	26.30	11.27	13.04	23.45	21.15	34.95	14.89	17.20	30.92					

Source: SRI International

In 1989, sales are estimated to be more than \$93 million. They double during the next 2 years as production rises from 386,000 to about 710,000 sdt/y and as prices increase modestly. In 1992, when the operation is in full production, sales are estimated to be nearly \$215 million. When operating costs stabilize because additional costs for start-up have been eliminated (which also occurs in 1992), operating cost estimates total \$72.9 million, transportation costs are \$51.9 million, and other costs are \$16.5 million. With depreciation at \$30.8 million and depletion at \$20.0 million, total costs equal \$198.0 million, yielding a pretax profit of \$16.8 million. Net income after taxes (i.e., after-tax profits) in 1992 are estimated to be \$13.3 million.

Table V-4 indicates net income is always positive, except in 1989, when high depreciation charges are incurred because of the items capitalized during the construction period. Depreciation charges substantially decline after 1993 because a major portion of the depreciated capital items are fully depreciated in 5 years. The net cash flow (i.e., net income after taxes, plus depreciation, plus depletion, less capital investments) is also always positive after 1989. The ROI for the "bottom line" cash flow is 16.5%.

The road and port user fee accounts for less than 7% of the total costs in 1992, and continues to decline as a percentage of costs in future years (see the summary in Table V-5). This decrease occurs because the major portion of the user fee is capital recovery, and the capital charge remains nearly constant over the life of the project. The user fee increases to \$17.8 million in 1992 and to \$19.8 million in 2002. The large increase in cost over this period is accounted for by the increase in the NANA royalty. These trends continue throughout the life of the project.

The major factors in determining the profitability of the project are metal prices. The comparison of ROI resulting from running the cost analysis for the base, optimistic, and pessimistic price scenarios using the "Cominco-based" user fee is given below:

	ROI (percent)
Base price case	16.5
Optimistic price case	19.3
Pessimistic price case	10.3

The detailed cash flows for these alternative price scenarios are included in Appendix C-1. Although the cash flows are significantly different for the three cases, all (even the pessimistic price case with the low ROI) show a positive cash flow after the first year of operation.

Table V-5
COST COMPONENTS OF TOTAL PRODUCTION COSTS
(Percent)

	<u>1992</u>	<u>1997</u>	<u>2002</u>
Operating costs	36.8	36.1	36.6
Transportation costs, less road and port user fees	19.3	17.0	15.6
Road and port user fees	6.8	6.7	5.7
Other costs	8.3	19.5	22.7
Depreciation	18.6	3.4	2.7
Depletion	10.1	17.3	16.9
Total(a)	<u>99.9</u>	<u>100.0</u>	<u>100.2</u>

(a) Totals do not add because of rounding.

The accumulated NANA royalties and accumulated revenues to the State (from the Mining License Tax and State taxes) during during the 30 years of production--1989 to 2018--are shown below:

	<u>Base Price Case</u>	<u>Optimistic Price Case</u>	<u>Pessimistic Price Case</u>
NANA royalties	635.5	813.9	286.6
Mining License tax	53.2	69.5	21.9
State tax	24.4	36.4	10.2

Another factor that has a measurable effect on the return of the operation is the treatment charge, which is deducted from the value of the concentrates. In this analysis we have used Cominco's proposed treatment charge of 40% to 41% of the value of the zinc concentrates. Treatment charges for concentrates vary, depending on concentrate quality, smelter availability (i.e., excess or limited smelter capacity), and smelter location. In addition, for a smelter to use Red Dog concentrates it must store large quantities because they will be shipped only during 4 months each year.

To test the sensitivity of the ROI with a reduced treatment charge, we used charges of 35% to 36% of the value of the zinc concentrates. (A lower treatment charge results in a higher concentrate value, hence a higher overall sales figure.) With the base price case projection, the

1992 total sales increase from \$177.8 million to \$191.6 million, with the lower treatment charge. Using a lower treatment charge increases the ROI by about 2% for each of the price cases, as shown below:

	ROI (<u>percent</u>)
Base price case	18.4
Optimistic price case	21.2
Pessimistic price case	12.7

VI INVESTMENT EVALUATION AND ALTERNATIVE FINANCE PLANS

The Investment Concept

Our investment evaluation and financing analyses are based on the following points:

- o The State of Alaska, through AIDA, will finance, construct, own, maintain, and operate the proposed DeLong Mountain transportation system.
- o The transportation system comprises a port, cargo-handling equipment, storage facilities, and a 55-mile road that provides tidewater access to mineralized areas in the DeLong Mountains.
- o Cominco Alaska has asked the State to provide the transportation system so that commercial development of the Red Dog mine can proceed.
- o The State's investment in the transportation system will be recovered, in whole or in part, through user fees and annual assessments levied against Cominco Alaska, other mining companies (which may develop claims if the State approves financing of the transportation system), and local residents who may use it to bring in fuel and other supplies.
- o The State wishes to invest the minimum amount of funds at the least possible cost and financial risk, consistent with providing an adequate incentive for Cominco Alaska to develop its Red Dog mine.

SRI has addressed all of these points in evaluating the proposed State investment. However, we have emphasized the last point in developing alternatives for recovering the maximum portion of the State's investment while minimizing its financial exposure and risk.

Cominco Alaska's Proposal

Cominco Alaska, in its "Memorandum of Understanding" of December 11 1984, proposed design, construction, financing, operations management, and user charge terms to cover operating and maintenance (O&M) costs, as well as to contribute towards debt service. We refer to this Memorandum, as well as the estimates of capital costs and O&M costs in other Cominco documents, as "the proposal."

Our analysis has focused on the aspects of the proposal that directly influence the economics and financing of the project. However, other aspects of the proposal must also be carefully considered before reaching a final agreement with Cominco Alaska because they may influence the tax-exempt status of the bond issue. We have assumed that the bond issue will qualify for tax-exempt status in all but the one case, which is presented under "Alternatives to Cominco's Proposal" below.

We emphasize the following aspects of the proposal:

- o A estimated capital cost of \$157.9 million for the transportation system in as-spent dollars from 1985 to 1989, including some \$5 million charged for studies before 1985. This is Cominco's \$167.5 million estimate, less a project contingency of \$9.6 million that the company does not expect to spend.
- o A first shipment of concentrates during 1989, amounting to about one-half of the mine's designed production level, increasing to full output in 1990 and operating at this level thereafter. However, a clause in Cominco's proposal appears to allow delay of this first concentrate shipment by 2 years--to 1991.
- o A minimum annual toll charge beginning in 1990, amounting to about \$8.5 million, increasing in 1994 to about \$11 million, remaining at this level to 2015, and then decreasing to about \$2.2 million and remaining at this level to 2018, the end of our analysis period. This toll charge contributes towards fixed annual debt service payments.
- o A user fee to cover Cominco's share of the transportation system's annual O&M costs.
- o Revenues from other future transportation system users that accrue to Cominco Alaska's benefit (but not the State's) by allowing the company to reduce its annual payments by the corresponding amount of other user fees.

These points in the proposal have the greatest effect on the amount of State subsidy required. The following factors are critical here:

- o The total capital costs that the State needs
- o The year in which commercial concentrate production begins
- o The source of funds to cover all or a part of the bond debt service (i.e., toll charges or a minimum annual assessment).

- o The source of funds to cover annual O&M costs (i.e., annual user fees).
- o The disposition of additional revenues from other future users of the transportation system.

The level of State subsidy and the ease of financing depend on the assumptions made about each critical factor. Cominco Alaska's assumptions about these factors are collectively referred to as the "Cominco Scenario."

We have also developed a set of assumptions for these factors as alternatives to Cominco's assumptions--an "Alternative Scenario." Our assumptions illustrate the potential effect on the required level of State subsidy and project financing if things do not proceed according to plan. The different assumptions for the two scenarios are illustrated in Figure VI.1, "Scenarios Used to Evaluate the Cominco Proposal."

Economic Evaluation of the Cominco Proposal

Detailed financial projections and our economic analysis are included in Appendix 8 for all the cases evaluated under each scenario. The results of our evaluation and analysis are summarized in Figure VI.2, "Evaluation of the Cominco Proposal." The left portion of the figure shows SRI's estimate of the mine's percent of after-tax return on investment (% ROI) to 2018. The bottom portion of the matrix shows our estimate of the State funds contributed. These are funds that are not recovered during project life (i.e., net present losses in 1985 dollars at a 10% discount factor).

We estimate that the State's subsidy of the transportation project will amount to about \$80 million under the Cominco Scenario and about \$95 million under the Alternative Scenario. This difference of \$15 million is due to an assumed higher project capital cost of \$190 million versus \$157.9 million in as-spent dollars.

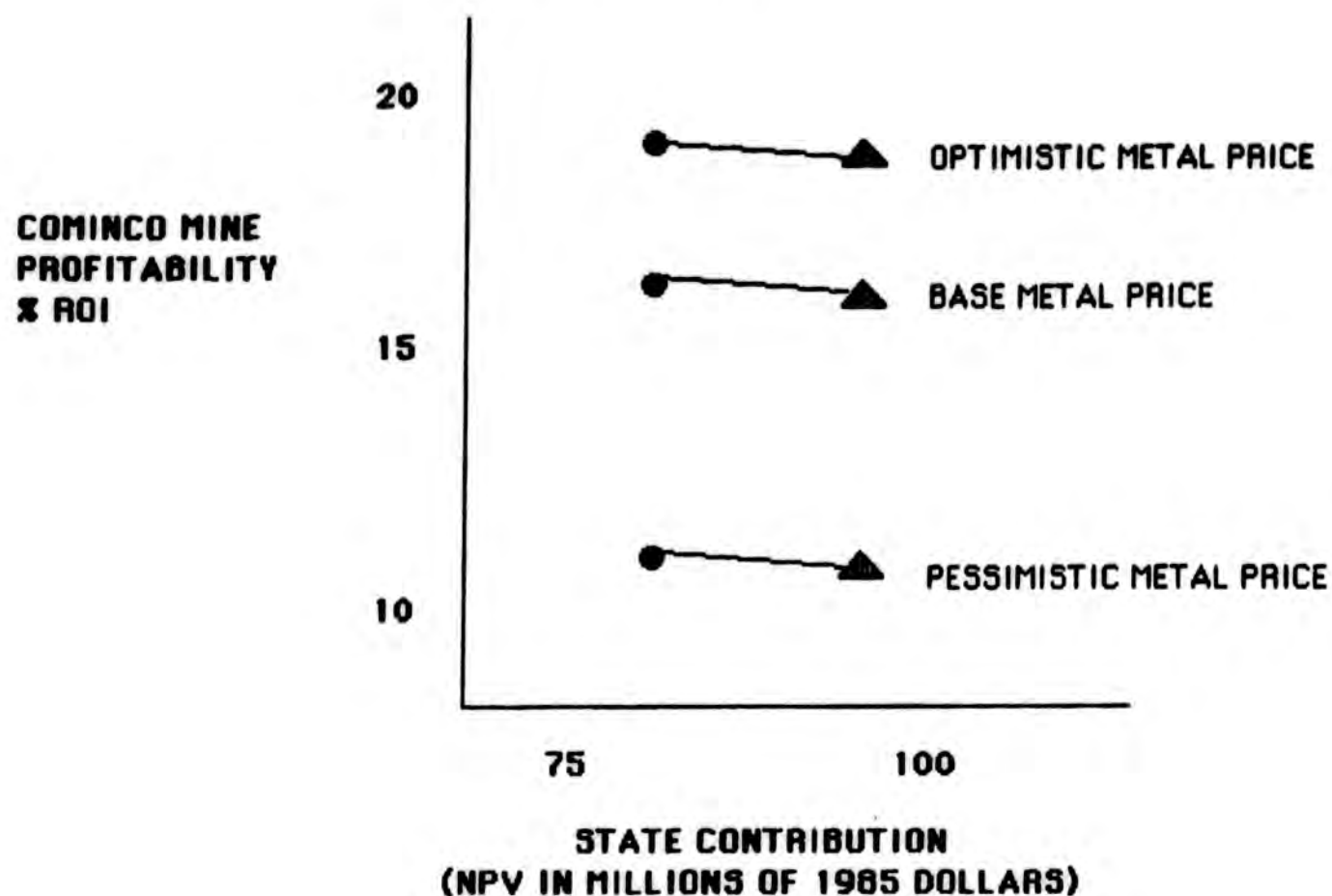
If Cominco Alaska should also delay concentrate shipments by 2 years to 1991, and hence user charges, the State's subsidy would increase by \$35 million, to about \$130 million (a one year delay would increase the subsidy by \$20 million). We refer to this eventuality as the "Alternative, Plus Delay Scenario." This large increase is due to two factors: (1) loss of user charges in 1989 and 1991 and (2) the additional burden of financing the cost of a completed transportation system for 2 more years.

Figure VI.2 also shows the variation in Cominco Alaska's mining profitability for each scenario, given base, optimistic, and pessimistic case metal price assumptions over the 30-year analysis period (1989 to

FIGURE VI.1: SCENARIOS USED TO EVALUATE THE COMINCO PROPOSAL

ASSUMPTIONS	COMINCO SCENARIO	ALTERNATIVE SCENARIO
CARGO TRAFFIC:		
CONCENTRATE SHIPMENTS	PLANNED PRODUCTION LEVEL	PLANNED PRODUCTION LEVEL
FIRST CONCENTRATE SHIPPED	1989	1989
COMINCO INBOUND CARGO	YES	YES
OTHER INBOUND CARGO	YES	YES
OTHER OUTBOUND CARGO	NONE	NONE
USER REVENUES:		
ANNUAL ASSESSMENTS	COMINCO'S TAKE-OR-PAY CONTRACT	INCREASED TO ACCOUNT FOR HIGHER CAPITAL COSTS
USER FEES	COVERS ANNUAL O&M COST	COVERS HIGHER ANNUAL O&M COST
O&M:	COMINCO ESTIMATES	INCREASED MAINTENANCE COST
CAPITAL COST: (INFLATED \$)	COMINCO'S \$157.9 MILLION (PROJECT CONTINGENCY NOT SPENT)	\$190 MILLION TO PROVIDE FOR HIGHER CAPITAL COSTS (PROJECT CONTINGENCY SPENT)
MINING OPERATION:	COMMERCIAL START-UP 1989	COMMERCIAL START-UP 1989

FIGURE VI.2: EVALUATION OF THE COMINCO PROPOSAL



● **COMINCO SCENARIO**

▲ **ALTERNATIVE SCENARIO**

2018). Mining profitability is marginally lower under the Alternative Scenario (for any given metal pricing assumption) because:

- o Higher capital costs result in a higher annual user assessment charge
- o Annual user fees are higher to cover higher O&M costs.

However, as Figure VI.2 shows, these two factors have a negligible effect on mining profitability in comparison with metal prices. Here, changes in metal prices can alter estimated mining profitability from about 10% to 19% after tax.

Financing the Cominco Proposal

The ability to finance the Cominco Proposal will be determined by two sets of constraints:

- o The funds available to AIDA (through the proposed capitalization plan) to finance the project and their annual timing, including: a transfer to AIDA of a loan portfolio (and its annual cash flow) from the Department of Revenue effective July 1, 1985; a cash appropriation to AIDA of some \$12 million effective July 1, 1985, which will increase its cash reserves to \$15 million; and the issuance of a bond early in 1986.
- o The annual user assessment (i.e., toll charge) proposed by Cominco Alaska, which is not quite large enough to cover the debt service on a 30-year \$100 million fixed rate bond at 10.5%.

The three scenarios used in the preceding sections to evaluate Cominco's proposal can be financed within these constraints. We have sized the bond issue to maximize the use of all of AIDA's financial resources in our alternative financial plans. The bond issue size has therefore been set for each scenario at the minimum level necessary to ensure that AIDA would have sufficient funds to cover all construction expense, debt service, and possible operating losses. SRI has chosen the minimum level because smaller bond issues are more marketable than large ones and result in lower financing costs for the State. Our calculations have involved an iterative approach, testing each issue size against the AIDA Fund balance and ascertaining that in the years after 1986 the fund is not overdrawn.

Under fixed-rate financing (FRF), a \$100 million bond issue (10.5%, 30 years) will be required to finance the Cominco Scenario. A \$140 million FRF bond issue (10.5%, 30 years) will be required to finance the Alternative Scenario, and the Alternative, Plus Delayed Scenario will require a \$145 million bond issue. For each of the FRF scenarios, we estimate that a 3% bond issue expense will be required. That fee

includes all expenses normally associated with issuing an industrial development bond, and the fee has been deducted from the bond proceed fund at the time of issuance.

Our principal concern with using a \$140 or a \$145 million bond issue is that the annual debt service payments (about \$16 million) exceed Cominco Alaska's proposed annual assessments of about \$10 to \$13 million (the lower amount pertains to the first 4 full operating years). Thus, the project would not be self-financing after commercial start-up because the net operating income would be less than debt service. AIDA, therefore, would be required to cover the difference on an ongoing basis. Although AIDA has the financial resources to do so, the State may prefer a self-financing situation. Furthermore, the project would not generate enough surplus revenue to accrue reserves to provide for contingencies. However, each finance plan has a debt service reserve with the equivalent of 1 year's debt service payment that is funded from AIDA's cash balances.

We have also developed finance plans for the Cominco proposal that uses variable rate financing (VRF). VRF differs in three potential regards from FRF: (1) lower overall interest charges during construction, which reduces the State's subsidy; (2) the opportunity to issue a smaller bond; and (3) a smaller bond issuance fee of 1.5%. However, this financing approach exposes the State to the risk of higher future interest rates.

Figure VI.3, "Finance Plans--The Cominco Proposal," shows the key elements, assumptions, and results of alternative finance plans. Appendix 8 includes a financing analysis showing the details of each of these alternative finance plans and associated cash flows for each of the three scenarios.

We have measured the State's subsidy by discounting all cash outflows (i.e., all State funds put into the project, including the net interest expense during construction) and all cash inflows (i.e., annual net operating income from the transportation system) at 10% back to the beginning of 1985 (i.e., NPV at 10% in 1985 dollars). If the computed value is zero, the State will achieve a "breakeven" position, recovering all of its investment, plus 10% interest on that investment. If the NPV at 10% is negative, the State will have earned less than 10% on its investment.

Alternatives to Cominco's Proposal

Cominco Alaska's proposal would result in the State providing a permanent subsidy of some \$78 million (in 1985 dollars under the Cominco Scenario). That is, the State would invest a total of about \$154 million (NPV at 10% in 1985 dollars) in capital and interest during construction, but would only recover about \$76 million (NPV at 10% in 1985 dollars)

Figure VI.3

FINANCE PLANS--THE COMINCO PROPOSAL

	Cominco Scenario		Alternative Scenario	Alternative Plus Delay	
	Fixed Rate	Variable Rate	Fixed Rate	Fixed Rate	Variable Rate
<u>User Charges ('85\$)</u>					
-Concentrates	\$4.00/t		\$4.50 /t	\$4.50 /t	
-General Cargo	\$ 28 /t		\$ 28 /t	\$ 28 /t	
-Annual Assessment (MM)	\$8.5-\$11.0		\$10.3-\$13.3	\$10.3-\$13.3	
<u>Capital Costs (MM)</u>					
-As Spent \$	158		190	190	
-1985 \$	147		170	170	
<u>Total State Funding (MM)</u>					
-As Spent \$	190	178	229	278	246
-NPV @10%	140	131	167	194	174
<u>Bond Issue (MM)</u>					
-Principal (MM\$)	100	90	140	145	125
-Interest Rate	10.5%	7%	10.5%	10.5%	7.0%
-Issue expense, (MM\$)	3.0	1.35	4.2	4.35	1.89
<u>State Subsidy (NPV @10%)</u>					
-Recovered Invest.	62	62	74	63	63
-Subsidy	78	69	93	131	111
-ROI	2.4%	3.0%	2.5%	1.2%	2.0%

through net operating income over a 30-year period. The other two scenarios result in yet higher State subsidies.

The State would be held to providing these potential subsidies on a permanent basis because of Cominco Alaska's proposal to use revenues from other users to offset its own user charges. Therefore, one alternative for the State to pursue to recover a higher proportion of its investment is having the additional revenues generated by future non-Cominco users accrue to the State's account and not to Cominco Alaska's.

As discussed, the State could encounter significant financial risk should Cominco Alaska delay start-up from 1989 to 1991. This option represents a financial exposure to the State of about \$35 million (NPV at 10% in 1985 dollars). In view of the implied level of subsidy in Cominco's proposal, the State needs to consider whether or not it wishes to assume a risk of this magnitude.

The most direct means the State has to reduce the amount of subsidy implied in Cominco's proposal is to charge Cominco Alaska higher user fees. Cominco Alaska's rate of return on its mine investment is not particularly sensitive to the range of user fees suggested here. Yet the level of State subsidy is quite sensitive over this same range of user fees.

Figure VI.4, "State Contribution versus User Fees," shows the sensitivity of State contributions to variations in user fees. The user fees are expressed as a 30-year average rate in 1985 dollars per ton of concentrate.

The Cominco proposal (under the Cominco Scenario) had an average annual total user charge of about \$11/dst of concentrate (in 1985 dollars). Figure VI.4 shows that the State can achieve a breakeven position (i.e., 10% return on its investment) with an average annual total user charge to Cominco Alaska of about \$19/dst of concentrate (in 1985 dollars). This would increase Cominco Alaska's total annual user charges by about \$10 million--from about \$17 million to \$27 million during 1995, for example.

Figure VI.5, "Mining Profitability versus User Fees," indicates an implied return on Cominco's mine investment that ranges from about 19% to 8%, depending on the metal price assumption selected (i.e., from pessimistic to optimistic) and average use fee selected. Under any given metal price assumptions, the State can achieve breakeven while reducing Cominco Alaska's profit by less than 2 percentage points compared with the Cominco proposal.

For illustrative purposes, we present a case with a user fee structure and rate that result in a 10% ROI for the State). Apart from the higher user fees (i.e., \$6.40/dst of concentrate, \$50/t of general cargo, and a flat annual assessment of \$17 million), we have used the

**FIGURE V1.4: STATE CONTRIBUTION VERSUS USER FEES
(GENERAL CARGO RATE OF \$50 PER TON)**

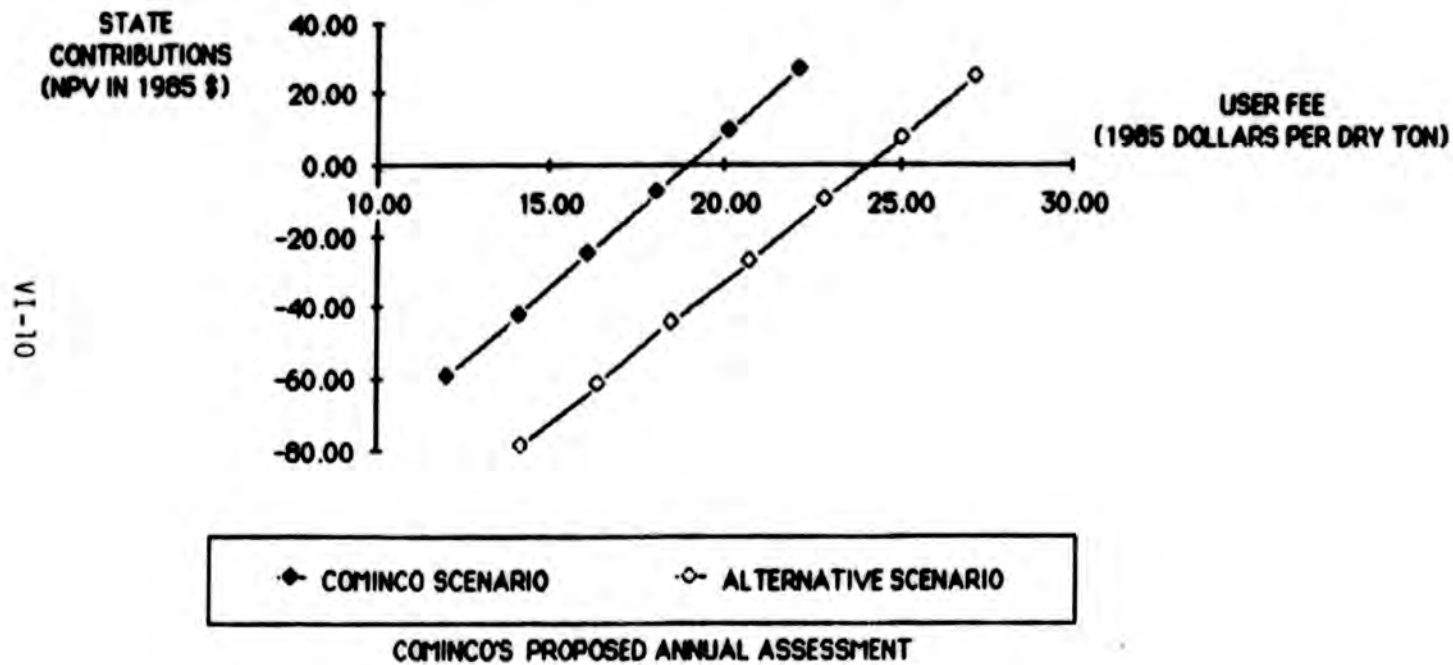
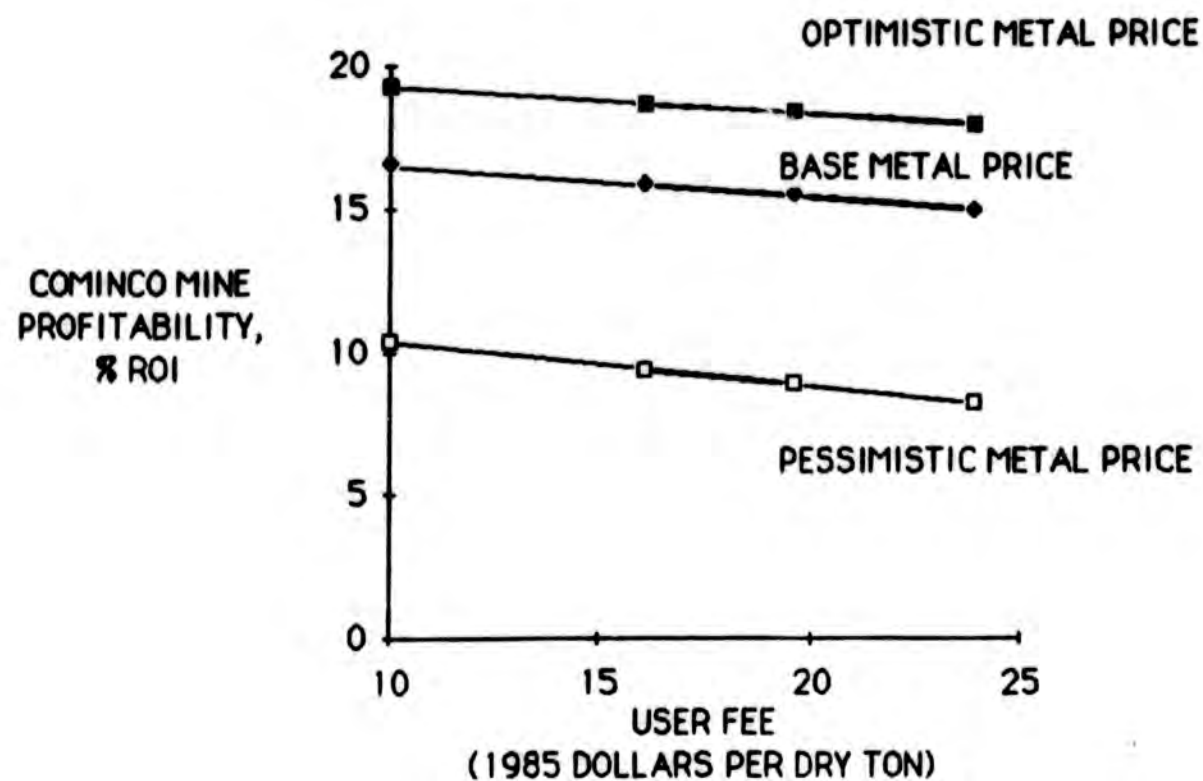


**FIGURE VI.5: MINING PROFITABILITY VERSUS USER FEE
(GENERAL CARGO RATE OF \$50 PER TON)**



same assumptions as those in the Cominco Scenario. We refer to this new set of assumptions as the Adjusted Cominco Scenario. The detailed economic and financing analysis for this adjusted scenario is found in Appendix 8.

Alternative Financing Plans

We believe the best overall approach to financing the transportation project that will minimize the total cost to the State is by making maximum use of AIDA's funds and to supplement these funds, as necessary, with the least possible amount of bond debt. Our finance plans thus use AIDA money to fund the debt service reserve rather than bond proceeds. This approach would reduce the amount of bond money and will allow the money that would be set aside for debt service reserve to earn interest at a rate higher than the bond interest rate (i.e., it would not be subject to IRS arbitrage restriction).

We would also use AIDA funds rather than bond proceeds, to cover capitalized interest costs during the construction period; doing so would reduce the size of the required bond issue. Furthermore, the AIDA funds will earn interest at a rate higher than the bond rate.

The finance plans we have developed for use in evaluating the Cominco Proposal assume that the associated bond issue will have tax-exempt status. However, AIDA's legal counsel appears to be of the opinion that an advance ruling from IRS will be required to clarify this tax-exempt status issue.

Because tax-exempt financing is not at all certain at this point, we have developed two finance plans for the Adjusted Cominco Scenario: one is based on a fixed rate tax-exempt (FR/TE) bond issue; the other is a fixed-rate partially exempt (FR/PE) bond issue. The latter finance plan assumes that the port will qualify for tax-exempt financing (at 10.5%) and that the road will require taxable financing (at 13%). Therefore we have used a weighted average bond interest rate of 11.9% in this FR/PE version of the finance plan.

The key features of these two finance plans are shown in Figure VI.6, "Finance Plans--the Adjusted Cominco Scenario".

Figure VI.6

FINANCE PLANS--THE ADJUSTED COMINCO SCENARIO

	<u>Tax Exempt Fixed Rate Financing</u>	<u>Partially Tax Exempt Fixed Rate Financing</u>
<u>User Charges ('85\$)</u>		
-Concentrates	_____ \$6.40/t	_____
-General Cargo	_____ \$ 50 /t	_____
-Annual Assessment (MM)	_____ \$ 17.0	_____
<u>Capital Costs (MM)</u>		
-As Spent \$	_____ \$ 158	_____
-1985 \$	_____ \$ 147	_____
<u>Total State Funding (MM)</u>		
-As Spent \$	190	194
-NPV @10%	140	142
<u>Bond Issue (MM)</u>		
-Principal (MM\$)	100	100
-Interest Rate	10.5%	11.9%
<u>State Subsidy (NPV @10%)</u>		
-Recovered Invest.	140	139
-Subsidy	0	3
-ROI	10.0%	9.8%

VII DISCUSSION

A central question in any decision involving user fees and financing alternatives for the transportation system is the effect of Cominco Alaska's project rate of return. Clearly, this is not an easy question to answer because Cominco Alaska, AIDA, and possibly others will apply different judgmental factors to the problem. SRI's approach has thus been to compare the results of Chapter V (Mine Economics and Profitability) with data for other operations, and to provide comments that qualify our previous conclusions.

The Red Dog mine should thus be a very low cost mine and become one of the most important zinc/lead operations in the world.

SRI has compared the economics of the Red Dog mine with other Western zinc and lead operations. To do so, we have used SRI's proprietary Mine Cost Model--a computerized model that estimates cash operating costs for mines, mills, and smelters in the Western World.

The results are graphically summarized in Figures VII.1 and VII.2, which depict lead and zinc suppliers in the Western World, arranged in ascending order of cash operating costs; the comparative position of the Red Dog mine is shown in each figure. (Cost items considered for Red Dog but not for other operations have been excluded to make for comparability.) In addition, each mine is assumed to be fully integrated into smelting and refining.

A mine's profit potential is related to its operating costs and revenues. The former, which have been discussed in the sections above, generally indicate that the Red Dog operation will be one of the lowest cost zinc/lead mines in the world. The revenues will be related to the realizable price of the metal concentrates that are sold, the "net smelter return"--a quantity that expresses the difference between prevailing metal prices and the amount that smelters charge for smelting and refining concentrates, plus transportation charges and selling expenses.

SRI recognizes that metal concentrates are sold on an individual basis and, therefore, that several factors (not merely one) determine the net smelter return for a mine.

Concluding Recommendations

SRI has examined several factors in terms of their potential effect on the proposed transportation system and its financing potential. Those that are most critical include: (1) the total capital costs of the

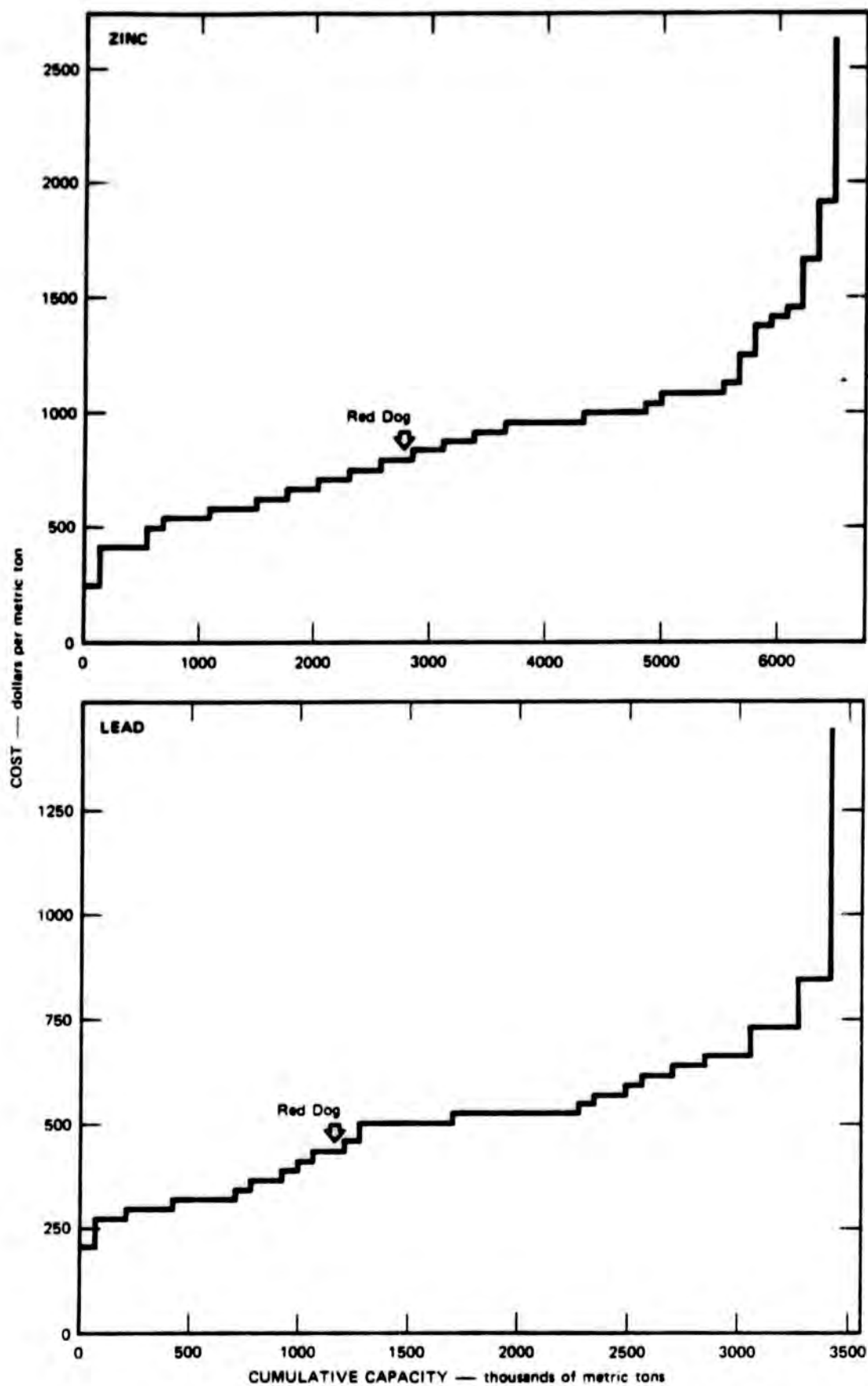


FIGURE VII-1 ZINC AND LEAD PRODUCTION COST CURVE FOR 1990

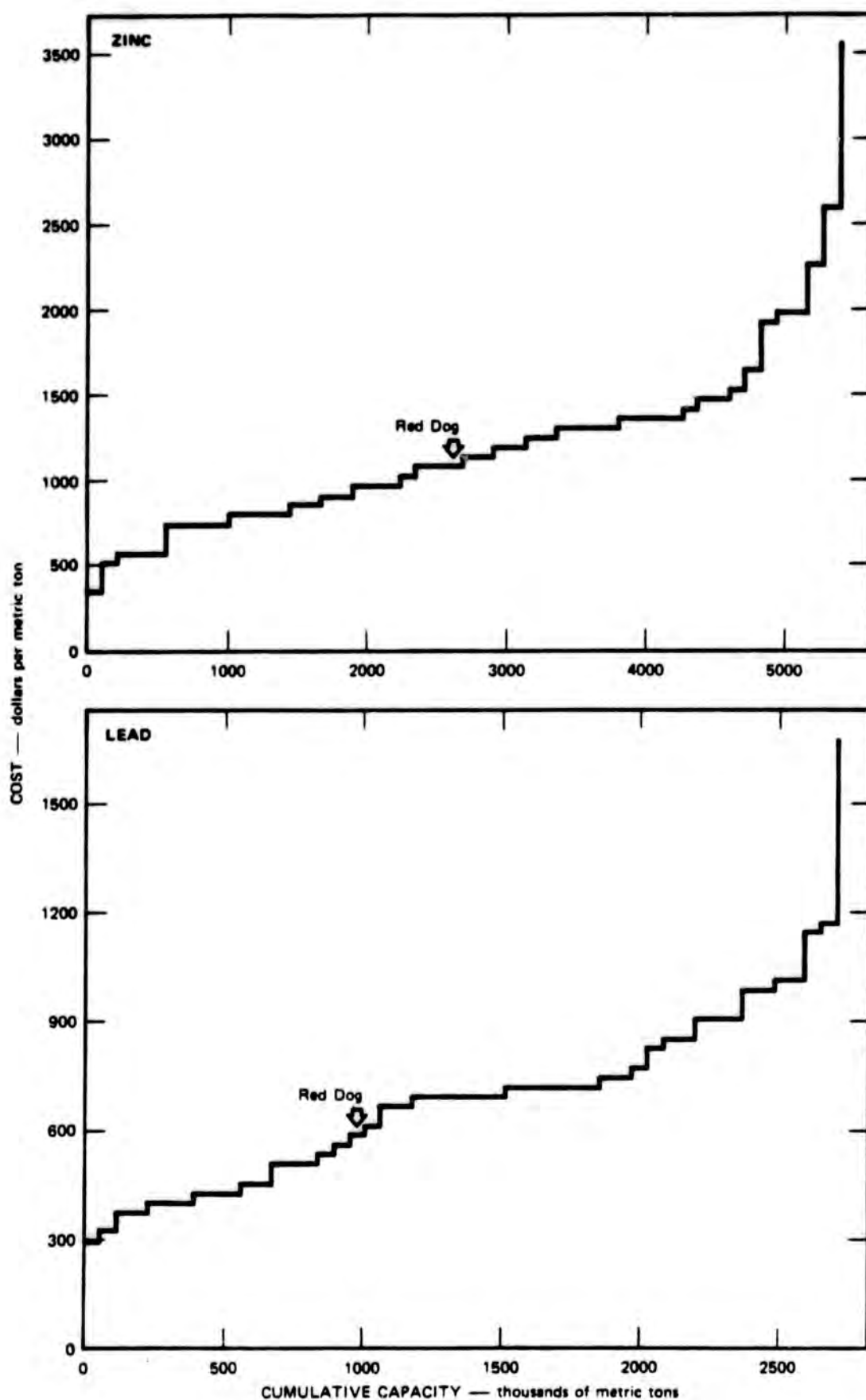


FIGURE VII-2 ZINC AND LEAD PRODUCTION COST CURVE FOR 1995

proposed infrastructure, (2) the date of mine and mill start-up, (3) the source of the funds that will cover all or part of the bond debt service, (4) the source of funds to cover O&M costs, (5) the disposition of possible revenues from other potential users of the transportation system, and (6) the price outlook for zinc, lead, and silver.

From SRI's analyses of these factors and of alternatives to those suggested by Cominco, it is clear that the most critical factor determining Cominco Alaska's return on investment will be the concentrate prices that the Red Dog operation will realize. This factor will depend on prevailing price levels for zinc, lead, and silver; equally important, however, will be the magnitude of smelting and refining charges.

Surprisingly, Cominco Alaska's rate of return appears relatively insensitive to many of the factors pertinent to its proposal (i.e., the broad range of user fees considered and, by extension, the amount of State subsidy required, if any). Potential increases in the amount of capital investment required for the road and port facilities or the possible contribution of other users of the transportation system also appear to have only limited effect on mining return. Instead, the second most important factor, following future concentrate revenues, is a possible delay in the starting date of production. If the delay is 1 year--from 1989 to 1990--for concentrate shipments an addition to the State subsidy of about \$20 million would result that would be unrecoverable. For a 2-year delay--to 1991--an additional \$35 million would be necessary.

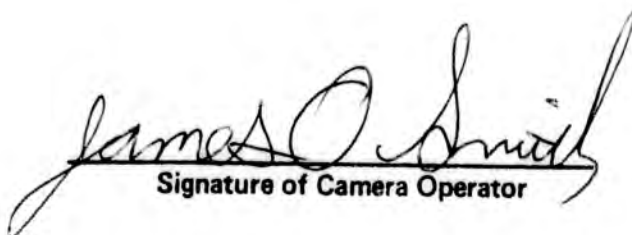
Additional clarification may be gained by elucidating the meaning of ROI in Chapter V calculations. These calculations are based on the assumption that 100% of the required mine and mill investment will in fact be provided by Cominco Alaska's funds. In all likelihood, however, Cominco Alaska would seek debt-financing of a substantial portion of the Alaska investment as is commonly done in the industry. A 40% debt-to-equity ratio would raise Cominco Alaska's profitability because the rate of return is higher than the cost of debt funds.



RECORDS CERTIFICATION



I, the undersigned, an employee of the State of Alaska, do hereby certify that the microfilm images on this microform are accurate reproductions of the original records of the State of Alaska as accumulated during the regular course of business, and that it is the established policy and practice of this State to microfilm its records and to dispose of the original records after microfilm reproductions have been made.


Signature of Camera Operator


Date

SCOMM

#50:11

Geoffrey G. Snow, President

Noranda Exploration, Inc.

Joint Resources and Special Committee on Loans

Briefing

Friday, February 8, 1985

Mr. Chairmen, members of the committee - Thank you for the opportunity to brief you today. Noranda Exploration, Inc. is the wholly-owned subsidiary of Noranda Inc. Noranda Inc. is a major Canadian mining company and a major zinc producer. Noranda mines produce (in 1982) about 625,000 tons of zinc per year, or close to 15% of world consumption. Zinc is important to Noranda's earnings. A 10% change in the price of zinc (4¢ today) affects Noranda's earnings 30%.

I am employed because Noranda's mines are being depleted. In order to survive, a mining company must replace material mined-out. Noranda can look anywhere in the world, but our organization has focused on the western Brooks Range. We have just concluded an agreement with GCO Minerals that permits us to examine a large claim block in the DeLong Mountains.

Why did we select the DeLong Mountains? Figure 1 shows where zinc has been mined. Most was from the Mississippi Valley. We are not looking there because, at today's prices and costs, the 6% average grade is not attractive.

Further we think the environment labeled volcanic-exhalative has greater potential. Figure 2 shows where reserves are.

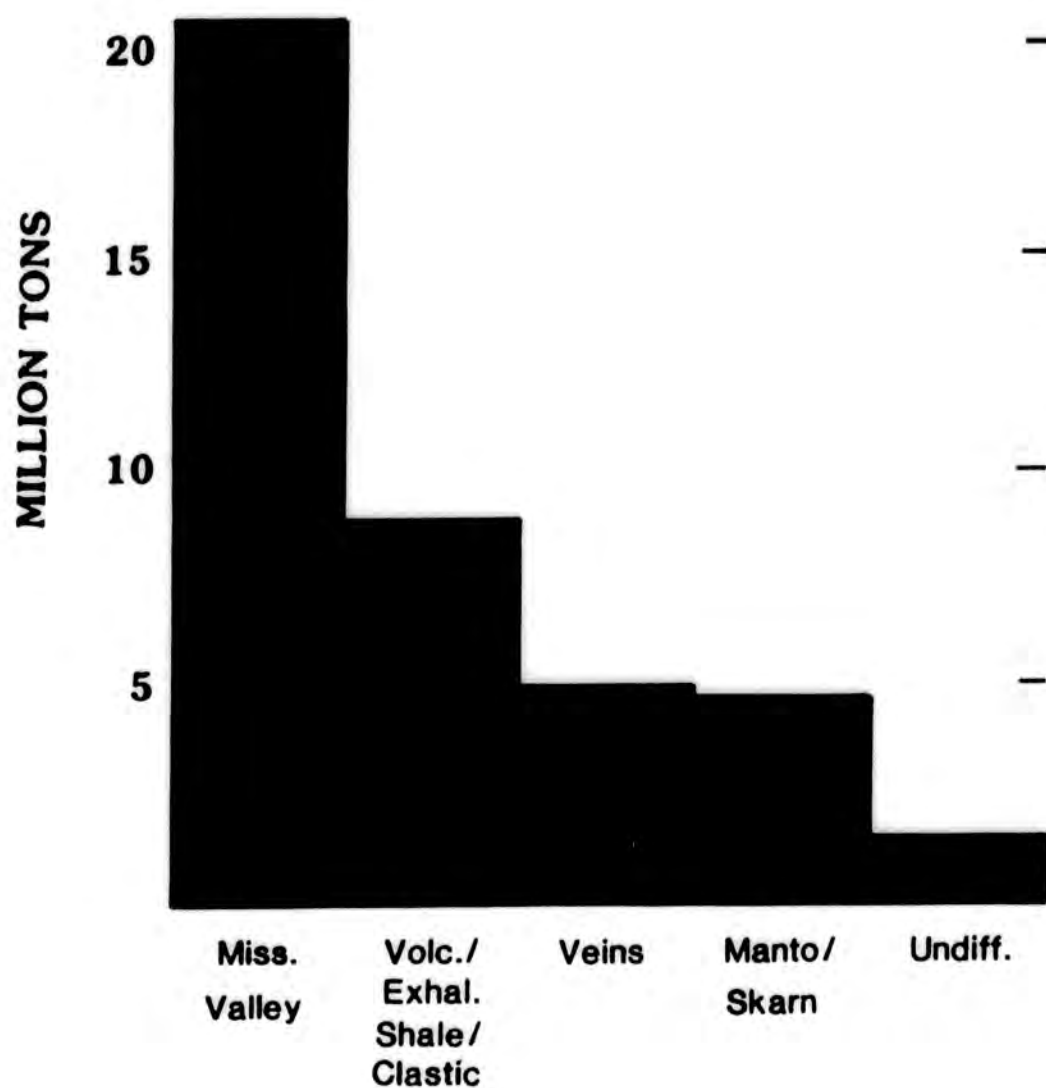
The Red Dog geologic environment is analogous to others in the world, for example the Selwyn Basin of the Yukon. There 10 deposits, ranging in size from 20 to 100 million tons, are in similar rocks over a length of 200 miles.

The point for me as an exploration geologist and for you as legislators is that deposits of this type occur in clusters. Noranda hopes to discover others in the Red Dog-Lik cluster.

We are not looking in the Yukon because that is too far from tide water. We are attracted to the DeLong Mountains because tide water is close. We are attracted because there is the possibility of a road to that water. We are attracted because Alaska's tax structure does not penalize those who produce.

The viability of mining operations is directly related to the capital required. A road into the DeLong Mountains will encourage exploration. Because of the clustering nature of deposits of this type, discoveries will hopefully result. Once started the DeLong Mountain zinc belt can provide long term employment, social benefit and new wealth to Alaska.

**SOURCE OF 42 MILLION TONS OF ZINC PRODUCED
IN THE UNITED STATES, 1864-1981**



MILLION TONS

35

30

25

20

15

10

5

ON TONS OF ZINC PRODUCED
STATES, 1864-1981

Miss.
Valley

Volc./
Exhal.
Shale/
Clastic

Veins

Manto/
Skarn

Undiff.

5 mt

2 mt

1
2 IN THE SENATE

BY THE RESOURCES COMMITTEE

3 SENATE BILL NO.

4 IN THE LEGISLATURE OF THE STATE OF ALASKA

5 FOURTEENTH LEGISLATURE - FIRST SESSION

6 A BILL

7 For an Act entitled: "An Act relating to the authorization of bonds or
8 notes for the DeLong Mountain transportation project,
9 establishing conditions under which the bonds or
10 notes may be issued; and providing for an effective
11 date."

12 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

13 * Section 1. The Alaska Industrial Development Authority is authorized
14 to issue bonds or notes in a principal amount not to exceed \$175,000,000 to
15 provide financing for the DeLong Mountain transportation project. Bonds or
16 notes may not be issued under this section until

17 (1) Cominco, Ltd. agrees in writing to terms and conditions
18 under which

19 (A) adequate access to the road and port constructed as
20 part of the DeLong Mountain project is guaranteed to other users;

21 (B) Cominco, Ltd. will pay for all or a portion of the
22 operation and maintenance of facilities constructed as part of the
23 project based on the use Cominco, Ltd. makes of the facilities com-
24 pared to the use made by others;

25 (C) Cominco, Ltd. will repay all expenditures by the state
26 for the project through toll fees for the use of facilities construct-
27 ed as part of the project, [and other payments;]

28 (D) payments by Cominco, Ltd. to the state will be accel-
29 erated if the price of zinc rises above a level determined by the
Alaska Industrial Development Authority to yield a reasonable profit;

1
2 (2) the United States Congress approves the Cape Krusenstern
3 National Monument land exchange between NANA Regional Corporation and the
4 United States Department of the Interior; *Make available*

5 (3) NANA Regional Corporation agrees in writing to *[convey]* ^{to} the
6 Alaska Industrial Development Authority, at no more than fair market value,
7 land needed for the port and road constructed as part of the DeLong Moun-
8 tain transportation project and land needed for future expansion of the
9 road and port; *for use of families?*

10 (4) NANA Regional Corporation agrees in writing to lease land
11 for the Red Dog Mine to Cominco, Ltd. and to provide easements and right-
12 of-ways needed to operate the mine to Cominco, Ltd.; *Done already*

13 (5) the Alaska Industrial Development Authority obtains a ruling
14 from the Internal Revenue Service that bonds or notes issued under this
15 section will qualify for tax exempt status; and

16 (6) the Alaska Industrial Development Authority establishes a
17 toll schedule for use of facilities constructed as part of the DeLong
18 Mountain transportation project that ensures ^{a reasonable} *[the greatest]* return on the
19 state's investment in the project and guarantees equitable access to the
20 facilities by all users; the toll schedule may be periodically adjusted.

21 * Sec. 2. Notwithstanding limitations on the establishment of a capital
22 reserve fund under AS 44.88.105, the authority may covenant and agree with
23 the trustee or holders of the bonds or notes authorized under sec. 1 of
24 this Act that the authority will establish a capital reserve fund for the
25 purpose of securing the bonds or notes, that the chairman of the authority
26 will, by January 2 of each year, certify in writing to the governor and the
27 legislature the amount required to restore the capital reserve fund to the
28 capital reserve fund requirement, and that the legislature may appropriate
29 to the authority the amount certified by the chairman. Nothing in this
section creates a debt or liability of the state.

1 * Sec. 3. This Act takes effect immediately in accordance with AS 01.-
2 10.070(c).
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SUGGESTED AMENDMENT LANGUAGE TO SB 280

Begin at line 18 of the bill

[(A) adequate access to the road and port constructed as part of the DeLong Mountain project is guaranteed to other users;]

[(A) (B) Cominco, Ltd. will pay for all or a portion of the operation and maintenance of facilities constructed as part of the project based on the use Cominco, Ltd. makes of the facilities compared to the use made by others;

(B) (C) Cominco, Ltd. will repay all expenditures by the state for the project through toll fees for the use of facilities constructed as part of the project and other payments;

(C) (D) payments by Cominco, Ltd. to the state will be accelerated if the price of zinc rises above a level determined by the Alaska Industrial Development Authority to yield a reasonable profit;

(2) the United States ~~Government~~ [Congress] approves the Cape Krusenstern National Monument land exchange between NANA Regional Corporation and the United States Department of the Interior;

(3) NANA Regional Corporation agrees in writing to make available [convey] to the Alaska Industrial Development Authority, at no more than fair market value, land needed for the port and road constructed as part of the DeLong Mountain transportation project and land needed for future expansion of the road and port.

[(4) NANA Regional Corporation agrees in writing to lease land for the Red Dog Mine to Cominco, Ltd. and to provide easements and right-of-ways needed to operate the mine to Cominco, LTd.;]

[4] [5] The Alaska Industrial Development Authority maximizes the use of tax exempt financing; and

[5] [6] the Alaska Industrial Development Authority establishes a toll schedule for use of the facilities constructed as part of the DeLong Mountain transportation project that ensures the greatest return on the state's investment commensurate with project viability in the project and guarantees equitable access to the facilities by all users; the toll schedule may be periodically adjusted.

3 IN THE LEGISLATURE OF THE STATE OF ALASKA

4 FOURTEENTH LEGISLATURE - FIRST SESSION

5 A BILL

6 For an Act entitled: "An Act transferring and appropriating certain loans
7 to the Alaska Industrial Development Authority; and
8 providing for an effective date."

9 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

10 * Section 1. (a) In an amount not to exceed \$142,000,000 in unpaid
11 principal as of July 1, 1985, all right, title, and interest in loans of
12 the type described in (b) of this section, and all right, title, and inter-
13 est in all mortgages, notes, and other instruments of security made in
14 connection with those loans, purchased or acquired by the Department of
15 Revenue and held in the general fund on July 1, 1985, are transferred and
16 appropriated to the Alaska Industrial Development Authority ^{edf(As-)} for the pur-
17 ~~poses of its economic development fund (AS 44.88.172).~~ ^{For the Delmar Int'l Regional Trans Project.}

18 (b) This section transfers and appropriates

- 19 (1) veterans loans acquired or made under AS 26.15;
20 (2) commercial fishing loans acquired or made under AS 16.10.-
21 300 - 16.10.370;
22 (3) small business loans acquired or made under AS 45.95;
23 (4) tourism loans acquired or made under AS 45.90;
24 (5) fisheries enhancement loans acquired or made under AS 16.10;
25 (6) child care loans acquired or made under AS 44.33; and
26 (7) historical district loans acquired or made under AS 45.98.

27 (c) In an amount not to exceed \$30,000,000 in unpaid principal as of
28 July 1, 1985, all right, title, and interest in commercial fishing loans
29 acquired or made under AS 16.10.300 - 16.10.370 and secured by a limited

1 entry permit, and all right, title, and interest in all mortgages, notes
2 and other instruments of security made in connection with those loans,
3 purchased or acquired by the Department of Revenue and held in the general
4 fund on July 1, 1985, are transferred and appropriated from the general
5 fund to the commercial fishing revolving loan fund (AS 16.10.340) for the
6 purposes of AS 16.10.300 - 16.10.370.

7 (d) In an amount equal to the principal balance of loans appropriated
8 under (c) of this section, all right, title, and interest in commercial
9 fishing loans, and all right, title, and interest in all mortgages, notes
10 and other instruments of security made in connection with those loans, are
11 transferred from the commercial fishing revolving loan fund to the Alaska
12 Industrial Development Authority for the purposes of its economic develop-
13 ment fund (AS 44.88.172). However, only loans that are not secured by a
14 limited entry permit may be transferred or appropriated under this sub-
15 section.

16 * Sec. 2. This Act takes effect July 1, 1985.
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April 15, 1985

SUGGESTED AMENDMENT TO SB 279

Sec. 4. All right, title, and interest in [commercial fishing] loans that are not secured by limited entry permits, in an amount equal to the principal balance of loans appropriated under sec. 3 of this Act, and all right, title, and interest in all mortgages, notes and other instruments of security made in connection with those loans, are transferred and appropriated from the commercial fishing revolving loan fund (AS 16.10.340), the Small Business revolving loan fund (AS 45.95.060), or the Alaska World War II veterans' revolving fund (AS 26.15.090) to the economic development fund (AS 44.88.172) of the Alaska Industrial Development Authority for the DeLong Mountain transportation project.

(3) NANA Regional Corporation agrees in writing to make available (convey) to the Alaska Industrial Development Authority, at no more than fair market value, land needed for the port and road constructed as part of the DeLong Mountain transportation project and land needed for future expansion of the road and port.

[(4) NANA Regional Corporation agrees in writing to lease land for the Red Dog Mine to Cominco, Ltd. and to provide easements and right-of-ways needed to operate the mine to Cominco, Ltd.];]

(4) [5] the Alaska Industrial Development Authority obtains a ruling from the Internal Revenue Service or obtains an opinion of bond counsel that some or all of the bonds or notes issued under this section will qualify for tax exempt status; and

(5) [6] the Alaska Industrial Development Authority establishes a toll schedule for use of the facilities constructed as part of the DeLong Mountain transportation project that ensures the greatest return on the state's investment commensurate with project viability in the project and guarantees equitable access to the facilities by all users; the toll schedule may be periodically adjusted.

April 15, 1985

FIRST SCENARIO

SUGGESTED AMENDMENT LANGUAGE TO SB 280

Begin at line 18 of the bill

[(A) adequate access to the road and port constructed as part of the DeLong Mountain project is guaranteed to other users;]

(A) [B] Cominco, Ltd. will pay for all or a portion of the operation and maintenance of facilities constructed as part of the project based on the use Cominco, Ltd. makes of the facilities compared to the use made by others;

(B) [C] Cominco, Ltd. will repay all expenditures by the state for the project through toll fees for the use of facilities constructed as part of the project and other payments;

(C) [D] payments by Cominco, Ltd. to the state will be accelerated if the price of zinc rises above a level determined by the Alaska Industrial Development Authority to yeild a reasonable profit;

(2) the United States Government [Congress] approves the Cape Krusenstern National Monument land exchange between NANA Regional Corporation and the United States Department of the Interior;

Draft

4/4/85

It is the intention of the Legislature that, before the appropriation of \$18.0 million and the loans of the Department of Revenue to the Economic Development Fund may be expended, obligated, or encumbered, the Alaska Industrial Development Authority must enter into a binding contractual agreement with Cominco, Ltd. and with NANA Regional Corporation to execute substantially the following assurances and guarantees:

1. Cominco, Ltd. will guarantee to pay minimum toll and other payments necessary to repay the State's investment if the mine is delayed or if production is suspended after operation commences.
2. Cominco, Ltd. will guarantee the operation and maintenance costs of the road and port facilities, proportionate to its use of those facilities.
3. Cominco, Ltd. will make available to AIDA and the communities of the region a description of the process it will use to allow regional freight to be carried on its ore carriers destined for the regional port, along with the estimated cost of such freight haulage.
4. NANA will make available at no cost to AIDA the land necessary to meet the expansion needs of the port to accommodate future regional and industrial users.
5. AIDA will establish a toll schedule for the use of the road and port facilities which maximizes the return to the state on its investment throughout the useful life of the facilities and which guarantees equitable access to the facilities by all users.

STATE OF ALASKA THE LEGISLATURE

LEGISLATIVE AFFAIRS AGENCY

POUCH Y STATE CAPITOL
JUNEAU, ALASKA 99811
907 465-3800

MEMORANDUM

April 2, 1985

SUBJECT: Bond Authorization for the DeLong Mountain
Transportation Project
(Work Order No. 14-1012)

TO: Representative John Sund

FROM: Tamara Brandt Cook *TBC*
Deputy Director
Division of Legal Services

Here is a draft of the bill you requested based on a draft submitted by the Department of Law authorizing the Alaska Industrial Development Authority to issue bonds or notes for the DeLong Mountain Transportation Project.

With the permission of Mr. John Hartle, I have omitted language from section 2 of the draft submitted by the Department of Law that deals with a "moral obligation" of the state. Bill Berrier has informed me that the term is shorthand for the standard provision - the entity that issues bonds may covenant with the holders of the bonds that a capital reserve fund will be established that any shortfall must be reported to the legislature, and the legislature may appropriate the amount needed to restore the fund. The term does not have legal significance in itself and a "moral obligation" is not capable of being pledged. Consequently, I have rewritten section 2 using the standard provision. Bill Berrier also informed me that he checked the statutes of several other states and has not found any use of the term "moral obligation" in the other states.

If the language as rewritten in this draft creates a problem, please let me know. The committee might also consider submitting the draft to a qualified bond attorney for review.

TBC:ojb
J13/046

4 IN THE LEGISLATURE OF THE STATE OF ALASKA
5 FOURTEENTH LEGISLATURE - FIRST SESSION

6 A BILL

7 For an Act entitled: "An Act relating to the authorization of bonds or
8 notes for the DeLong Mountain transportation project;
9 and providing for an effective date."

10 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

11 * Section 1. The Alaska Industrial Development Authority is authorized
12 to issue bonds or notes in a principal amount not to exceed \$175,000,000 to
13 provide financing for the DeLong Mountain transportation project.

14 * Sec. 2. Notwithstanding limitations on the establishment of a capital
15 reserve fund under AS 44.88.105, the authority may covenant and agree with
16 the trustee or holders of the bonds or notes authorized under sec. 1 of
17 this Act that the authority will establish a capital reserve fund for the
18 purpose of securing the bonds or notes, that the chairman of the authority
19 will, by January 2 of each year, certify in writing to the governor and the
20 legislature the amount required to restore the capital reserve fund to the
21 capital reserve fund requirement, and that the legislature may appropriate
22 to the authority the amount certified by the chairman. Nothing in this
23 section creates a debt or liability of the state.

24 * Sec. 3. The Alaska Industrial Development Authority may not issue
25 bonds or notes under sec. 1 of this Act unless conditions imposed by law
26 related to the expenditure of money appropriated for the fiscal year ending
27 June 30, 1986, to the authority for the DeLong Mountain transportation
28 project have been satisfied.

29 * Sec. 4. This Act takes effect immediately in accordance with AS 01.-
10.070(c).

STATE OF ALASKA THE LEGISLATURE

POUCH Y STATE CAPITOL
JUNEAU ALASKA 99811
907-465-3800

LEGISLATIVE AFFAIRS AGENCY

MEMORANDUM

April 2, 1985

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TBC:ojb
J13/046

14-1012
Cook
4/1/85 -

1 IN THE HOUSE

BY THE HOUSE SPECIAL
COMMITTEE ON STATE LOANS

2 HOUSE BILL NO.

3 IN THE LEGISLATURE OF THE STATE OF ALASKA

4 FOURTEENTH LEGISLATURE - FIRST SESSION

5 A BILL

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14 reserve fund under AS 44.88.105, the authority may covenant and agree with
15 the trustee or holders of the bonds or notes authorized under sec. 1 of
16 this Act that the authority will establish a capital reserve fund for the
17 purpose of securing the bonds or notes, that the chairman of the authority
18 will, by January 2 of each year, certify in writing to the governor and the
19 legislature the amount required to restore the capital reserve fund to the
20 capital reserve fund requirement, and that the legislature may appropriate
21 to the authority the amount certified by the chairman. Nothing in this
22 section creates a debt or liability of the state.

23 * Sec. 3. The Alaska Industrial Development Authority may not issue
24 bonds or notes under sec. 1 of this Act unless conditions imposed by law
25 related to the expenditure of money appropriated for the fiscal year ending
26 June 30, 1986, to the authority for the DeLong Mountain transportation
27 project have been satisfied.

28 * Sec. 4. This Act takes effect immediately in accordance with AS 01.-
29 10.070(c).
#

14-1013
Levy
3/29/85

1 IN THE HOUSE

BY THE HOUSE SPECIAL
COMMITTEE ON STATE LOANS

2 HOUSE BILL NO.

3 IN THE LEGISLATURE OF THE STATE OF ALASKA

4 FOURTEENTH LEGISLATURE - FIRST SESSION

5 A BILL

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7 to the Alaska Industrial Development Authority; and
8 providing for an effective date."

9 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

10 * Section 1. (a) In an amount not to exceed \$142,000,000 in unpaid
11 principal as of July 1, 1985, all right, title, and interest in loans of
12 the type described in (b) of this section, and all right, title, and inter-
13 est in all mortgages, notes, and other instruments of security made in
14 connection with those loans, purchased or acquired by the Department of
15 Revenue and held in the general fund on July 1, 1985, are transferred and
16 appropriated to the Alaska Industrial Development Authority for the pur-
17 poses of its economic development fund (AS 44.88.172).

18 (b) This section transfers and appropriates

19 (1) veterans loans acquired or made under AS 26.15;

20 (2) commercial fishing loans acquired or made under AS 16.10.-
21 300 - 16.10.370;

22 (3) small business loans acquired or made under AS 45.95;

23 (4) tourism loans acquired or made under AS 45.90;

24 (5) fisheries enhancement loans acquired or made under AS 16.10;

25 (6) child care loans acquired or made under AS 44.33; and

26 (7) historical district loans acquired or made under AS 45.98.

27 (c) In an amount not to exceed \$30,000,000 in unpaid principal as of
28 July 1, 1985, all right, title, and interest in commercial fishing loans
29 acquired or made under AS 16.10.300 - 16.10.370 and secured by a limited

1 entry permit, and all right, title, and interest in all mortgages, notes
2 and other instruments of security made in connection with those loans,
3 purchased or acquired by the Department of Revenue and held in the general
4 fund on July 1, 1985, are transferred and appropriated from the general
5 fund to the commercial fishing revolving loan fund (AS 16.10.340) for the
6 purposes of AS 16.10.300 - 16.10.370.

7 (d) In an amount equal to the principal balance of loans appropriated
8 under (c) of this section, all right, title, and interest in commercial
9 fishing loans, and all right, title, and interest in all mortgages, notes
10 and other instruments of security made in connection with those loans, are
11 transferred from the commercial fishing revolving loan fund to the Alaska
12 Industrial Development Authority for the purposes of its economic develop-
13 ment fund (AS 44.88.172). However, only loans that are not secured by a
14 limited entry permit may be transferred or appropriated under this sub-
15 section.

16 * Sec. 2. This Act takes effect July 1, 1985.
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Alaska State Legislature

ARLISS STURGULEWSKI, Chairman
BETTYE FAHRENKAMP, Vice Chairman
JACK COGHILL
DICK ELIASON
VIC FISCHER
RICK HALFORD
FRED ZHAROFF



POUCH V
JUNEAU, ALASKA, 99811
(907) 465-4907

Senate Committee on Resources

April 1, 1985

Bert Wagon, Executive Director
Alaska Industrial Development Authority
1577 C Street, Suite 304
Anchorage, AK 99501

Dear Mr. Wagon: *Bert*

We are continuing to gather information concerning the Delong Mountain Transportation Project (Red Dog) and would like to ask you to provide some additional data. The announcement by the Department of Revenue last Friday that the state's expected revenues would be less than previously anticipated has naturally caused a great concern about all state spending programs.

1. If the \$160 million (\$142 million in loans plus the \$18 million from the general fund) are transferred to the AIDA Economic Development Fund, what is the mechanism for these funds to flow back to the general fund over time?
2. Considering that the \$160 million will be used to back the sale of AIDA bonds but that toll fees charged to Cominco, LTD. (and perhaps others) as well as interest earned from the fund will be used to retire the bonds, what is the expected balance in the Economic Development Fund at the end of 20 years?
3. Can you provide us with a projected Economic Development Fund balance by year from July 1, 1985 until the retirement of all of the \$175 million in bonds issued for this project?
4. What effect will the additional management requirements of \$142 million in loans have on AIDA's personnel requirements?
5. Can you provide us with a breakdown of the expenditures made to date and those anticipated from the \$3 million appropriation in last years budget for this project?

Bert Wagnon

-2-

April 1, 1985

6. What is the total amount that could be expected to accrue to the Economic Development Fund in both principal and interest over time if you added together the \$18 million from the general fund, the \$142 million principal in loans, the interest on the \$18 million while in the fund, the interest generated from the \$142 million in loans and the interest earned on the earnings of the fund?

I have enclosed for your information copies of requests I have made to the Departments of Revenue and Commerce and Economic Development. Because of the limited time remaining this session, I would appreciate a response as soon as possible. Thank you.

Sincerely yours,



Senator Arliss Sturgulewski
Chairman, Senate Resources Committee

Enclosures

cc: Mary Nordale, Commissioner, Department of Revenue
Loren Lounsbury, Commissioner, DCED

Alaska State Legislature

ARLISS STURGULEWSKI, Chairman
BETTYE FAHRENKAMP, Vice Chairman
JACK COGHILL
DICK ELIASON
VIC FISCHER
RICK HALFORD
FRED ZHAROFF



POUCH V
JUNEAU, ALASKA 99811
(907) 465-4907

Senate Committee on Resources

April 1, 1985

Mary Nordale, Commissioner
Department of Revenue
Mail Stop 0400, Pouch S
Juneau, AK 99811

Dear Commissioner Nordale:

Mary
In light of your announcement on Friday regarding further declines in expected state revenues over the next several years, it is important that we closely analyze all proposed state funding requirements. As you know, the Senate Resources Committee has the Delong Mountain Transportation Project (Red Dog) under investigation and we are in need of some additional information.

1. It has been suggested that \$142 million in state loans held by the Department of Revenue be transferred to AIDA bonds. I would like to know the make up of those loans. What is the amount of each category (such as veterans, commercial fishing, small business, tourism, fisheries enhancement, child care and historical districts), the interest rates by category and the maturity dates? What is the amount of money by category that returns to a revolving loan fund pool and what amount returns to the general fund? If any revolving loan funds are transferred to AIDA, how does that affect the future ability of those revolving funds to meet the public demand for loans?
2. What is the expected cash flow (principal and interest) by year from July 1, 1985 that would return to the state over the term of the loans if they remained in the Department of Revenue?
3. What is the expected financial shortfall in state revenue in FY 86 as a result of transferring these loans to AIDA? Has any adjustment been made to the Administration's budget for FY 86 to reflect this income reduction?

April 1, 1985

4. What is the total amount of interest that is expected to be returned to the state from the \$142 million over the life of the loans calculated as of July 1, 1985?
5. What is the total amount of interest that the state would expect from the \$142 million in loans plus the \$18 million in general fund expenditure if this \$160 million were not transferred to AIDA?
6. Will the transfer of the \$142 million in loans to AIDA result in increased requests this year or in future years for the various state loan programs since the principal and interest will not flow back to the general fund or a revolving fund as expected?

I have included for your information copies of requests I have made to Bert Wagon, Executive Director, AIDA and Commissioner Lounsbury, Department of Commerce and Economic Development. Because of the limited time remaining this session, I would appreciate a response as soon as possible. Thank you.

Sincerely yours,



Senator Arliss Sturgulewski
Chairman, Senate Resources Committee

Enclosures

cc: Loren Lounsbury, Commissioner, DCED
Bert Wagon, Executive Director, AIDA

Alaska State Legislature

ARLISS STURGULEWSKI, Chairman
BETTYE FAHRENKAMP, Vice Chairman
JACK COGHILL
DICK ELIASON
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Senate Committee on Resources

April 1, 1985

Loren Lounsbury, Commissioner
Department of Commerce and Economic Development
Mail Stop 0800, Pouch D
Juneau, AK 99811

Dear Commissioner Lounsbury: *Loren*

It has been suggested that \$142 million in loans from the Department of Revenue and Department of Commerce and Economic Development be transferred to AIDA in support of the Delong Mountain Transportation Project (Red Dog). This would no doubt have some effect on your department's operation. Can you provide me with some further information on the following questions.

1. Will the transfer of the \$142 million in loans to AIDA affect the personnel requirements of your loan servicing division? In other words, would you anticipate a reduction in staffing?
2. If these loans were transferred to AIDA, do you anticipate that the loan repayment or servicing policies would change?
3. What would be the effect on the borrowers if these loans were transferred to another agency?
4. How would the loss of future income from these loans (both principal and interest) affect the ability of your loan divisions to provide for the public demand for loans in the various categories? Would you anticipate increased funding requests to the legislature to meet the public need?
5. Does the loss of income from these loans affect your FY 86 budget loan requests if all principal and interest is transferred on the \$142 million as of July 1, 1985?

Commissioner Lounsbury

-2-

April 1, 1985

I have enclosed for your information copies of requests I have made to AIDA and the Commissioner of the Department of Revenue. Because of the limited time remaining this session, I would appreciate a response as soon as possible. Thank you.

Sincerely yours,



Senator Arliss Sturgulewski
Chairman, Senate Resources Committee

Enclosures

cc: Mary Nordale, Commissioner, Department of Revenue
Bert Wagon, Executive Director, AIDA



by Wilbur Mills in Alaska, *The Great Land*

Sierra Club
241 E. Fifth Avenue
Suite 205
Anchorage, Alaska 99501
(907) 276-4048

MEMORANDUM

To: John Hartle
From: Jack Hession
Re: Cominco's Transportation Study
Date: April 1, 1985

On page 25, total construction cost of the Asikpak Route is listed as \$125.7 million. On page 31, total construction cost for the Kruz (Cominco's preferred) route is \$115.3 million if Cominco is not allowed to take gravel from inside Cape Krusenstern National Monument.

When Cominco filed its Title 11 application, the National Park Service asked the company what the Kruz route would cost with and without gravel from the Monument. Cominco's answer is \$74.7 million (p. 29), and \$115.3 million, respectively. Hence, the \$40.6 million difference I mentioned.

One other observation. Cominco is apparently telling the Legislature that its preferred route is assured if the State agrees to the funding of its transportation facilities.

Is it prudent for the Legislature to appropriate funds on the basis of Cominco's assurance of Congressional cooperation? That cooperation is by no means assured. Hearings have not even been scheduled yet.

REPORT

An Economic Evaluation of Alternative Road Routes from RED DOG to a Road/Marine Transshipment Site

**PREPARED FOR COMINCO ALASKA INC.
JUNE 1984**



Cominco Engineering Services Ltd.

a subsidiary of



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I. INTRODUCTION

The purpose of this report is to provide route selection and engineering data sufficient to permit a detailed independent review.

The report outlines the cost of constructing and operating a road from Red Dog to a port on the Chukchi Sea. The alternative routes investigated are identified and the selection procedure described. In addition, the report defines the environmental constraints, basic engineering design parameters and basis of estimate.

Throughout this report geographical identification is based on physical features and settlements named on the U.S. Geological Survey 1:63360 scale mapping.

II. DESCRIPTION OF PROPOSED ROAD ALTERNATIVES

The Red Dog deposit is located in northwest Alaska approximately 90 miles north of Kotzebue and 70 miles east of Kivalina. The deposit is on the west side of Deadlock Mountain and straddling Red Dog Creek. A suitable mill site has been identified on a low hill 1-1/2 miles west of the deposit at an elevation of 1050 feet. This is the designated inland terminus for all the alternative road routes investigated.

Four possible port sites on the Chukchi Sea have been identified, together with two road vehicle to barge transshipment sites on the Noatak River. These are located as follows (see Figure 1):

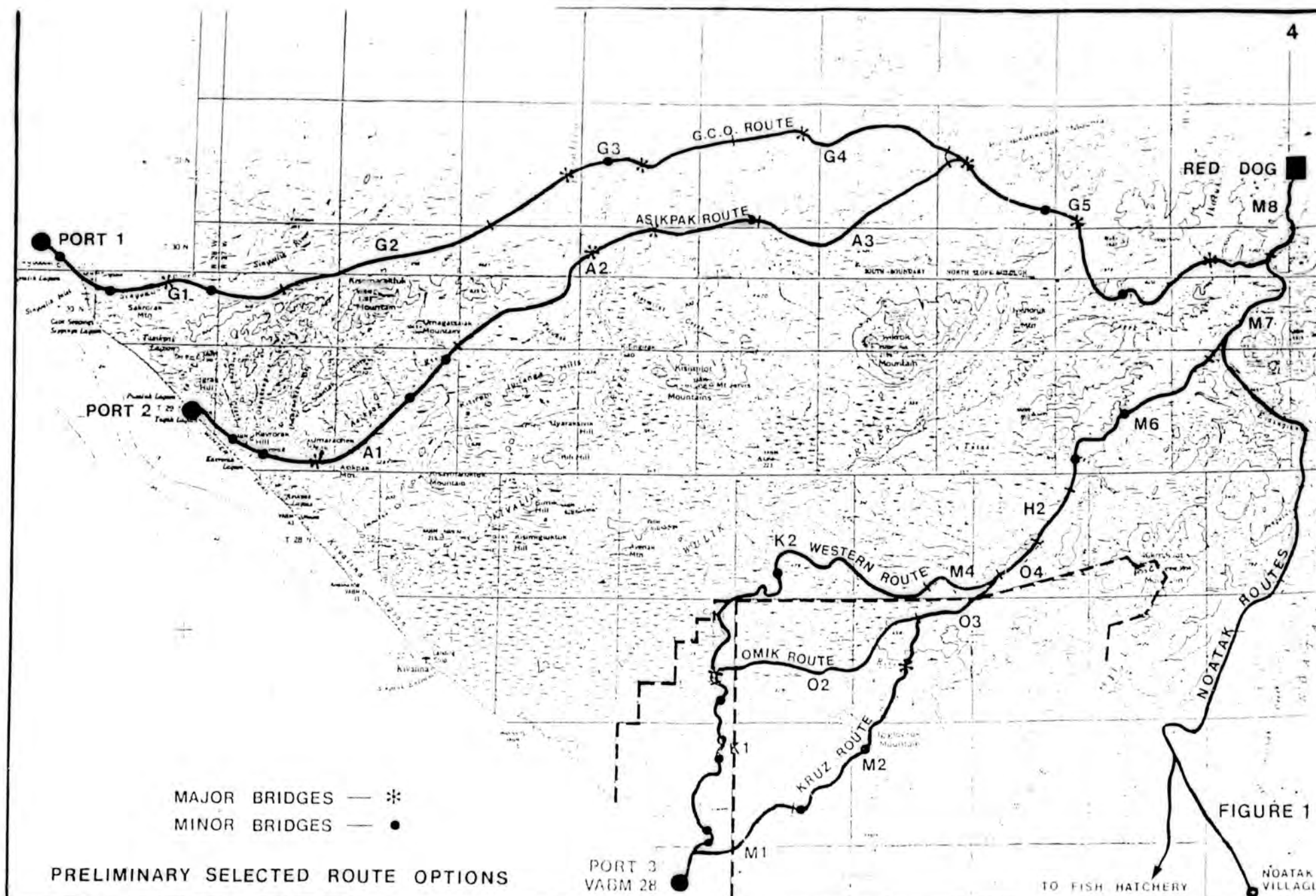
- ° Port Site 1 -- 28 miles northwest of Kivalina village, between Singoalik and Pusigrak lagoons.
- ° Port Site 2 -- 16 miles northwest of Kivalina village and immediately south of Tugak lagoon.
- ° Port Site 3 -- Located 10 miles southeast of Kivalina village at VABM 17, between Imikruk and Ipiavik lagoons.
- ° Port Site 4 -- Located 16 miles southeast of Kivalina village at VABM 28, midway between the mouths of New Heart and Umagatsiak Creeks.
- ° Transshipment Site 1 -- On the Noatak River at Noatak village.
- ° Transshipment Site 2 -- At the Fish hatchery on the Noatak River, 19 miles south of Noatak village and 10 miles above the confluence of the Agashashok River.

II. DESCRIPTION OF PROPOSED ROAD ALTERNATIVES (continued)

Engineering and environmental constraint maps were prepared incorporating existing data and the results of field work carried out by Cominco's consultants. (For much simplified versions of these maps, see Figures 2, 3, and 4). Using these maps, along with U.S. Geological Survey 1:63360 scale mapping, numerous possible routes and route segments were defined (see Figure 1).

For each of these routes, the alignment has been plotted on 1:63360 scale mapping or enlargement of this mapping and for the majority of routes profiles were also prepared.

A preliminary engineering evaluation was carried out for each route. This evaluation included an estimation of route length, determination of terrain characteristics by segment, calculation of approximate fill quantities, preliminary sizing of major bridges and an estimation of minor bridge and culvert requirements. From this data, preliminary cost estimates were prepared. A preliminary selection was made using these cost estimates in conjunction with the constraint mapping and additional field reconnaissance.



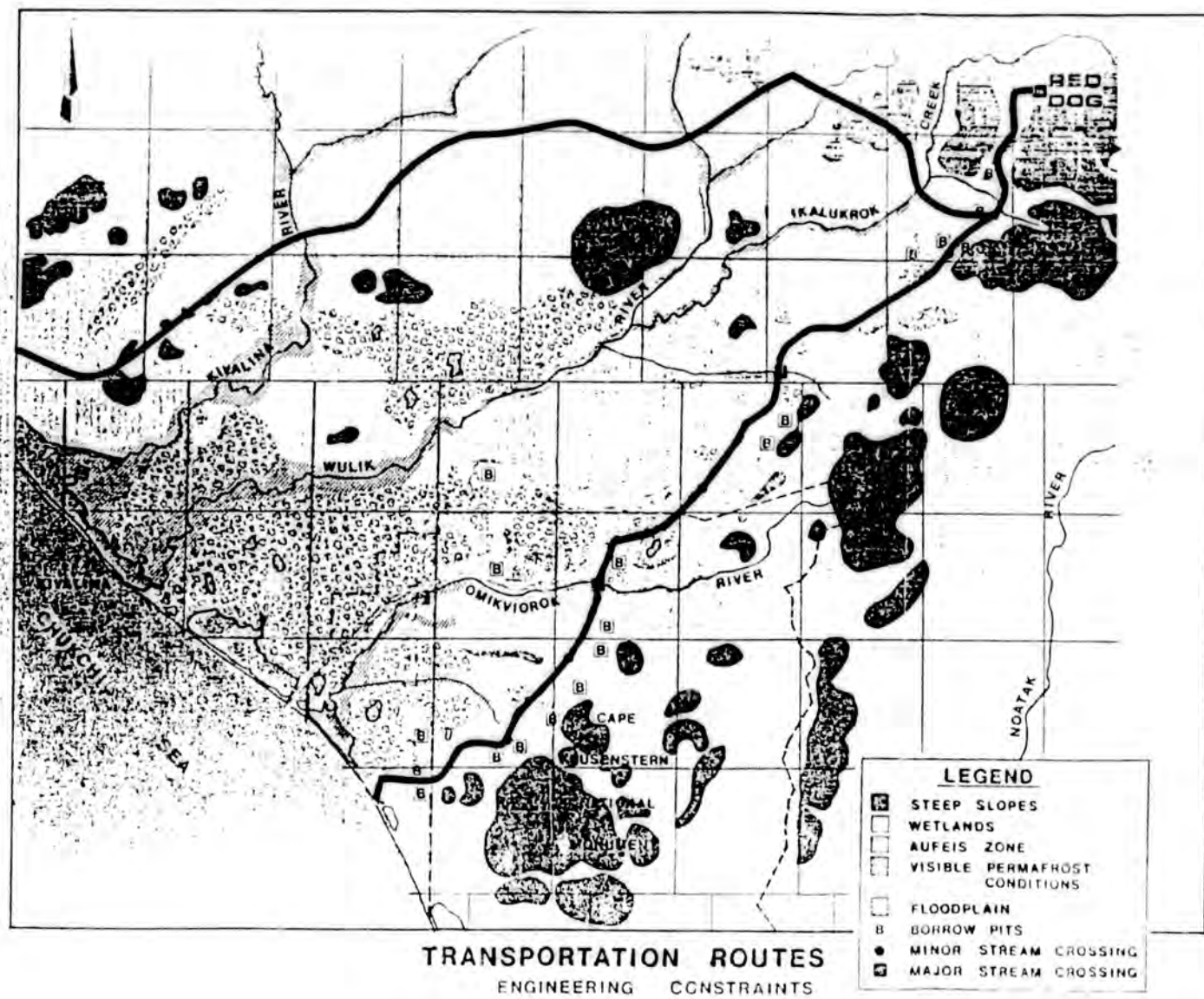
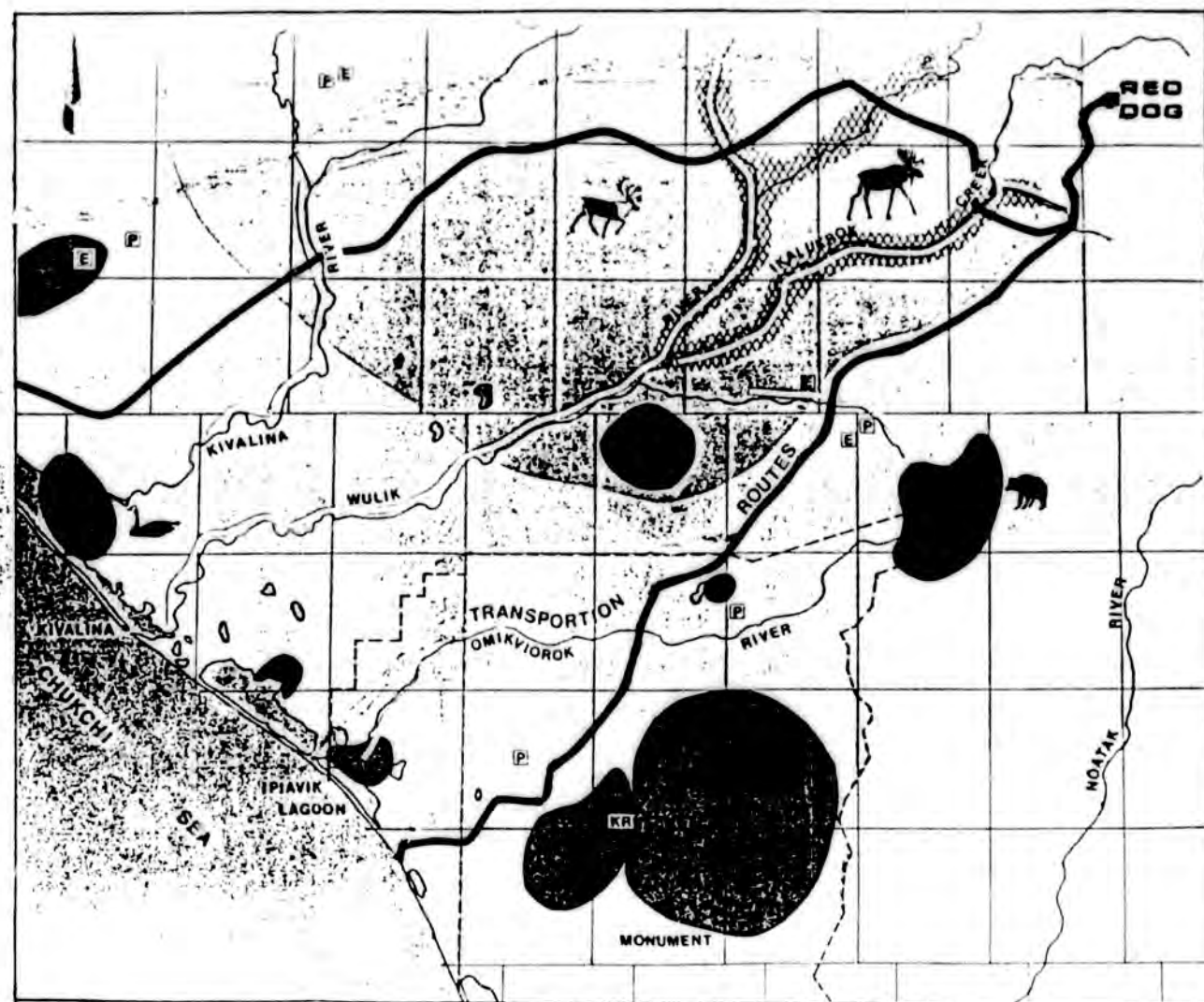


FIGURE 2



TRANSPORTATION ROUTES
FISH & GAME CONSTRAINTS

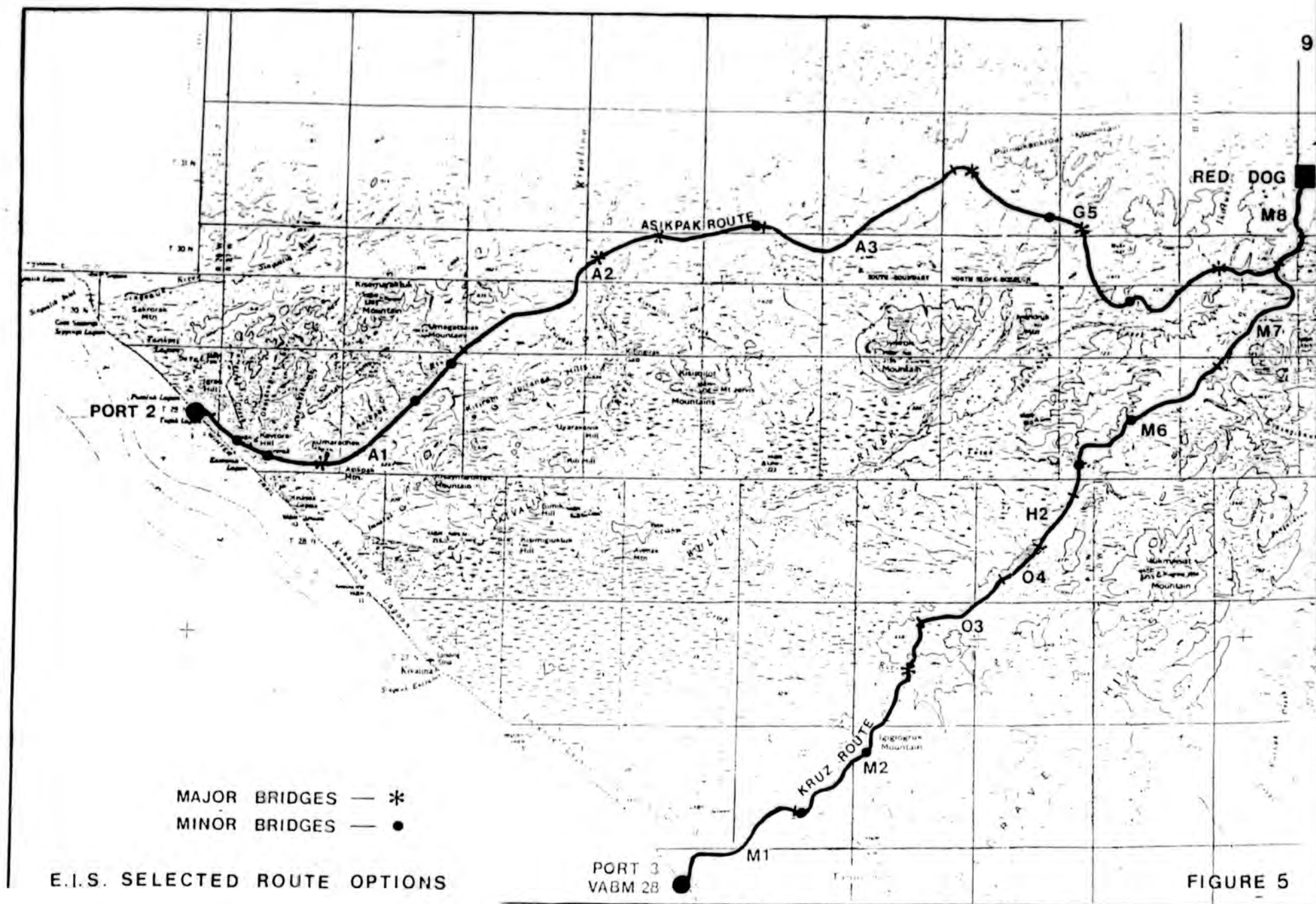
FIGURE 4

II. DESCRIPTION OF PROPOSED ROAD ALTERNATIVES (continued)

All of these routes were reviewed by the Environmental Protection Agency and the Department of the Interior. The KRUZ and ASIKPAK route options were selected by these agencies for more detailed study (Figure 6). The Environmental Impact Statement should be referred to for a detailed description of this selection procedure. In addition, further studies were carried out by Cominco and the Environmental Protection Agency's E.I.S. contractor of the logistics and costs of the road/barge/bulk carrier transshipment via the Noatak River.

At this point, engineering design parameters were reviewed and refined to form a basis for more detailed evaluation of the two selected routes. These parameters are as follows:

- ° Road design speed - 30 mph.
- ° Road width - 30 feet.
- ° Design vehicle is the proposed concentrate haul truck/a tractor/double trailer, side dump vehicle of 443,000 pounds GVW and maximum tandem axle loads of 109,500 pounds. (Figure 7).
- ° Crossfall 3 percent either side of center line.
- ° Side slopes 2:1 minimum.
- ° Maximum grade 4 percent.
- ° Maximum grade change 4 percent.
- ° Minimum radius of horizontal curvature 400 feet.
- ° Minimum radius of vertical curvature 1,500 feet.
- ° Thaw settlement of subgrade 6 inches maximum.
- ° Passing turnouts (50 feet total road width) at 2-mile intervals.



II. DESCRIPTION OF PROPOSED ROAD ALTERNATIVES (continued)

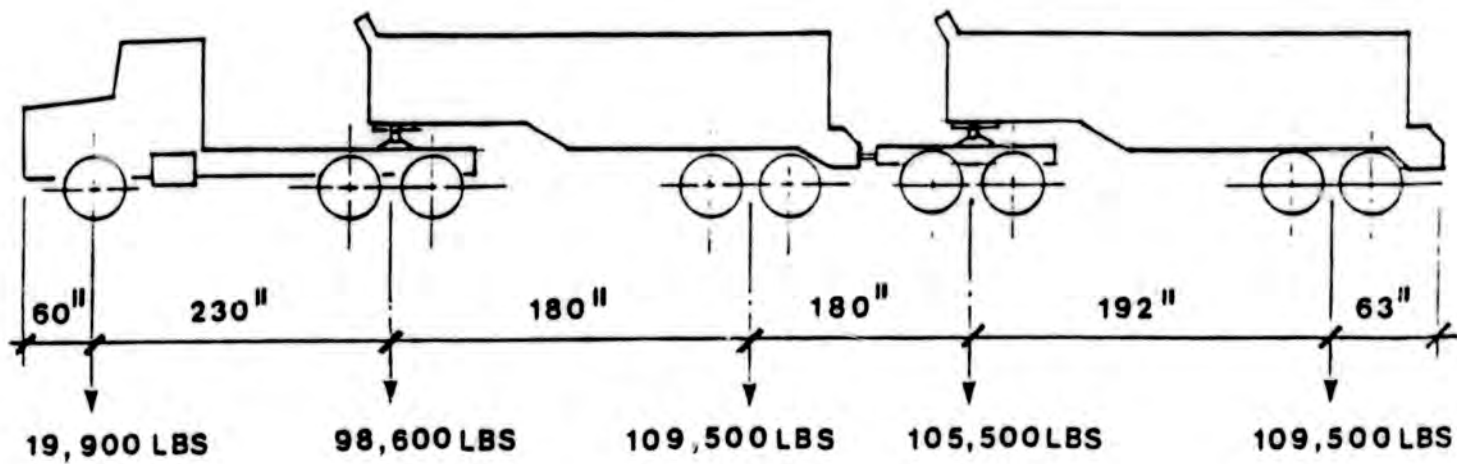
The road must also be capable of handling the movement of plant modules of up to 1500 tons weight during the construction period. These modules will be moved on multi-wheeled, hydraulic levelled, purpose made transport vehicles (Figure 7). Maximum speed when loaded will be approximately 5 mph. Side clearances must be sufficient to permit movement of modules up to 70 feet wide.

At stream and river crossings, two approaches to module movement have been considered. Modules may be transported through the streams at low water using temporary diversion roads and fords or alternatively, bridges would be strengthened to sustain module loads. Either of the approaches would be viable for the Kruz Route, however, on the Asikpak Route, fording the major rivers may not be practicable and strengthening of the longer span bridges will result in significantly increased costs.

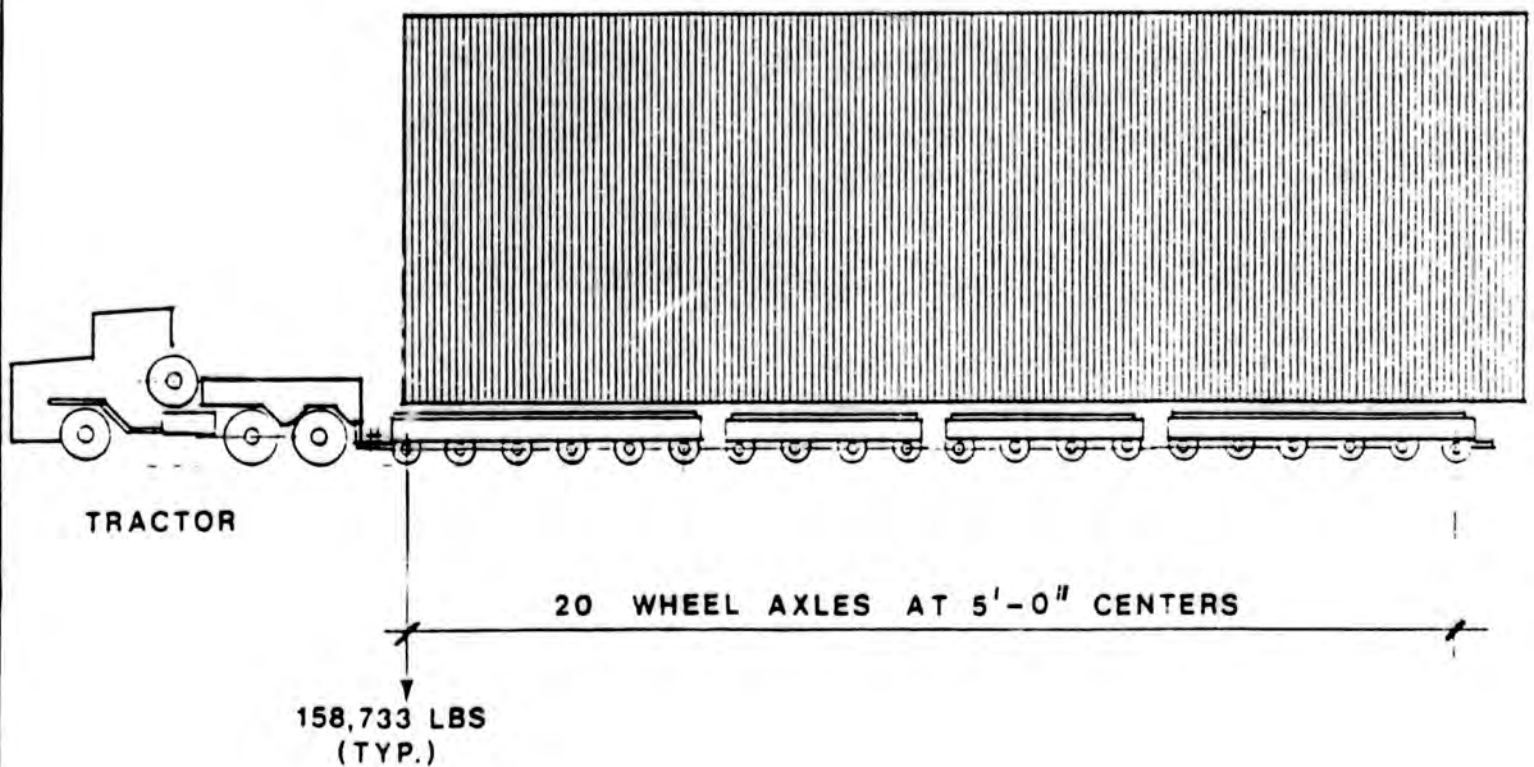
The maximum grade of 4% was adopted to accommodate movement of plant modules and to permit possible future reuse of the grade for a railroad. In general, grades will be easier than the maximum, particularly on the Kruz route where maximum grades only exceed 1-1/2% for short distances. The maximum 4% grade will be adopted in areas of more difficult terrain on the Asikpak route and on both routes locally at stream crossings.

The use of 4% grades for a railroad will generate operating difficulties and high operating costs. Industry practice for a railroad of this type would be to limit grades to 1-1/2% which will significantly reduce operating costs but at the expense of increased capital cost. Studies indicate that 1-1/2% grades will offer economic benefit where profile improvements are required in the vicinity of stream crossings only. The easier terrain of the Kruz route option would permit cheaper conversion to a railroad.

Both routes lie within the zone of continuous permafrost and all soils and bedrock are expected to be permanently frozen. Available thermistor data shows temperatures from 32°F to 27°F indicating a relatively warm permafrost. The active layer is expected to range from 1-2 feet thick on poorly drained soils to a maximum of 4-5 feet on well-drained upper slopes.



CONCENTRATE HAULER - 150 tons



MODULE TRANSPORTER

FIGURE 6

II. DESCRIPTION OF PROPOSED ROAD ALTERNATIVES (continued)

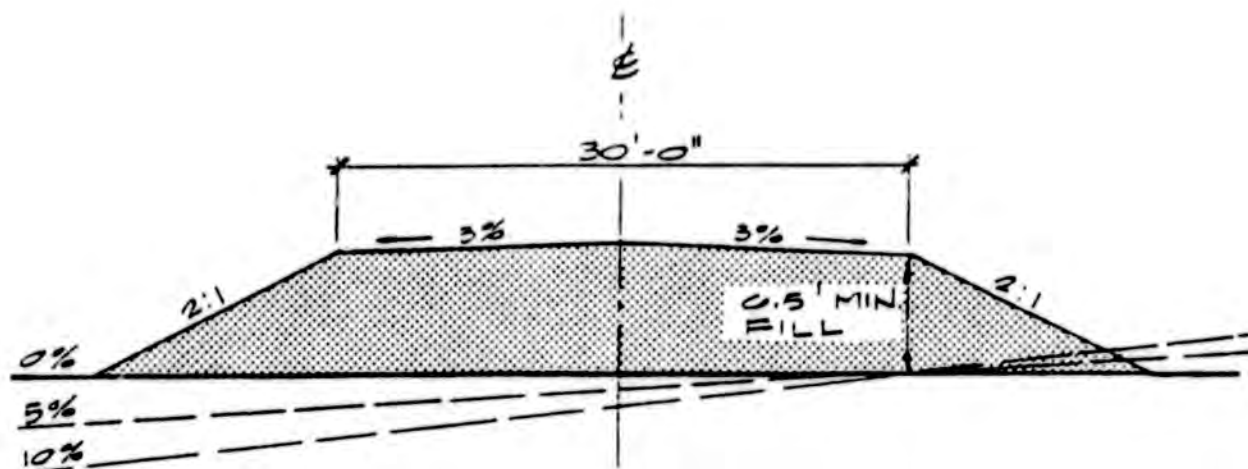
From an engineering point of view, the most acceptable thermal regime is expected to occur on well drained, gently sloping north facing slopes.

Preliminary thermal analyses have been carried out which indicate that a minimum fill depth of from 5 feet to 6.5 feet will be required to limit thaw settlement to 6 inches. Determination of minimum fill depth for detailed road design will be based on the results of the Geotechnical Investigation which will define terrain, underlying soils, ground thermal regime and micro-climate variations. It is anticipated that minimum fill depth will vary along the length of the road.

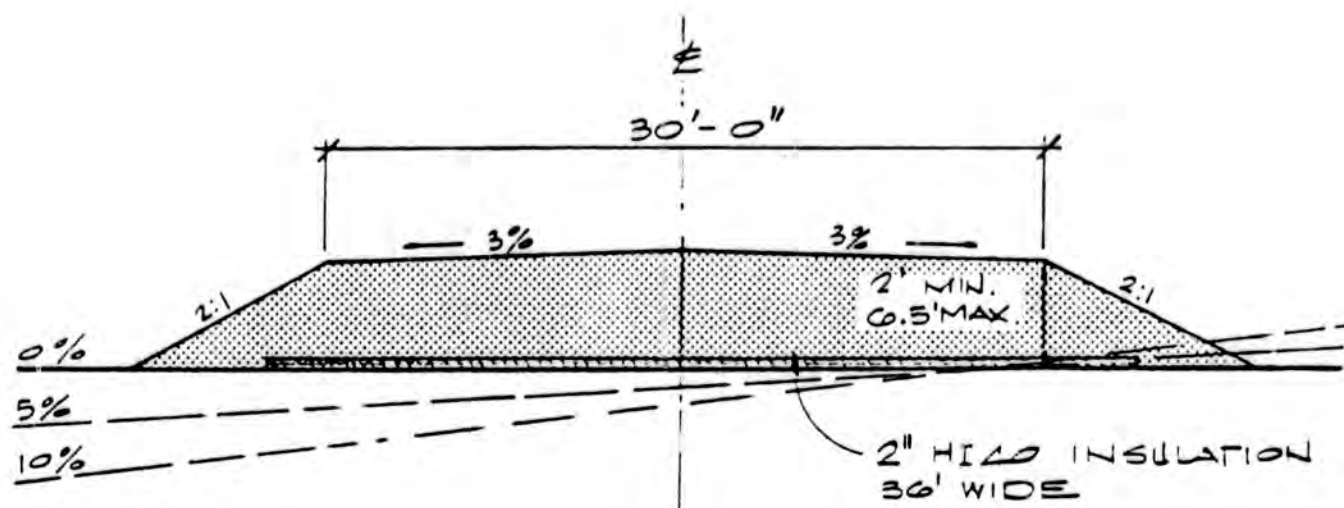
The estimates have been based on a minimum fill depth of 6.5 feet with an alternative composite construction comprising 2 inches of rigid insulation with a 2 feet minimum thickness of granular fill topping. Thermal characteristics of both Asikpak and Kruz routes are expected to be similar and so these sections have been adopted for both routes (Figure 8). The composite section will be utilized only where haul distances from borrow sources are long enough for it to offer a cost advantage.

On the Asikpak and Kruz routes it is anticipated that cut and fill construction will only be possible within the final 8 miles approaching Red Dog.

Proposed borrow pit locations have been determined by reference to U.S. Geological Survey mapping, aerial photography at 1:12000, reports and terrain unit mapping based on field work carried out for Cominco by Dames and Moore and supported by field reconnaissance (Figure 9).



FILL CROSS SECTION



COMPOSITE CROSS SECTION

TYPICAL ROAD SECTIONS

FIGURE 7

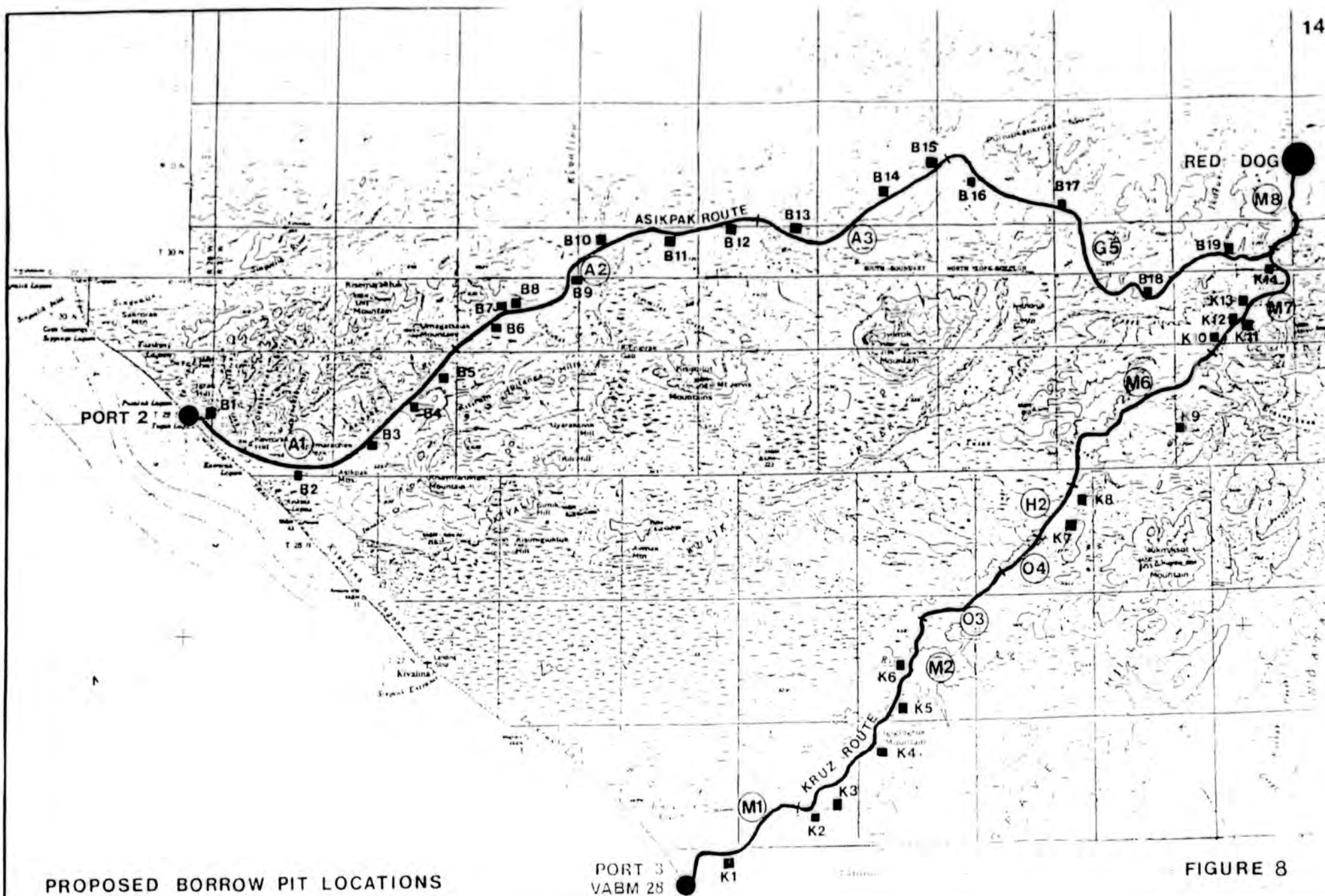


FIGURE 8

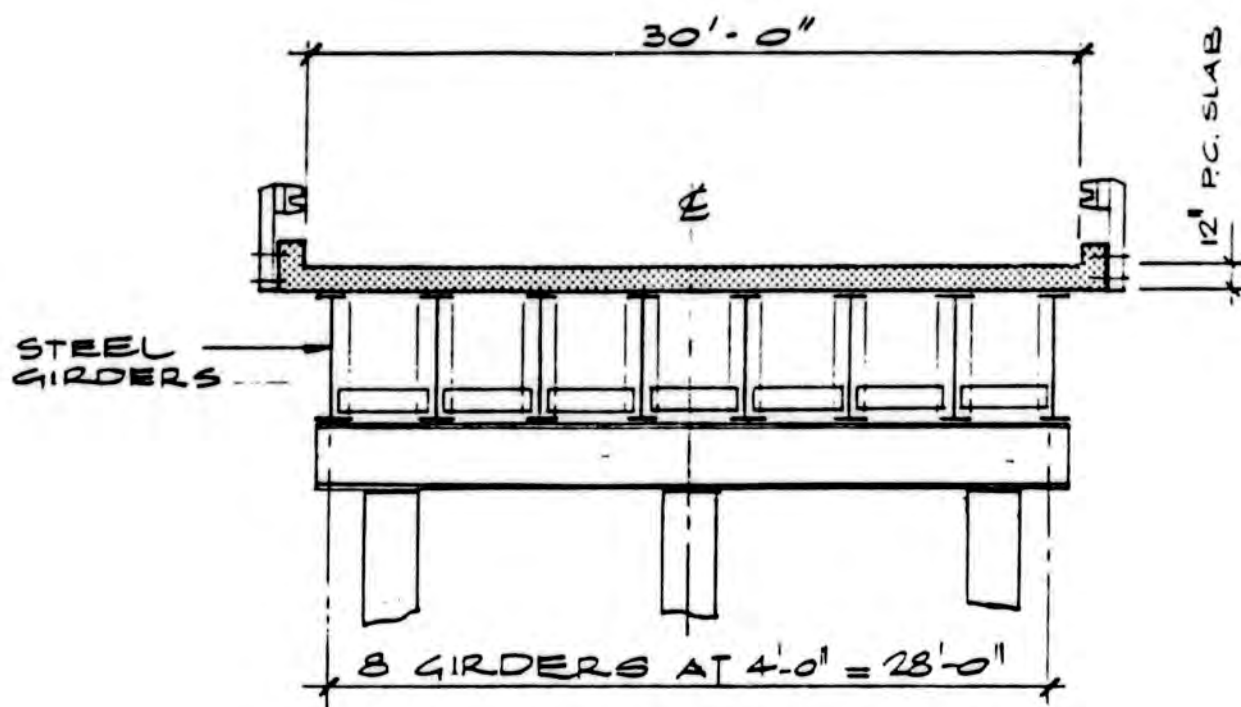
II. DESCRIPTION OF PROPOSED ROAD ALTERNATIVES (continued)

All water courses crossed by the selected routes have been identified, their drainage basins defined and areas measured. Peak flows at each crossing were calculated using peak unit flows of 80 cfs/sq. mile for drainage basins smaller than 10 sq. miles and 55 cfs/sq. mile for drainage basins exceeding 10 sq. miles. Lengths of bridges were calculated using a peak flow of 5 fps and an average water depth of 4 to 5 feet. Bridges have been used wherever peak flow exceeds 800 cfs. Culvert sizes are based on capacities ranging from 10 cfs for 24-inch diameter to 710 cfs for 120-inch diameter.

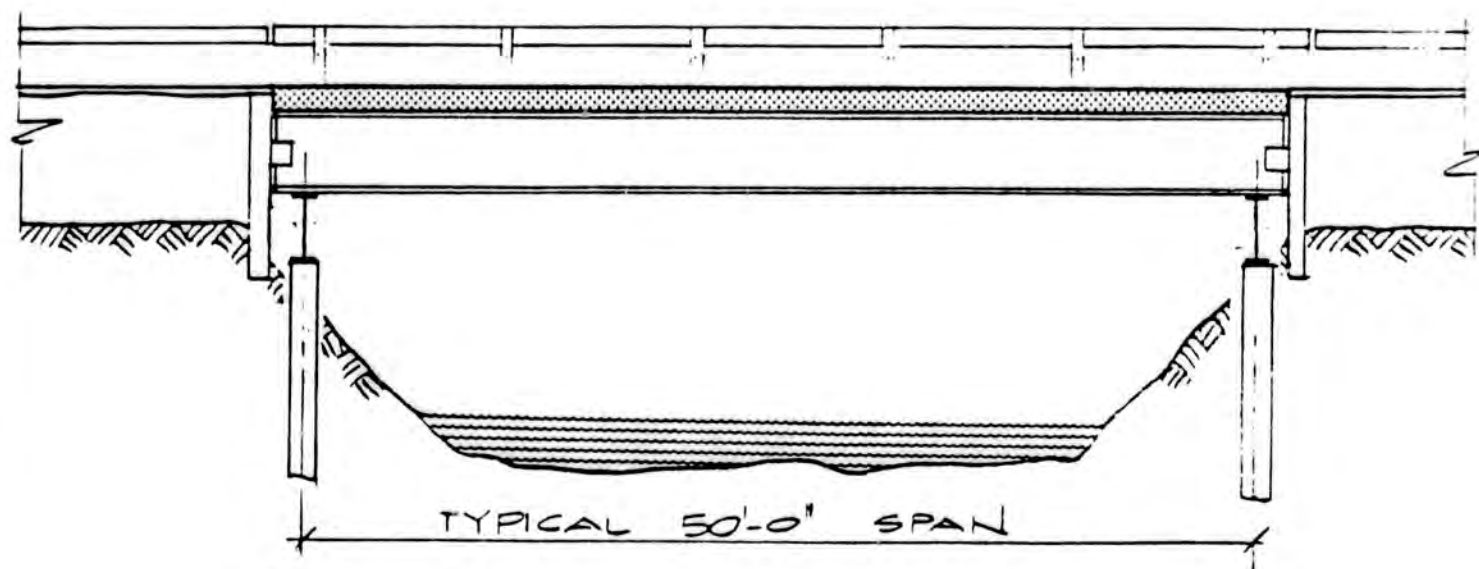
Bridges are designed using standardized decks suitable for spans of 50 to 60 feet with a width of 30 feet face to face of guardrails. These units would be utilized wherever possible. Construction would consist of steel beams supporting composite precast concrete deck slab units with abutments and piers of steel adfreeze piles into permafrost (Figure 10). Pier design would be modified wherever a significant thaw bulb exists.

Culverts would be galvanized corrugated steel pipe with rip-rap or similar protection to side slopes adjacent to the crossing. Culverts (48-inch diameter) would be provided at all well-defined dry swales and in addition 24 and 30-inch diameter culverts are allowed for at a nominal spacing to handle sheet flow and roadway runoff (Figure 11).

Preliminary engineering studies and all engineering for the Southern Route options were carried out for Cominco by R&M Consultants of Anchorage. Engineering for the Northern and Noatak Route options has been carried out by Cominco Engineering Services Ltd. A consistent methodology has been used throughout.



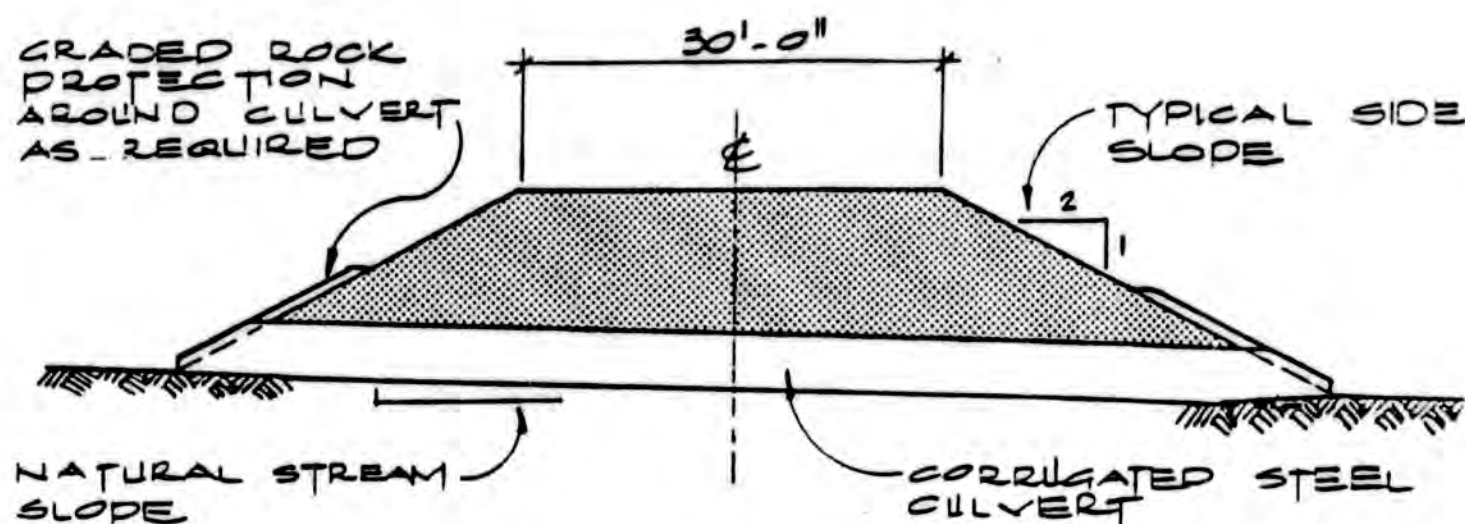
BRIDGE SECTION



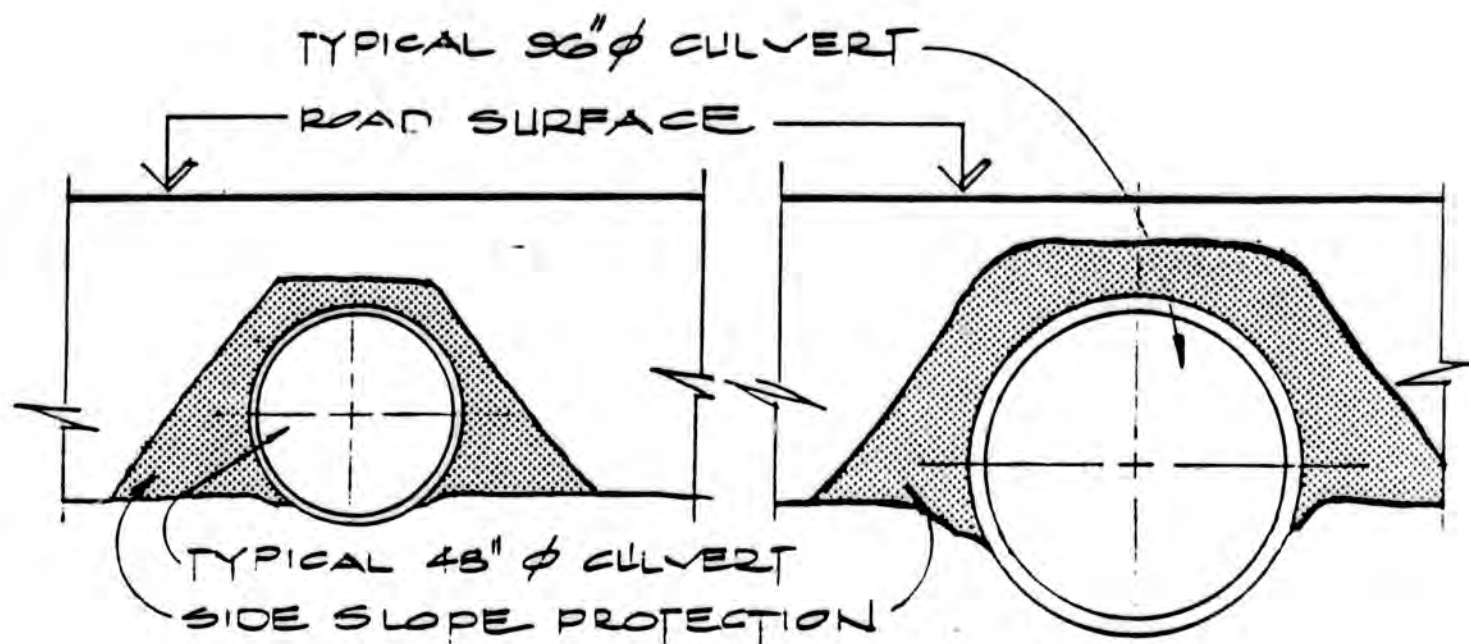
BRIDGE ELEVATION

TYPICAL BRIDGE

FIGURE 9



CROSS SECTION



ELEVATIONS

TYPICAL CULVERTS

FIGURE 10

III. COST ESTIMATES

Estimated road costs are developed as "Direct Costs" to which are added "Indirect Costs" to obtain a "Net Total Cost". A contingency allowance is added to this Net Total Cost to give the "Total Estimated Capital Cost" for road construction.

Direct costs are developed under five headings:

- ° Road Fill
- ° Turnouts
- ° Culverts
- ° Bridges
- ° Royalty on Fill

Road fill cost is generated as two elements: first, the fill which includes all extraction and placement costs and, second, the haulage cost. The base costs used in this estimate are \$9.20 per cubic yard for fill and \$1.30 per cubic yard mile for haulage. These prices also allow for all costs associated with cut and fill construction and insulation costs where composite construction is utilized.

Turnout cost is generated in a similar manner to road fill cost.

Culverts are estimated assuming all culverts are of the average 80 feet length and are priced according to size. Prices used range from \$6,400 for a 24-inch diameter up to \$61,200 for a 120-inch diameter culvert. These costs include all installation costs, provision for the side slope protection and allowance for mitered end treatment on culverts of 66-inch diameter or larger.

Bridge costs are based on nominal deck area which is defined as net width times span. The base cost used in this estimate is \$400 per sq. foot of nominal deck area. This price includes allowance for deck, substructures, piling, watercourse training work, side slope protection and provides for all field construction and deck placement. Actual costs for major bridges on the Asikpak route may well be higher than the base case, if hydraulic or other considerations dictate longer spans than those provided for with the standard deck.